AN APPLICATION OF PARTICLE SWARM OPTIMIZATION TO CONTROL INVERTED PENDULUM

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ABSTRACT

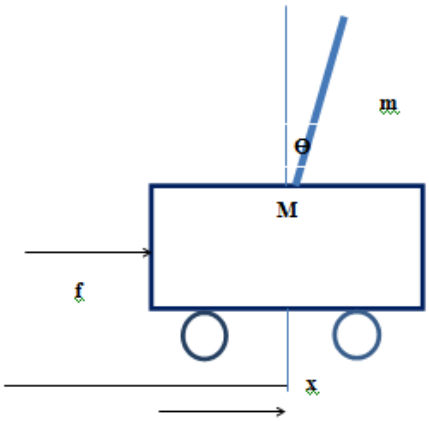
One of the most important problems today is robotics and its control, due to the vast application of inverted pendulum in robots.In this paper, by using a combination of "PSO" Algorithms, we have tried to optimally control the inverted pendulum by nonlinear equations. Here particle swarm optimization algorithm is used to refining parameters of PID controller The results of this simulation has been mentioned in the conclusion. The simulation is done using MATLAB.

I. INTRODUCTION

The pendulum is one of the benchmark problems of control theory for illustration and comparison of different control methodologies. The inverted pendulum is composed of a cart and a free moving pendulum. The popularity of this problem comes from the motivation of development of missiles, rockets, robots and other transportation means.Fig. 1 shows the general model of the inverted pendulum. The pendulum is composed of a free movingpendulum with the mass m and length l attached to the cart with mass M, where a force f is applied tothis setup. The following expressions give the differential equations of the inverted pendulum

$$\ddot{x} = \frac{mg\sin(\theta)\cos(\theta) - ml\dot{\theta}^2 \sin(\theta) - f}{m\cos\theta^2 - (M+m)l} \quad (1)$$

$$\ddot{\theta} = \frac{-(M+m)g\sin\theta + ml\dot{\theta}^2 \sin(\theta)\cos(\theta) + f\cos(\theta)}{m\cos\theta^2 - (M+m)l} \quad (2)$$



Equation1 and 2 represent the nonlinear mathematical model of the inverted pendulum. The rod angle at the model can be changed under the influence of the environment. Thus, the control structure is needed to correct the pole angle with applied the force f to the cart. In order to solve this problem, various control methodologies (such as optimal control, linear/nonlinear control, intelligent and adaptive control methods) were previously applied. Some of these control methods use the linearized model of the system. Hence, for such methods, the performance of the controller is only valid around the operation point.

The paper is organized as follows. Next section deals with the PID control scheme followed by PSO technique. Section 4 deals with the results obtained and last section consists of conclusion.

II. PID CONTROL SCHEME

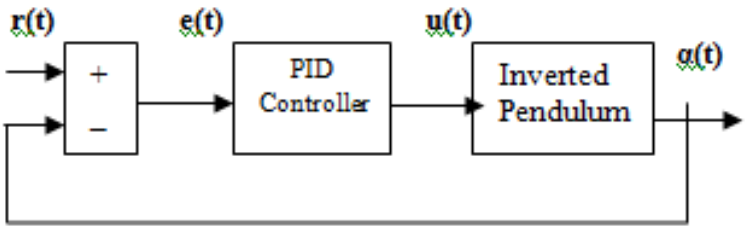


Fig.2

The controller output of conventional PID controller is given as in eqn.(12)

$$u(t) = K_p e(t) + K_i \int e(t).dt + K_d \frac{de(t)}{dt} \quad (3)$$

where,

K_p = Proportional gain

K_i = Integral gain

K_d = Derivative gain

By taking the Laplace transform the transfer function of PID controller is as below

$$G(s) = K_p + K_i/s + K_d.s \quad (4)$$

Equation (4) can also be estimated as following

$$G(s) = k_p(1 + \frac{1}{t_i.S} + t_d s) \quad (5)$$

where, t_i is the integral time and t_d is the derivative time.Here, r(t) is the reference input, u(t) is the control force and α(t) is the output.

III. PARTICLE SWARM OPTIMIZATION TECHNIQUE

Particle swarm optimization is a heuristic evolutionary global optimization algorithm discovered by Doctor Kennedy and Eberhart in 1995. In the basic particle swarm optimization algorithm, the swarm consists of n particles, and the position of each particle stands for the potential solution in D-dimensional space. PSO is based on the swarm intelligence concept, which is the property of a system. Basic swarm Intelligence based on some fundamental principles such as proximity principle, stability principle, quality principle [9, 10].In proximity principle it is considered that the space and time computation done by the population should be simple. Quality principle depict that the population should respond to change in quality factor of the environment. Stability principle describe that population should not change its behavior for the change in environmental condition. In particle swarm optimization the term particles refers to population members which are mass-less and volume-less and they are characterized by velocities and accelerations which are used to get the best result.

In PSO A particle represents a potential solution to a problem. Each particle is represented in a d (1, 2, 3,…., D) dimensional space. Supposed the scale of swarm is N, the position of particle i can be represented as $X_i = (x_{i1}, x_{i2}, \ldots, x_{iD})$. The best previous position which shows the minimum fitness value of any particle is recorded and represented as $P_i = (p_{i1}, p_{i2}, \ldots, p_{iD})$, this is called p_{best}. The best position among all particles in the population is represented by the symbol g and known as g_{best}. The velocity of particle is defined as the distance of particle movement in each iteration, described as $V_i = (v_{i1}, v_{i2}, \ldots, v_{iD})$. The particles are updated according to the following equations

$$v_{id}^{n+1} = v_{id}^{n} + c_1 \mathrm{rand}().(p_{id}^{n} - x_{id}^{n}) + c_2 \mathrm{rand}().(p_{gd}^{n} - x_{id}^{n}) \qquad (6)$$

$$x_{id}^{n+1} = x_{id}^{n} + v_{id}^{n+1} \qquad (7)$$

where N is the number of particles in the group, d is the dimension, $v_{id}$is the velocity of particle i ,$c_1$and c_2 is the acceleration constant, rand() is the random number between 0 and 1,x_{id} is the current position of particle i ,$p_{id}$is the best previous position of the ith particle, pgdis the best particle among all the particles in the population and n represents iteration. Eq.6 is used to calculate particle's new velocityaccording to its previous velocity and the distances of itscurrent position from its own best experience (position) andthe group's best experience. Then the particle flies toward anew position according to Eq.7.

IV. SIMULATION RESULT

The angle of the rod is controlled via the PID.Controller where the aim is to hold the rod at the upright position. The model of the inverted pendulumwas given in the introduction section, and is used in the simulation environment PID controller with PSO algorithmis applied to the system. Fig. 3 gives the change of the rod angle, the inverse error and the output of the inverted pendulum. From the result ,it is observed that the controller parameters are adjusted in 50 ms.

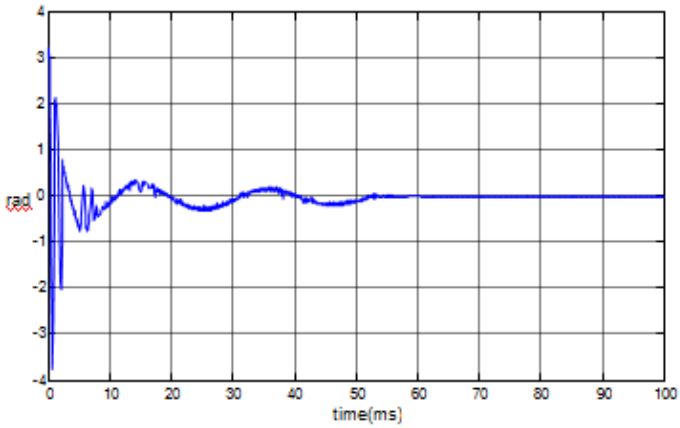


Fig. 3

Fig. 3

V. CONCLUSION

In this study, the novel particle swarm optimization algorithm (PSO) is developed, and applied tothe popular engineering problem called inverted pendulum. The PID controller is designed by applyingPSO to the nonlinear system model. At each iteration, the PID parameters are found off line then; the optimized controller is applied to the system. The results show that a smooth response can beobtained.

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SELECTION OF GOOD QUALITY ANTIVIRUS SOFTWARE

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ABSTRACT

Antivirus software is the most commonly used technical control for malware threats mitigation, for operating systems and applications that are frequently targeted by malware. Antivirus software has become a necessity for preventing incidents. According to past experience with virus infection cases, most of them are related to operational practices when handling email or other IT security management issues. Antivirus products, Firewall products and other utility program are designed to protect computer system from Internet threats like hackers, viruses and worms by filtering out any suspicious communications sent to user computer. Current antivirus software also contains firewall and other utility program to protect computer system from malware related threats. Now in market there are many antivirus software available, therefore it is very important to know some tested result and parameter which help in selection of good quality antivirus software.

Keywords: Antivirus software, Antivirus engine, Antivirus parameter, Malware threats, Firewall

I. INTRODUCTION

Antivirus software often abbreviated as AV, sometimes known as anti-malware software, is computer software used to prevent, detect and remove malicious software. Today enterprise networks are distributed to different geographical locations and applications are more centrally located. Every company's data is most valuable asset and must be treated as such. With the ever growing number of malicious threats such as Viruses, Spyware and Hackers, it has become mandatory to protect yourself against them. In order to prevent such data looses many organization came forward and designed network security tools and antivirus packages. Antivirus packages are mainly used to prevent and remove the viruses, Trojans, worms etc, where as firewalls are used to monitor incoming and outgoing connections. Computers are used extensively to process the data and to provide information for decision making therefore it is necessary to control its use. Due to organizational cost of data loss, cost of incorrect decision making, and value of computer software hardware organizations suffer a major loss therefore the integrity of data and information must be maintained. Antivirus packages are mainly used to safeguard. A specific component of the Antivirus and antimalware software commonly referred as the

on-access or real time scanner, hooks deep into the operating systems core or kernel functions in a manner similar to how certain malware itself would attempt to operate, though with the user's informed permission for protecting the system. Any time the operating system accesses a file, the on-access scanner checks if the file is a legitimate file or not. If the file is considered a malware by the scanner, the access operation will be stopped, the file will be dealt by the scanner in pre-defined way i.e. how the Anti-virus program was configured during post installation and the user will be notified. This may considerably slow down the operating system depending on how well the scanner was programmed. The goal is to stop any operations the malware may attempt on the system before they occur, including activities which might exploit bugs or trigger unexpected operating system behavior. Anti malware programs can combat malware in two ways**[1-3].**

(i) They can provide real time protection against the installation of malware software on a computer. This type of malware protection works the same way as that of antivirus protection in that the anti-malware software scans incoming network data for malware and blocks any threats it comes across.

(ii) Anti-malware software programs can be used solely for detection and removal of malware software that has already been installed onto a computer. This type of anti-malware software scans the contents of the Windows registry, operating system files, and installed programs on a computer and will provide a list of any threats found, allowing the user to choose which files to delete or keep or to compare this list to a list of known malware components, removing files that match.

There are number of venders providing antivirus packages which are differ in various features such as installation time, size, memory utilized, boot time, user interface launch time and full system scan time etc. We study in this paper to those parameter which are used to measure the performance of most commonly used antivirus products.

II. VARIOUS ANTIVIRUS ENGINE'S

The systems at highest risk are those that have internet access attached to their local retail network. Most viruses arrive through email attachments, but they can also arrive by downloading files, browsing the internet or simply using a diskette from home. More recently though, viruses have targeted Apple, Linux, handheld PDA, computers and cell phones. One of the few solid theoretical results in the study of computer viruses is Frederick B. Cohen's 1987 demonstration that there is no algorithm that can perfectly detect all possible viruses. However, using different layer of defense, a good detection rate may be achieved. There are several methods which antivirus engine can use to identify malware**[3-4].**

(i)Signature-based detection

It is the most common method. To identify viruses and other malware, the antivirus engine compares the contents of a file to its database of known malware signatures.

(ii)Heuristic-based detection:

It is generally used together with signature-based detection. It detects malware based on characteristics typically used in known malware code.

(iii)Behavioural-based detection

It is similar to heuristic-based detection and used also in Intrusion Detection System. The main difference is that, instead of characteristics hardcoded in the malware code itself, it is based on the behavioural fingerprint of the malware at run-time. Clearly, this technique is able to detect (known or unknown) malware only after they have starting doing their malicious actions.

(iv)Sandbox detection

It is a particular Behavioural-based detection techniques that, instead of detecting the behavioural fingerprint at run time, it executes the programs in a virtual environment, logging what actions the program performs. Depending on the actions logged, the antivirus engine can determine if the program is malicious or not. If not, then, the program is executed in the real environment. Albeit this technique has shown to be quite effective, given its heaviness and slowness, it is rarely used in end-user antivirus solutions.

(v)Datamining techniques

It is one of the latest approach applied in malware detection. Data mining and machine learning algorithms are used to try to classify the behaviour of a file as either malicious or benign given a series of file features, that are extracted from the file itself.

(vi)Digital Immune System

The digital immune system is a comprehensive approach to virus protection developed by IBM. The motivation for this development has been the rising threat of Internet based virus propagation. Traditionally, the virus threat was characterized by the relatively slow spread of new viruses and new mutations. Antivirus software was typically updated on a monthly basis and this has been sufficient to control the problem.

III. EVALUATION OF ANTIVIRUS ENGINE'S

When entering into an evaluation of antivirus engines the path to conclusive results requires patience and knowledge. Figure 1 shows simple flow chart of virus detection and table 1 shows comparison of some important virus detection methods according to their feature. Symbol √ means the method can support the property or may affect on the property positively. Actually, symbol √ □ dedicates an advantage for the method, while symbol **X** □ shows a weakness of the method. In scanning speed column, √□ denotes that the method can improve the scanning speed and reduce the time complexity. For example from the table it can be seen that hashing techniques in first generation scanners can improve the scanning speed and supports complete disinfection of the infected host, but it cannot used for detection of variants of a virus family or unknown viruses or macro viruses. It has no effects on the false negative or false positive alarm, as well in comparison to simple

string signature scanning. Recently dynamic malware detection technology is mostly used in virus detection. The design of the testing process and the test files used will directly influence the outcome. Some important key point is given bellow**[5-7]**.

(i) Use a mixture of new and old files and a mixture of bad and good files

(ii) Do not just compare "number detected" but rather divide the detected files into categories like garbage /corrupted files, virus files and clean files in order to accurately compare detection rates of various engines

(iii) Consider turning off signature updates for a few days to a week, to test the engine's proactive capabilities

(iv) When using third party test results, it is important to understand how those results were achieved

(v) Besides testing virus detection levels, it is crucial to evaluate performance and/or system utilization, since this has the largest impact on cost and overall satisfaction levels from the system

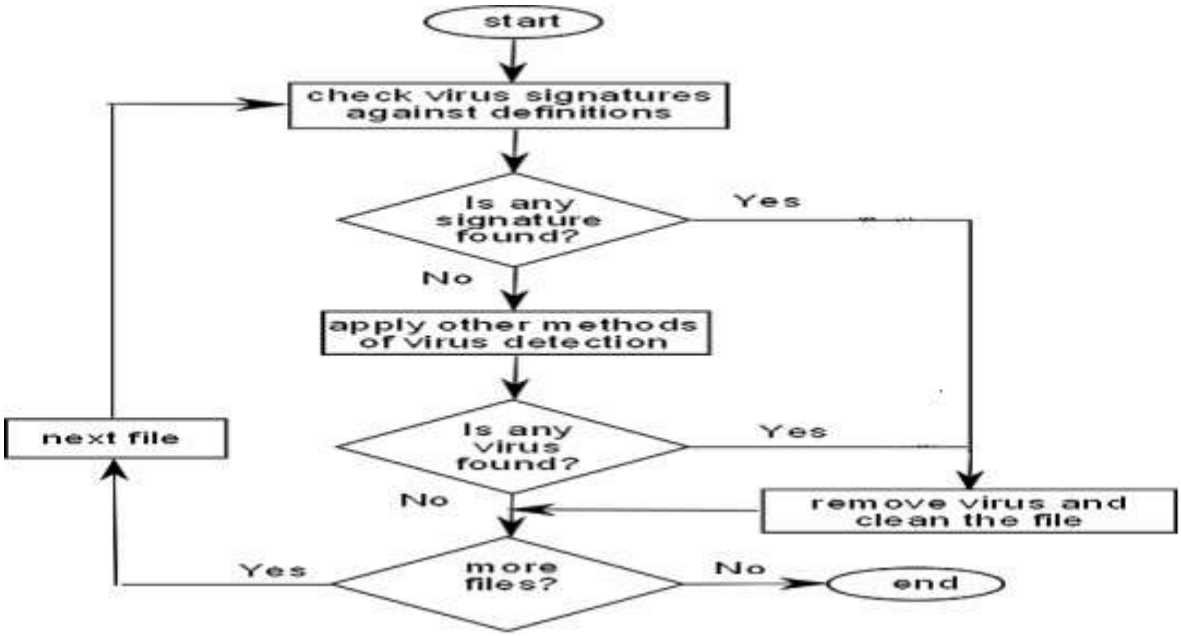

Fig. 1: Virus Detection Process

Table 1: Comparison of virus detection methods according to their feature

Scanner Name	Subcategories		Promise Perfect disinfection	Scanning speed improvement	Virus family detection	New or unknown Viruses detection	Encrypted/ polymorphic viruses	Metamorphic viruses	Macro viruses	False Positive	False Negative
First generation Scanners [String Signature Scanning]	Simple scanning		√	x	x	x	x	x	x	Low	Low
	Optimizing Techniques	wildcard	√	x	√	x	x	x	x	Low	Low
		mismatch	√	x	√	x	x	x	x	Low	Low
		Generic degree	√	x	√	x	x	x	x	Low	Low
	Bookmark		√	x	x	x	x	x	x	Very low	low
	Speed up technique	Hashing	√	√	x	x	x	x	x	Low	Low
		Top and tail scanning	√	√	x	x	x	x	x	Low	High
		Entry point/Fixed point	√	√	x	x	x	x	x	Low	Low
Second generation scanning	Smart scanning		√	√	√	x	x	√	√	Low	Low
	Skeleton detection		√	x	x	x	x	x	√	Low	Low
	Nearly exact identification		√	x	x	x	x	x	x	Very low	Very low
	Exact identification		√	xx	√	x	x	x	x	Zero	Zero
	Heuristic analysis		x	x	√	√	x	√	√	Very high	Low

IV. VIRUS DEFENCE SOFTWARE

Common sense which are very useful for protecting computer system from virus infection given bellow.

(i) Keep your Internet browser up-to-date by 'patching' it regularly. Most browser updates include new security elements to meet newly identified virus threats. These updates can be obtained from Microsoft for Internet Explorer and other browser can be updated from their website also.

(ii) Purchase virus defense software. You should identify your individual requirements depending on your technical infrastructure, geographic spread and dependency on technology.

(iii) Suppliers offer many kinds of anti-virus program, some of which are downloadable from their web sites.

(iv) Use this software to scan e-mail attachments for viruses before you open them and also run an anti-virus program that scans files as they are opened. This type of scanning should take place constantly, automatically checking every file, programme or document each time it is opened or used. In network connected system Gateway virus checking, Server virus checking , Workstation virus checking etc. Performed by antivirus engine.

In present time various types of antivirus software are available. Some antivirus software support only windows, Some Linux/Unix and some Mac, Some software are also available which support two or more than two platforms. Table 2 shows list of Anti-virus Freeware, Table 3 shows list of Anti-virus Trialware, Table 4 shows Internet Security Suites Freeware which include anti-virus, firewall and other functions and Table 5 shows Internet Security Suites Trialware which include anti-virus, firewall and other functions**[8-9]**.

Table 2: Anti-virus Freeware

Name	**Link**	**Platforms**			
		Windows	**Linux/Unix**	**Mac**	**Mobile**
Android Antivirus	https://play.google.com/store/apps/details?id=and.anti				Y (Support Android)
Zoner Antivirus	http://www.zonerantivirus.com/	Y	Y		Y (Support Android)
Symantec iAnti Virus	http://www.iantivirus.com/product/			Y	
Sophos Antivirus	http://www.sophos.com/en-us/products/free-tools.aspx			Y	
Microsoft Security Essentials	http://www.microsoft.com/security_essentials/	Y			
Kingsoft AntiVirus	http://www.kingsoftsecurity.com/	Y			
Comodo Antivirus	http://www.comodo.com/products/free-products.php	Y	Y	Y	

Table 3: Anti-virus Trialware

Name	Link	Platforms			
		Windows	Linux/Unix	Mac	Mobile
BitDefender Antivirus Plus	http://www.bitdefender.com/Downloads/	Y			
F-Secure Anti-Virus	http://www.f-secure.com/en/web/home_global/anti-virus	Y		Y	
G Data AntiVirus	http://www.gdatasoftware.com/free-trial.html	Y			
McAfee AntiVirus Plus	http://home.mcafee.com/store/antivirus-plus	Y			
Panda Antivirus	http://www.pandasecurity.com/homeusers/downloads/	Y		Y	
Symantec Norton AntiVirus	http://hk-en.norton.com/downloads/	Y		Y	

Table 4: Internet Security Suites - Freeware (include anti-virus, firewall and other functions)

Name	Link	Platforms			
		Windows	Linux/Unix	Mac	Mobile
Avast Free Mobile Security	http://www.avast.com/free-mobile-security				Y (Support Android)
Avira Android Security	http://www.avira.com/en/avira-android-security				Y (Support Android)
BitDefender Mobile Security	http://www.bitdefender.com/toolbox/freeapps/mobile/				Y (Support Android)
Checkpoint ZoneAlarm Free Antivirus + Firewall	http://www.zonealarm.com/security/en-us/anti-virus-spyware-free-download.htm	Y			
Comodo Internet Security	http://www.comodo.com/products/free-products.php	Y			
360 SecuritySafe and MobileSafe (Chinese version)	http://www.360.cn/	Y			Y (Support Android, iOS, Symbian

Table 5: Internet Security Suites – Trialware (include anti-virus, firewall and other functions)

Name	Link	Platforms			
		Windows	Linux/Unix	Mac	Mobile
Panda Internet Security	http://www.pandasecurity.com/homeusers/solutions/internet-security/	Y			
Sophos Complete Security Suite	http://www.sophos.com/en-us/products/complete/complete-security-suite.aspx	Y	Y	Y	
Symantec Norton Internet Security	http://us.norton.com/downloads	Y		Y	
Kaspersky Internet Security	http://www.kaspersky.com/trials	Y		Y	Y (Support Android)
F-Secure Internet Security, Mobile Security	http://www.f-secure.com/en/web/home_global/support/installers	Y			Y (Support Android, Symbian)
BitDefender Sphere	http://www.bitdefender.com/Downloads/	Y		Y	Y (Support Android)
AVG Internet Security	http://www.avg.com/ww-en/internet-security	Y			
avast! Internet Security	http://www.avast.com/download-software	Y			
McAfee Internet Security, Mobile Security	http://home.mcafee.com/store/free-antivirus-trials	Y			Y (Support Android, Blackberry, Symbian

V. ANTIVIRUS SOFTWARE PERFORMANCE MEASUREMENT PARAMETER

Antivirus products are categorized into three parts such as Internet Security [IS], Total Security [TS] and Antivirus [AV]. Antivirus products are the products, which are primarily focused on detecting and remediation viruses and Spyware. Internet Security product provides all the virus and Spyware removal features of an antivirus (AV) as well as additional functions to provide greater Internet protection. These features may include protection against phishing, root kit detection, firewalls and scanning of web pages and HTTP data. Total Security products provide data migration and backup features on top of all security features common to internet security (IS) products. For the test performance of antivirus software following parameters were used **[10-11]**.

1. Installation Size [INS].
2. Installation Time [INT].
3. Boot Time [BT].
4. Scan Time [ST].
5. User Interface Launch Time [UILT].
6. Memory Usage During System Idle [MUDSI].
7. Browse Time [BwT].
8. File Copy, Move and Delete [FCMD].

(i) Installation Size

A products Installation Size was previously defined as the difference between the initial snapshot of the Disk Space (C: drive) before installation and the subsequent snapshot taken after the product is installed on the system. Although this is a widely used methodology, we noticed that the results it yielded were not always reproducible in Vista due to random operating system operations that may take place between the two snapshots. We improved the Installation Size methodology by removing as many Operating System and disk space variables as possible. This metric aims to measure a product's total installation size. This metric is defined as the total disk space consumed by all new files added during a product's installation

(ii) Installation Time

This test measures the minimum installation time a product requires to be fully functional and ready for use by the end user. Installation time can usually be divided in three major phases **.** The speed and ease of the installation process will strongly influence the user's first impression of the antivirus software. This test measures the minimum installation time required by the antivirus software to be fully functional and ready for use by the end user. Lower installation times represent antivirus products which are quicker for a user to install.

(iii) Boot Time

This metric measures the amount of time taken for the machine to boot into the operating system. Security software is generally launched at Windows startup, adding an additional amount of time and delaying the startup of the operating system. Shorter boot times indicate that the application has had less impact on the normal operation of the machine.

(iv) Scan Time

Scan Time is the time it took for each product to scan a set of sample files. The sample used was identical in all cases and contained a mixture of system files and Office files. All antivirus solutions have functionality designed to detect viruses and various other forms of malware by scanning files on the system. This metric measured the amount of time required to scan a set of clean files.

(v) User Interface Launch Speed

This metric provides an objective indication as to how responsive a security product appears to the user, by measuring the amount of time it takes for the user interface of the antivirus software to launch from Windows. To allow for caching effects by the operating system, both the initial launch time and the subsequent launch times were measured. Our final result is an average of these two measurements.

(vi) Memory Usage During System Idle

This metric measures the amount of memory (RAM) used by the product while the machine and antivirus software are in an idle state. The total memory usage was calculated by identifying all antivirus software processes and the amount of memory used by each process. The amount of memory used while the machine is idle provides a good indication of the amount of system resources being consumed by the antivirus software on a permanent basis. Better performing products occupy less memory while the machine is idle.

(vii) Browse Time

This metric measures the time taken to browse a set of popular internet sites to consecutively load from a local server in a user's browser window.

(viii) File Copy, Move and Delete

This test measures the amount of time required for the system to copy, move and delete samples of files in various file formats.

VI. RESULTS AND DISCUSSION

On the basic of parameter, Performance of Internet security products and Antivirus software are given bellow.

(i) Products with lower boot times are considered better performing products.
(ii) Products with lower scan times are considered better performing products.
(iii) Products with lower User Interface launch times are considered better performing products.
(iv Products with lower memory usage during system idle (usage of RAM) are considered better performing products.
(v) Products with lower browse times are considered better performing Products.
(vi) Products with lower Internet explorer launch times are considered better performing products..
(vii) Products with lower installation times are considered better performing Products.
(viii) Products with lower installation sizes are considered better performing Products.

The one of most important parameter of antivirus, which is commonly known as the detection rate. The second is to know under which circumstances the software is able to see the virus. Can it see viruses if they come through a network share, via email or if they are already running in memory. There are three things you could do and should not do to get the assurance that your anti-virus software is indeed reliable. First user could be tempted to test the anti-virus yourself, to go on the net looking for virus libraries and throw them at the anti-virus. I would strongly discourage you from doing so, even if some vendors include such a methodology in their white papers. As EICAR (European Institute for Computer Ant-Virus Research) states: "Using real viruses for testing in the real world is rather like setting fire to the dustbin in your office to see whether the smoke detector is working", You are not a virus expert and you never know what can happen. What if the anti-virus does not catch them all and they start deleting data on your hard drive or start spreading in your enterprise. That could cost you your job. Anti-virus experts themselves take all the precaution when dealing with viruses, ensuring, for example, that all infected media they handle are destroyed after being reviewed. Second, if you really want to know that the anti-virus is doing something, you can download at www.eicar.org a safe anti-virus test string. Most anti-virus software will detect the eicar file as being infected. That is a secure way to check the anti-virus ability to see viruses under different circumstances**[12-13].**

Finally, we can rely on external sources to verify the anti-virus detection rates. In order to understand what detection rates really mean, you need to know the difference between viruses in the wild and viruses In-The-Zoo. The In-The-Zoo viruses are lab viruses that have not been encountered in the real world. The In-The-Wild

viruses are viruses that have been infecting computers worldwide. A list of the In-The-Wild viruses is kept by the WildList Organization International and can be found at www.wildlist.org.

□(i) The Virus Bulletin at www.virusbtn.com , for example, awards a 100% logo to products that pass their testing. It consists of testing anti-virus on-demand and real-time scanners against the list of the viruses found in the wild. The products able to detect a 100% of the in-the-Wild list are awarded.

□(ii)□□ The West Coast Lab offers two levels of checkmarks for anti-virus products. Vendors have to pay to have their products tested. The first level is passed if the product detects 100% of the virus listed in the WildList. To obtain the level 2 checkmark, the anti-virus has to pass level 1 and has to be able to repair all reparable viruses of the WildList without altering the system stability. The checkmarks can be found at www.check-mark.com/cgi-bin/redirect.pl. The West Coast Lab also provides test results for anti-virus software ability to catch Trojan horses.

□(iii) The ICSA (International Computer Security Association), division of TrueSecure, offer certification for On-Demand/On-Access anti-virus products, anti-virus products cleaning, anti-virus product for Internet Gateway E-mail, anti-virus products for Microsoft Exchange and Lotus Notes, anti-virus products for Security Service Providers, Internet Service Providers and anti-virus scanners. Anti-virus vendors also have to pay a fee to have their products tested. To be certified an On-Access or Real-Time scanner, for example, has to detect 100% of the viruses listed in the current In-The-Wild List, detect 100% of the viruses listed in the ICSA Labs Common Infectors Test Suite, detect 90% of macro viruses in the ICSA Labs Virus Collection and not cause false positives. An exhaustive list of the certification criteria for each type of anti-virus product can be found at:www.icsalabs.com/html /communities/antivirus/certification.shtml. A list of all testing results can be found at: www.icsalabs. com /html /communities/antivirus/index.shtml.

VII. CONCLUSIONS

As a member of the IT community, user face challenges every day in keeping servers and workstations up and running. These challenges are complicated by the demands of an increasingly complex IT environment, limited IT resources and often the requirements of a service level agreement as well. Yet the failure to meet these challenges can result in decreased IT credibility, unanticipated organizational changes, outsourcing of IT functions and diminished resource allocations all of which make it even harder for you to provide excellent service in the future. Computer viruses are among the most frustrating challenges faced by IT organizations today. They rob workers of productivity, divert IT personnel from more strategic corporate concerns and can even jeopardize company's information security. Yet there is no way which can keep every virus out of your company's computers. Employees unthinkingly launch executable email attachments that contain them. Newsreader programs pick up viruses attached to Usenet postings. Traveling employees bring them in on laptops after visits to customer sites.

Different tools are good at tackling different malware related threads or problems. Some are better at one or two than others. Some have better overall detection records than others and some are faster than others. There is no best unique anti-virus product. The choice of anti-virus solution should depend on user needs, user environment

and user goals. Vendor information is always useful, but it is not wise to rely solely on them. In order to make the right choice of antivirus products, user should see yourself, look vendor information and see tested result released by different security company as well as other alternative sources.

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THE OUTPUT VOLTAGE QUALITY OF THREE PHASE MULTILEVEL INVERTERS CONSIDERING COGENERATION SYSTEMS

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ABSRACT

In This paper solar, wind and fuel cells based stand alone cogeneration systems are presented for remote area utilities applications. The solar, wind and fuel cells based co generation system output voltages are not constant or stable in always. The generated output voltages are directly connected to the loads or utilities without battery bank or energy storage devices. A PI-control method was proposed in this paper such that the output voltage of converter circuit is constant even though input voltages are fluctuation conditions. A three phase three level, five level inverter with 3kw,5kw static load and dynamic load was examined to validate for proposed work in MATLAB environment.

Keywords: Closed Loop Feedback Control; Cogeneration Systems; Voltage Fluctuations; PI-Control; SPWM.

I INTRODUCTION

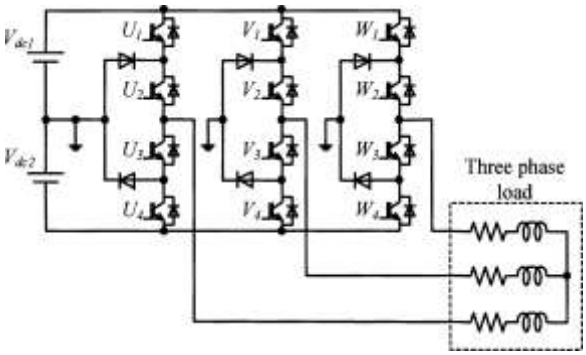
As one solution for the problem of environmental worsening and energy shortage, co-generation system using natural energy and fuel cell widely increasing. The electric power generated from these systems is converted to AC voltage by the inverter, after it is stored as DC electric power in the battery. In case of the system of power generation using natural energy and fuel cell, comparatively large fluctuation is generated at the DC voltage [4]. As this counter measure, improvement of voltage utilization factor by the superposition of the third harmonic wave was applied to absorb this voltage fluctuations [8]. The feed back control of output voltage was applied for the stabilization of output voltage. In addition, the output voltage in the ideal modulation without the distortion was obtained by controlling superposition ratio of third harmonic wave with the fluctuation of DC voltage. As a circuit converted into AC power from DC power, the multilevel inverter circuit was applied considering the reduction in switching component and capacity an expansion. The multilevel inverter is possible to reduce lower harmonic wave and switching component by outputting many voltage levels [9]. It is possible to output stabilizing AC voltage by the absorption of the fluctuation of DC voltage. And it will be possible to reduce the capacity of the DC capacitor [4][5].

In an effort to improve efficiency and voltage quality, a simple control method for improving the voltage utilization factor of multilevel inverter[9]. In this paper a control method which introduced the control of superposition ratio of third harmonic wave into output voltage feedback control and improvement on voltage utilization factor is proposed. It is applied to the multilevel inverter, and the operation principle and features are explained. Block diagram of co-generation systems is an explained in Fig2. Which including Solar, Wind and

fuel cells system .The fluctuated inputs are converted to stable output by using Multilevel inverter. By simulation the validity of proposed control has been confirmed.

II. CIRCUIT CONFIGURATION

The circuit configuration is shown in Fig. 1.This circuit is an ordinary three-phase 5level inverter composed of 12 IGBTs, 6 diodes, and 2 DC sources. With *E* denoting the voltage of one DC source, the output provides five levels of line voltage, namely ±2*E*, ±*E*, 0. In addition, pulse width modulation is applied in order to reduce harmonic components. With more voltage levels, the content of switching components is reduced, and the generation of harmful harmonics is suppressed [8].



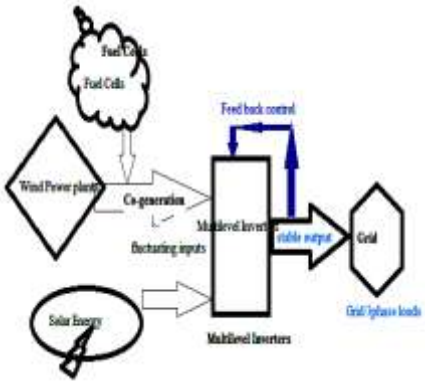


Fig. 1 Circuit Configuration. **Fig.2 Block Diagram of Co-Generation System Integration**

III. CONTROL METHOD

In the proposed control method, the basic PWM control block used conventionally for multilevel inverters is supplemented by output voltage feedback and improvement of the voltage utilization factor.

Assuming the use of a general-purpose digital control system, we aimed at the minimizing individual phase control in order to simplify control processing. A block diagram of the proposed control method is shown in Fig. 2, and detailed explanations are given below.

3.1 Output voltage tracking control

Two phase output line voltages V_{RY} and V_{BR} are taken into the Simulation the following can be obtained from the fundamental equations for a three-phase three-wire system, and from the relationship between the line voltages and phase voltages:

$V_{RY}+V_{YB}+V_{BR} =0$

$V_{RY} = V_{BN}- V_{YN}$

$V_{YB} =V_{YN} -V_{BN}$

$V_{BR}= V_{BN} -V_{RN}$ ……..(1)

Therefore,

$V_{BN} = 1/3(V_{RY}- V_{BR})$

$V_{YN} = 1/3(V_{YB} - V_{RY})$

$V_{BN} = 1/3\ (V_{BR} - V_{YB})$……..(2)

Three phase voltages V_{RN},V_{YN} and V_{BN} are converted into two-phase AC voltages $V\alpha$ and $V\beta$ by using the following:

$$\begin{bmatrix} V\alpha \\ V\beta \end{bmatrix} = \frac{\sqrt{3}}{2} \begin{bmatrix} 1 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & \frac{\sqrt{3}}{2} & -\frac{\sqrt{3}}{2} \end{bmatrix} \begin{bmatrix} V_{RN} \\ V_{YN} \\ V_{BN} \end{bmatrix}$$

……..(3)

Now the magnitude V_{out} of the resultant output vector is calculated as follows:

$$V_{out} = \sqrt{|\dot{V}_\alpha|^2 + |\dot{V}_\beta|^2} \text{ ..... (4)}$$

The magnitude Vout corresponds to the effective value of the output line voltage, which is a DC value in the case of a three-phase balanced voltage without fluctuation. Therefore, tracking control of the output voltage can be implemented by maintaining this value at a stable level [8].

The difference between the output voltage references V*out and the resultant vector magnitude Vout is given to the proportional integrator, and the DC voltage compensation on V_{pi} is calculated. A coefficient related to the superposition ratio α is applied to this value, and then a sinusoidal reference is obtained by multiplying by a three-phase sine Wave with amplitude of one[7][8].

The advantage of this system is obtaining the fixed control characteristic, when the AC voltage of any frequency is output, because the signal input to the proportional integrator is the instant DC voltage which does not depend on the frequency of the output

Voltage. That is, the method can be applied to variable speed drive of electric motors and to other cases when a variable-frequency source is required.

IV. PWM CONTROL

As shown in Fig 2, after output voltage tracking and Improvement of the voltage utilization factor, the three phase signals V^*_R V^*_Y, and V^*_B are compared to two triangular carrier waves with positive and negative offsets. The PWM signals thus generated are passed through control circuit. Then fed to control switches as gate signals [5].

4.1. Sine + 3rd Harmonic PWM Technique

The idea of Sine+3rd harmonic modulation technique is based on the fact that the 3-phase inverter-bridge feeding a 3-phase ac load does not provide a path for zero-sequence component of load current. Only three output points are brought out from a three-phase inverter-bridge. These output points are connected to the three supply terminals of the load. Such an arrangement does not cause any confusion for the delta connected load but for a star connected load the neutral point remains floating. However for a balanced, three-phase, star-connected load this should not be a drawback as the fundamental component in the load phase voltage is identical to the fundamental component of inverter's pole voltage[6]. In fact, the floating neutral point has the advantage that no zero sequence current (which includes dc, third and integer multiples of third harmonics) will be able to flow through the load and hence even if the pole voltage is distorted by, say, 3rd and integral multiples of third

harmonics the load side phase and line voltages will not be affected by these distortions. Accordingly a suitable amount of third harmonic signal is added to the sinusoidal modulating signal of fundamental frequency. Now, the resultant waveform (modified modulating signal) is compared with the high frequency triangular carrier waveform. The comparator output is used for controlling the inverter switches exactly as in SPWM inverter. the low frequency component of the pole voltage will be a replica of the modified modulating signal provided (i) The instantaneous magnitude of the modified modulating signal is always less than or equal to the peak magnitude of the carrier signal and (ii) the carrier frequency is significantly higher than the frequency of modulating signal[6].

The addition of small percentage of 3rd harmonic to the fundamental wave causes the peak magnitude of the combined signal to become lower than triangle wave's peak magnitude. In other words, a fundamental frequency signal having peak magnitude slightly higher than the peak magnitude of the carrier signal, if mixed with suitable amount of 3rd harmonic may result in a modified signal of peak magnitude not exceeding that of the carrier signal. Thus the peak of the modulating signal remains lower than the peak of triangular carrier signal and still the fundamental component of output voltage has a magnitude higher than what a SPWM can output with m = 1.0. Thus the fundamental voltage output by the inverter employing Sine+3rd harmonic modulation technique can be higher [6].

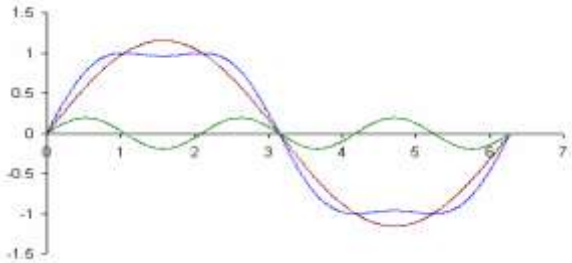


Fig3. The modulating signal for Sine+3rd harmonic modulation

V. SIMULATION RESULTS

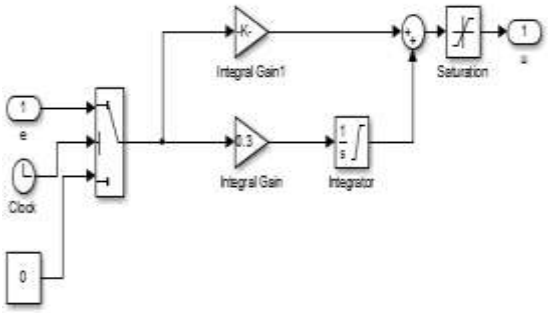


Fig4. PI Controller Circuit Diagram

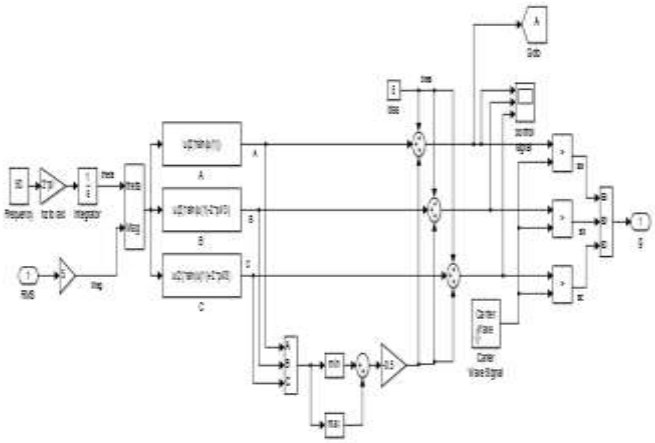


Fig5. Sinusoidal PWM with (sine plus3rd harmonic injection)

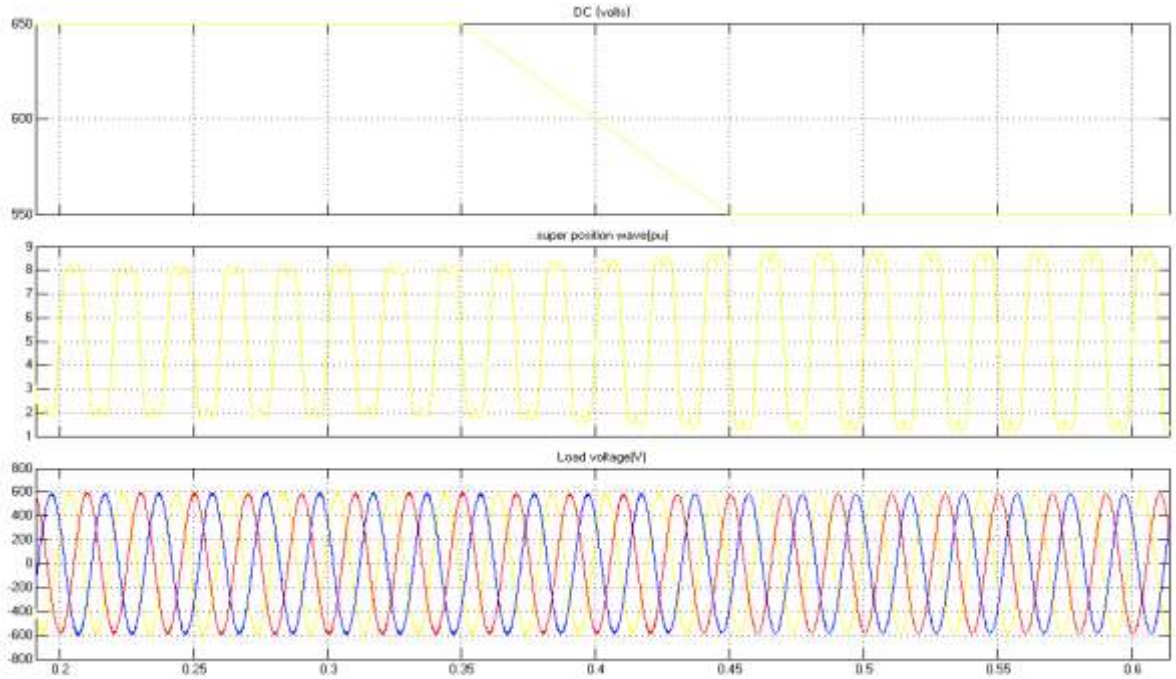


Fig6.(a) Input DC voltage with 8% voltage fluctuation, (b)Superposition wave (c)Stable output voltage (586.89V) .

From Fig6, (a) it show that voltage fluctuation of ±8% on peak magnitude, up to 0.35sec the DC voltage of more than the rated value. From scale0.35sec to0.4 sec the DC voltage decreased to below value of rated. After the scale 0.4sec to 0.45sedec the input DC voltage has decreased up to 8% less value than rated value. In fig6 (b)show the superposition wave(pu), its value up 0.35sec has constant magnitude after the scale from 0.4 to 0.45 sec superposition wave magnitude increase to such that the output voltage maintained constant magnitude. By using spwm method the results are supported to validate the proposed work.

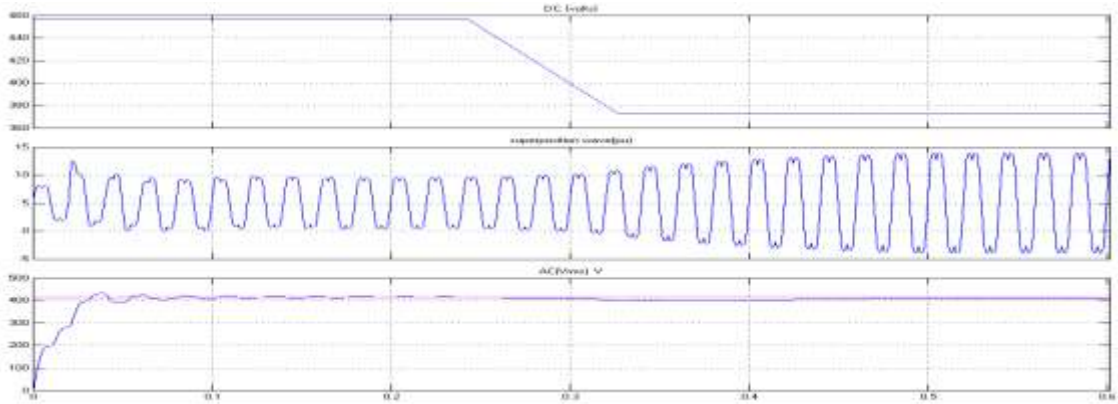


Fig7. 3level inverter (a) Input DC voltage with 10% voltage fluctuation, (b) Superposition wave (c) output voltage (Vrms) with 3kw load static load.

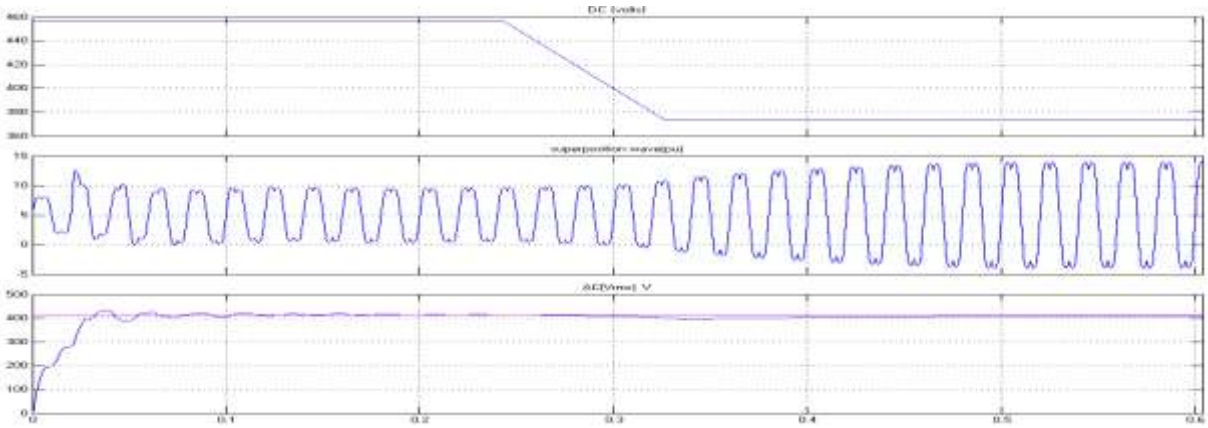
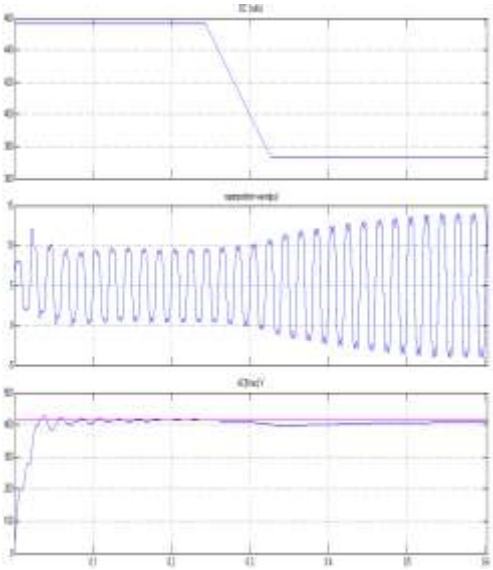


Fig8. 3level inverter (a) Input DC voltage with 10% voltage fluctuation, (b) Superposition wave (c) output voltage (Vrms) with 5kw static load.

From fig7&8, results are observed that the constant output voltages (Vrms),Even though input DC voltages are 10% fluctuation condition with static resistance load of 3kw and 5kw was an examined for three level inverter.



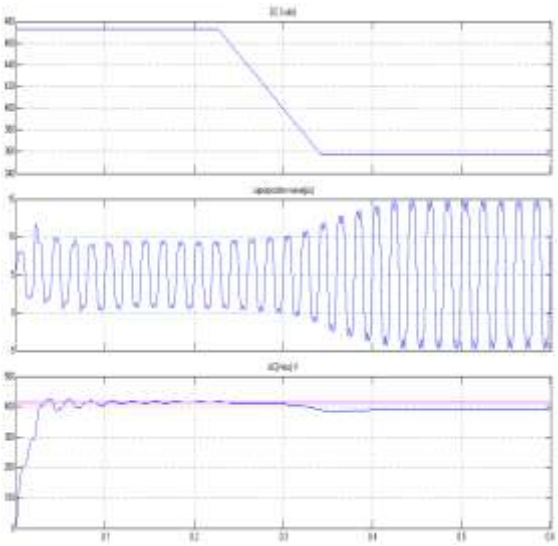


Fig : 9 **Fig : 10**

Fig9. 5 Level Inverter

(a) Input DC voltage with 10% voltage fluctuation,(b) Superposition wave (c) output voltage (Vrms) With 3kw load static load

Fig10. 5 Level Inverter

(a) Input DC voltage with 14% voltage fluctuation, (b) Superposition wave (c) output voltage (Vrms) with 5kw load static load

From fig9&10, results are observed that the constant output voltages (Vrms),Even though input DC voltages are 14% fluctuation condition with static resistance load of 3kw and 5kw was an examined for five level inverter. In fig10(c) the output voltages is maintained constant magnitude with input DC voltages are 13% to 14% fluctuation condition with static resistance load, from fig9&10 (c) we analysis that by using PI control technique with spwm the obtained results are supported to up 13% to 14% input DC voltage fluctuation conditions, after scale 0.4sec the output voltages is not maintained constant and fluctuation conditions.

In the fig 11. Simulation Results are an analyzed that the time scale up to 0.3sec, an Induction motor rotor speed is constant and fluctuating nature for 5.4h.p induction motor load. After 0.3sec the motor speed is maintained constant as shown in fig11(b) and fig(c) respectively, the results are an examined that the output voltage Vrms is maintained constant. Table1, shows the validated result in this paper.

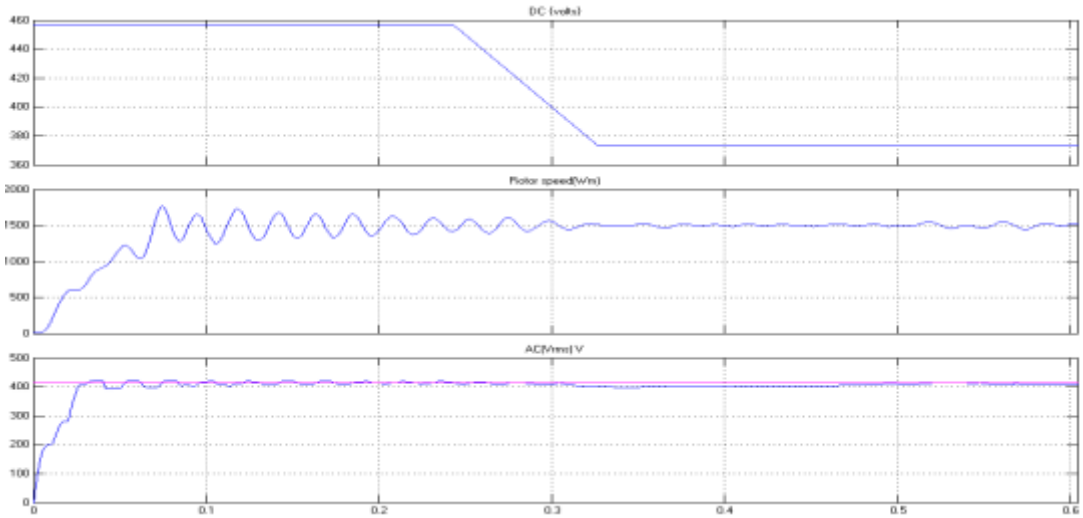
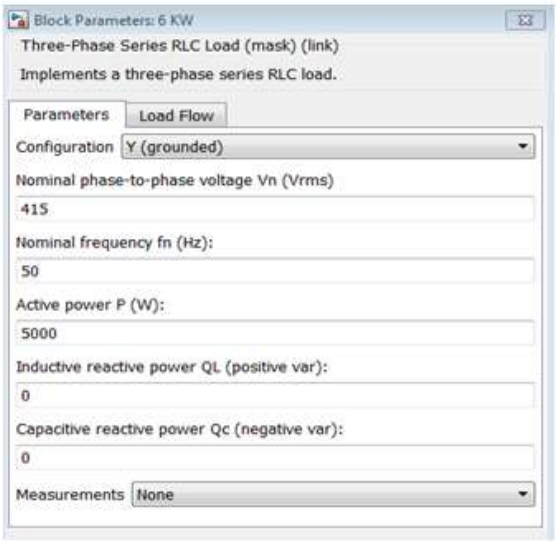


Fig11 .3level inverter (a) Input DC voltage with 10% voltage fluctuation, (b) Rotor speed of an asynchronous induction motor (c) output voltage (Vrms) with Dynamic load.

Table :1

Input DC voltage	Percentage (%)of flutuation	Stable output voltage(Vrms)
373.5(V)-456.5(V)	10	415
356.9(V)-473.1(V)	14	415



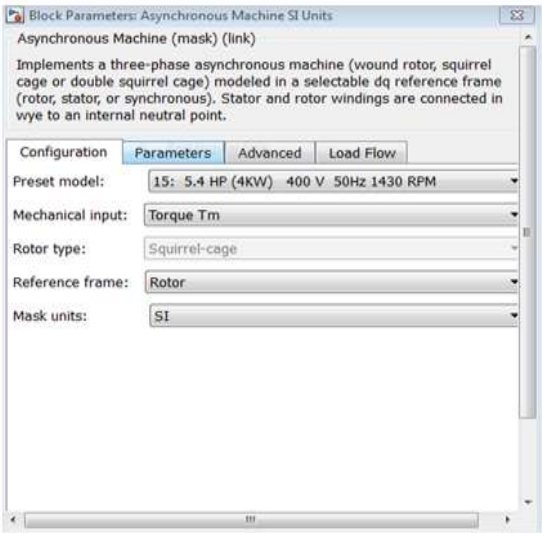


Fig 12.Static (Resistive) Load Parameters **Fig13.Dynamic Load Parameters**

VI CONCLUSIONS

In this paper, the proportional Integral (PI) control method which combined the improvement on voltage utilization factor through the superposition of third harmonic wave with voltage feedback control was proposed with validated results for static and dynamic load conditions, and it was applied to the three levels and five level inverters. Features of this control are to control the superposition ratio with the high amount fluctuation of the DC voltage. The improvement in the control performance is considered, and reduction of the capacity of the common-mode filter and electrolytic capacitor -less of the DC link for nonlinear loads will be examined. In this paper we confirmed the absorption of DC voltage fluctuations of about 14% was examined, 3,5Level cascade connection multilevel inverters with SPWM and static load conditions and 5HP dynamic load. In the future, we intend to focus on further reduction of output voltage distortion and improvement of the voltage control characteristics for dynamic loads.

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RFID BASED AUTOMATED LOW COST DATA ACQUISITION SYSTEM FORPUBLIC TRANSPORT

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ABSTRACT

In public transport system, particularly in bus collecting ticket is really a problematic issue. Transport Company has to employ one or two personnel for this purpose. They have to knock everybody for this purpose. It is very common practice for few people to travel without ticket or do not give proper fare. Sometimes there is a rough argument during the journey regarding fare. Also bus personnel have to monitor whether a person has purchased ticket or not. Again having no government authority to take control or keep an eye over the whole scenario, the private sectors are creating a monopoly, taking control over the public transport and autocratic raise in bus fare. To overcome this problem, RFID technology can be used. RFID technology has long been recognized as an efficient method for identifying a single entity. RFID technology also provides for greater security in the system. The ticketing systems using RFID can be merged to solve the above mentioned problems.

This paper actually suggests a much more public friendly, automated system of ticketing with the use of RFID based tickets. This system is suitable for megacities like Kolkata where a large no of customers avail public transport system daily.

Keywords : RFID Reader, 8051 Microcontroller and Display Unit

I INTRODUCTION

Radio Frequency Identification (RFID) systems use radio frequency to automatically identify products. TheRFID system contains two parts, Reader and Tag. Ticket friend solution mainly proposed to overcome theproblems in traditional ticketing method liketransferring tickets from one person to anotherto avoid confrontation.This system introduces RFID technology.RFID technology has long been recognized as an efficient method for identifying a single entity. RFID technology also provides for greater security in the system. The ticketing systems using RFID can be merged to solve the above mentioned problems. Automated Fare calculation for Public transport system is an Economic and Management Approach for Transit system. This provides a wealth of resourceful information to everyone with interest in mass transit. All the conventional systems are prepaid system. Another disadvantage is

that the passenger has to carry a smart card and there is no scope of recharge at the bus. This system is postpaid system. So if anybody forgets to bring the card, he can ride the bus easily.

II. RFID SYSTEMFUNDAMENTALS

Basically, an RFID system consists of an antenna or coil, a transceiver (with decoder) and atransponder (RF tag) electronically programmed with unique information. There are many different types of RFID systems in the market. These are categorized on the basis of their frequency ranges. Some of the most commonly used RFID kits are low-frequency (30-500kHz), mid-frequency (900kHz-1500MHz) and high-frequency (2.4- 2.5GHz).

2.1 RFID Antenna

The antennaemits radio signals toactivate the tag and read/write data from/to it. It isthe conduit between thetag and the transceiver,which controls the system'sdata acquisition and communication.Theelectromagnetic field produced bythe antenna can be constantly presentwhen multiple tags are expected continually.If constant interrogation is notrequired, a sensor device can activatethe field.The readeremits radio waves in the range of 2.5cm to 30 meters or more, dependingupon its power output and the radio frequency used. When an RFID tagpasses through the electromagneticzone, it detects the reader's activationsignal. The reader decodes the dataencoded in the tag's integrated circuit(silicon chip) and communicates to thehost computer for processing.

2.2 RFID Tag

It comprises a microchip containingidentifying information about theitem and an antenna that transmitsthis data wirelessly to the reader. Atits most basic, the chip contains a serializedidentifier or license plate numberthat uniquely identifies that item(similar to bar codes). A key difference,however, is that RFID tags havea higher data capacity than their barcode counterparts. This increases theoptions for the type of information thatcan be encoded on the tag; it may includethe manufacturer's name, batchor lot number, weight, ownership,destination and history (such as thetemperature range to which an itemhas been exposed). In fact, an unlimitedlist of other types of informationcan be stored on RFID tags, dependingon the application's requirements.RFID tag can be placed on individualitems, cases or pallets for identificationpurposes, as well as fixed assetssuch as trailers, containers and totes.

2.3. Electronic product code (EPC) Tags :

EPC is an emerging specification for RFID tags, readers and business applications. It represents a specific approach to item identification, including an emerging standard for the tags—with both the data content of the tag and open wireless communication protocols.

2.4. RF transceiver

RF transceiver isthe source of RF energy used to activateand power the passive RFID tags.It may be enclosed in the same cabinetas the reader or it may be a separatepiece of equipment. When providedas a separate piece of equipment, thetransceiver is commonly referred to asan RF module. RF transceiver controlsand modulates the radio frequenciesthat the antenna transmits andreceives. The transceiver filters andamplifies the backscatter signal from apassive RFID tag.

III BLOCK DIAGRAM OF THE SYSTEM

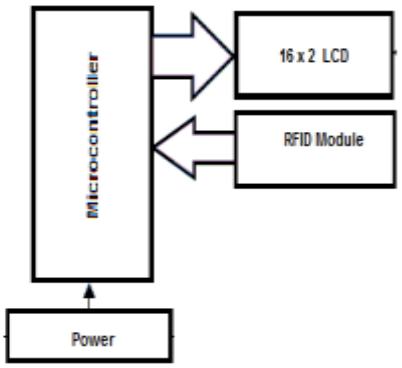


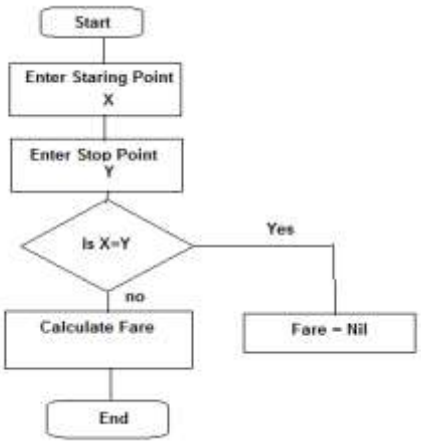
Fig 1

IV CIRCUIT OPERATION

The RFID tag is used as an identity for a particular user. If the identity (serial number of the tag) of the user is matched with the one already stored in this system, he gets the actual fare of the travelled distance. This RFID based is a secured access system with many additional features. For example, a new passenger's databasewill be installedinto the system. A registered passenger can also withdraw his entry from the system in case of mistake. These features can be accessed by pressing a tactile switch connected to the microcontroller.

In beginning, the user is prompted to scan his tag or ID which will be given to him through a smart card. The information regarding starting of the journey will be stored into the system.At the end of the journey, passenger has to produce the smart card to the system. The serial code of the tag is identified by the reader module and is sent to AT89C51 for checking. If the ID is matched by the microcontroller, the user will the amount of the total fare .

A new passenger needs to press the switch to register after which his identity is verified twice with RFID tag. The new record is stored by the microcontroller. Again the verification is carried out and the user is deleted after his journey will be over.



V RESULT

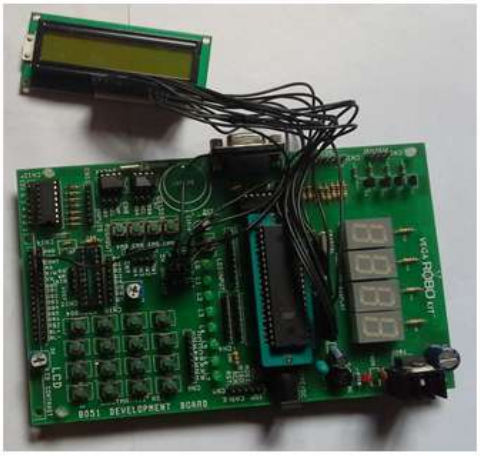
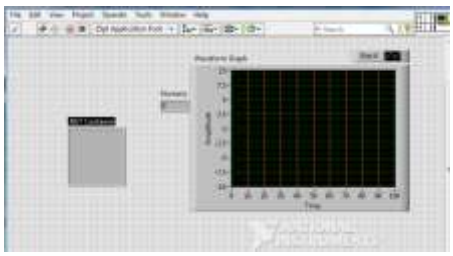


Fig 2 BLOCK DIAGRAM **Fig 3 PART OF THE CIRCUIT**

Passengers have to carry a RFID based card that will have a unique ID number. Information regarding starting point will be stored into the card. According to the route distance between departure & destination as well as considering bus type, it will calculate the ticket fare. If a passenger is given the card mistakenly (passenger‘s destination is not in the same route, then no fare will be calculated. The passenger has to submit the card immediately). During get down, passenger has to submit the card. The information regarding fare will be displayed based on total distance travelling. Data regarding bus stoppage will be updated after every stoppage. This is a postpaid system. After the days trip, from the system the total amount of money collected will be displayed.

VI ANALYSIS



Siimulation in LABView 2014

The program is written in C language. Then it is converted into hex file using KEIL software. For simulation part, I have used LABView 2014 evaluation version whose picture is shown above.

VII CONCLUSION

All the conventional systems are prepaid system. Another disadvantage is that the passenger has to carry a smart card and there is no scope of recharge at the bus. This system is postpaid system. So if anybody forgets to bring the card, he can ride the bus easily. The manual fare collection system has many issues which are overcome by our proposed system. Automated fare collection system for public transport is an innovative idea which reduces man power.Itis believed that by implementation of these system problems such as underutilization of buses fleet will be reduced. So bothpassenger and bus station administrators will benefit fromthe system as Real time information are provided. The ticketing systems using RFID can be merged to solve the above mentioned problems. This project actually suggests a much more public friendly, automated system of ticketing with the use of RFID based tickets. This system is suitable for megacities like Kolkata where a large no of customers avail public transport system daily.

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REQUIREMENTS, PROPOSALS AND CHALLENGES IN TRANSACTION MANAGEMENT SERVICE-ORIENTED SYSTEMS

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ABSTRACT

Service orientation system has been treated as one the important technologies for designing, implementing deploying large scale service provision software systems. The main idea of SOC is to explicitly separate software Engineering from programming, to emphasize on software Engineering and to de-emphasize on programming. Service-Oriented Computing (SOC) is becoming the mainstream development paradigm of applications over the Internet, taking advantage of remote independent functionalities. The cornerstone of SOC's success lies in the potential advantage of composing services on the fly. When the control over the communication and the elements of the information system is low, developing solid systems is challenging. In particular, developing reliable Web service compositions usually requires the integration of both composition languages, such as the Business Process Execution Language (BPEL), and of coordination protocols, such as WS-Atomic Transaction and WS-Business Activity. Unfortunately, the composition and coordination of Web services currently have separate languages and specifications. A list of potential challenges for the maintenance and reengineering of service-oriented systems is presented for discussion.

Key Terms: Transaction Management, Service Oriented Computing, BPEL

1. INTRODUCTION

Although the Web was initially intended for human use, most experts agree that it will have to evolve probably through the design and deployment of modular services to better support automated use. Services provide higher-level abstractions for organizing applications for large-scale, open environments. Thus, they help us implement and configure software applications in a manner that improves productivity and application quality. Because services are simply a means for building distributed applications, we cannot talk about them without talking about service-based applications specifically, how these applications are built and how services should function together within them. The applications will use services by composing or putting them together. Architecture for service based applications has three main parts: a provider, a consumer, and a registry. Providers publish or announce their services on registries, where consumers find and then invoke them. Standardized Web service technologies are enabling a new generation of software that relies on external services to accomplish its tasks. The remote services are usually

invoked in an asynchronous manner. Single remote operation invocation is not the revolution brought by Service-Oriented Computing (SOC), though. Rather it is the possibility of having programs that perform complex tasks coordinating and reusing many loosely coupled independent services. It is the possibility of having programs manages business processes which span over different organizations, people and information systems. A new approach to software, such as that brought by SOC, calls for new ways of engineering software and for new problems to be solved. The central role of these systems is played by services which are beyond a centralized control and whose functional and, possibly, non-functional properties are discovered at run-time. The key problems are related to the issue of discovering services and deciding how to coordinate them. For instance, while planning to drive to a remote city, one might discover that it is heavily snowing there, and may want to obtain snow tires. Therefore, one needs to find a supplier and a transport service to have the appropriate tires in a specific location by a specific deadline. That is, various independent services are composed into the form of a process, called the 'get winter tires while traveling' with the requirement that we order the tires if and only if we find also a transport service for them. In other words, we require the services of tire ordering and tyre delivery to be composed in a transactional manner. In the present treatment, a service is a standard XML description of an autonomous software entity, it executes in a standalone container, it may have one or more active instantiations, and it is made of possibly many operations that are invoked asynchronously. A service composition is a set of operations belonging to possibly many services, and a partial order relation defining the sequencing in which operations are to be invoked. Such a partial order is adequately represented as a direct graph. A service transaction is a unit of work comprehending two or more operations that need to be invoked according to a specific transaction policy. The coordination of a service transaction is the management of the transaction according to a given policy. One may argue that transaction management is a well-known technique that has been around for ages but, as anticipated by Gray more than fifteen years ago, nested, long-lived transactions demand for different techniques, and in fact they do. To cater for the new features of transactions executed by Web services, various Web transaction specifications have been developed. WS-Coordination specification describes an extensive framework for providing various coordination protocols. The WS-Atomic Transaction and WS-Business Activity specifications are two typical Web transaction protocols. They leverage WS-Coordination by extending it to define specific coordination protocols for transaction processing. The former is developed for simple and short-lived Web transactions, while the latter for complex and long-lived business activities. Finally, the Business Process Execution Language (BPEL) is a process- based composition specification language. In order to develop reliable Web services compositions, one needs the integration of transaction standards with composition language standards such as BPEL. Unfortunately, these are currently separate specifications. This paper has a double goal: The first one is to look at the requirements of transaction management for Service- oriented systems. The systematization of requirements is the starting point for an analysis of current standards and technologies in the field of Web services. The second goal of the paper is to propose a framework for the integration of BPEL with transaction protocols such as WS-Atomic Transaction and WS-Business Activity. We use a simple but representative example across the paper, the drop dead order one, to illustrate requirements and the proposed approach.

The need for filling the gap regarding transaction management for BPEL in a declarative way is testified also by Other proposals in the Sam line. E.g., independently and in the same time window, Tai et al. have worked out declarative approach to Web service transaction management. Their approach is very similar to ours with respect to the execution framework and the use of a policy-driven approach to extend BPEL definitions with coordination behavior. However, they do not consider the semi-automatic identification of transactions and consequent process restructuring as we do. Earlier, Loecher proposed a framework for a model- based transaction service configuration, though it was never implemented. Even before the birth of Web services, declarative approaches to automate transaction management have been proposed, most notably. The present work extends our survey and requirement analysis for service transactional systems and our proposal of the XSRL language for handling requests against service compositions. In XSRL a construct is defined to express atomicity of services execution, though no means for recovering from failures is provided. The rest of the paper is organized as follows. First, we introduce the drop dead order example.

Fig. 1. The drop dead order example.

Requirements in Section 2 the proposed approach to transaction management is presented in Section 3.

II TRANSACTION REQUIREMENTS

In the field of databases,transactions are required to satisfy the so called ACID properties, that is, the set of operations involved in a transaction should occur atomically, should be consistent, should be isolated from other operations, and their effects should be durable in time. Given the nature of service oriented systems, satisfying these properties is often not possible and, in the end, not necessarily desirable [14]. In fact, some features are unique to service oriented systems: • Long-lived and concurrent transactions, not only traditional transactions which are usually short and sequential.• Distributed over heterogeneous environments.• Greater range of transaction types due to different types of business processes, service types, information types, or product flows. Number of participants.Unpredictable execution length. E.g., information query and flight payment needs 5 minutes; while e-shopping an hour; and a complex business trans- action like contracting may take days. Computation and communication resources may change at run-time.• Unavailability of undo operations, most often only compensating actions that return the system to a state that is close to the initial state are available. Furthermore transactions may act differently when exposed to certain conditions such as

logical expressions, events expressed in deadlines and even errors in case of a faulty Web service. To make sure that the integrity of data is persistent, the two transaction models used are namely Composite and Distributed allow smooth recovery to a previous ”safe” state.

The set of emerging features mentioned earlier, which are a combination of requirements mostly coming from the areas of databases and workflows, provide the basis for identifying the most relevant requirements for transactions in service-oriented systems.

III PROPOSAL FOR INTEGRATING TRANSA-CIONS INTO BPEL

The above survey shows that there are standardized protocols for describing transactions and languages for describing processes in terms of flows of activities. The connection among these is, to say the least, very loose. The problem is that processes are described in terms of activities and roles capable of executing the activities, but semantic dependencies among these activities are not represented beyond message and flow control. It may happen that several operations from a single Web service are invoked within a BPEL process, and dependencies among these operations may exist. For example, before a supplier provides the product requested by a distributor, he needs first to process the request and then reply to the requester. The two operations correspond to two activities in the BPEL process, namely providing products and processing request, which need to be managed in some transactional way, but BPEL is unable to capture the right granularity and the dependencies among operations.

Our proposal consists of making the dependencies among the activities explicit via an automatic procedure and performing a restructuring step of the process, where necessary. The identified dependencies among activities can be then identified by the designer of the process as being transactions or not. In case they are, the designer will decide which kind of transactions they are and simply annotate them. The execution framework then takes care that transaction annotations are correctly managed at run time. Ply annotates them. The execution framework then takes care that transaction annotations are correctly managed at run time.

Let us be more precise on what the phases of the proposed approach are. Consider Figure 3, where data transformation goes from left to right and we distinguish three layers: the data layer at the bottom, the middle execution layer defining the data transformation, and the knowledge level indicating from where the knowledge to transform the data comes. We start with a generic business process designed to solve some business goal. An automatic processing step, which we define next, identifies dependencies among activities. These are then reviewed by an expert that decides which actually transactions are and which not. This step cannot be auto- mated unless further semantic annotations are made on the BPEL. The restructured and annotated process is then ready to be sent for execution. We notice that the restricted process may be sent to execution several times. In fact, at this stage no concrete binding has occurred.

3.1 Preprocessing

Preprocessing the BPEL specification is performed in two steps, namely (I) identification and (ii) resolution of transaction dependencies. In order to illustrate the two steps, we introduce an abstract model of BPEL.1 Abstract model of BBBPPPEEEL specifications A BPEL process specification describes the interaction between services in a

specific composite Web service. Its abstract model, known as behavioral interface, defines the behavior of a group of services by specifying constraints on the order of messages to be sent and received from a service [15]. In this sense, a BPEL specification S is a set of activities A and its associated links L, represented by S = (A, L). The links, which are directed, define a partial ordering over the set of activities and are thus well represented as a directed graph (e.g., Figure 4).

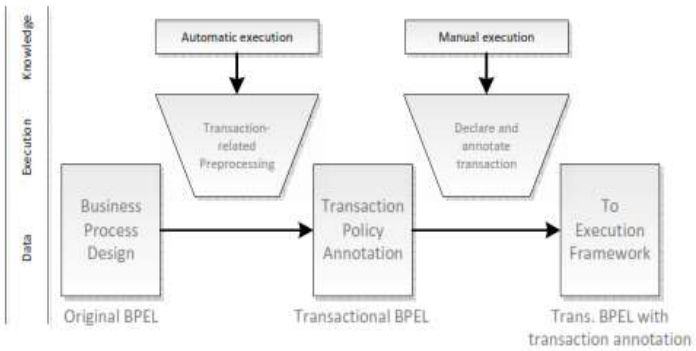

Fig. 3. Approach to integrating transactions into BPEL processes.

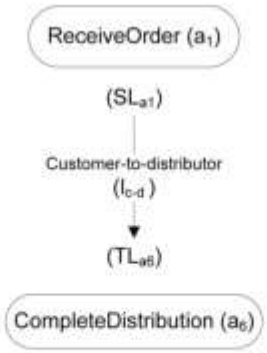

Fig. 4. Representation of activities and the link that connects them.

- An activity a in A having a type represented by

Ta, has the following properties:

- Name Na.
- Operation OPa, which is usually implemented by the Web service at a specific port.
- input variable IVa and output variable OVa, which specifies the parameters required and produced by the OPa, respectively
- set of source links SLa and set of target links T La , which specify the outgoing and incoming links (transitions), respectively.

- A link l in S has a unique name Nl and is indirectly defined through two activities a1 and a2 which indicates not only the direction ld of the transition, but also the conditions lc for the transaction to take

place. Furthermore, the Customer-to-distributor link lc−d is one of the source links of the Receive Order activity a1,Furthermore, lc−d∈ La6, where T La6 is the target link of the Complete Distribution

3.2 Dependencies identification algorithm

To identify the existence of transaction dependencies within a given BPEL specification S, we propose Algorithm 4.1. The algorithm is a standard graph algorithm similar to those for reachable set construction, e.g., [16]. The function Identify Dependency takes S as input and outputs a Boolean value that represents the existence of transaction dependencies td. The function first creates a path p for any two activities am and an . Then traverses the links in the link chain ls obtained from p. When a link l is detected and its transition condition lc contains the output variable OVam of the first activity am , or if it contains an output variable OVaI which is identical to OVam semantically, the algorithm stops and returns TRUE. Otherwise, it continues until all pairs of activities in St have been visited. Finally, if no transaction dependencies are detected, the algorithm returns FALSE.

3.3 Declaration of transaction policies

Once transactions are identified and BPEL has been accordingly restructured, one needs to define the desired transactional behavior. One can declare the transaction policy using the following elements:

1) T rams ID is a non-zero integer, representing transactions within a business process.

2) T rams P rotocol specifies a protocol for the transaction, such as WS- Atomic Transaction (WS-AT) or WS-Business Activity (WS-BA).

3) Trans Root indicates the parent transaction identified by TransID. The value 0 is used to indicate the root transaction within the business process.

One can specify the hierarchy of transactions by assigning appropriate TransIDs and Trans Roots.

With such a schema, one can annotate constraints or preferences to a specific activity in the BPEL specification. The annotated activity must be an invoke activity. One can separately specify the desired constraints or preferences in the design-time-info or run-time-info sections. For trans- action management, we declare the transaction policies in the section of the trans-info which is embedded within the section of run-time-info, since a transaction policy is a run-time constraints. Together with the other types of process information, transaction policies are stored in an XML file for use at run-time.

3.4 The Execution framework

The proposed approach transforms a generic business process into a restructured one in which transactions are identified and annotated. Now one needs an execution framework that is richer than a simple BPEL engine. In fact, one needs to interpret the annotations, make sure that activities are executed according to the transaction conditions and also that the binding among dependent activities is consistent with the transaction semantics. To achieve this we rely on the Sense platform in the context of which the current approach has been developed. Ser-vice Centric System Engineering (Sense) is an Europe an sixth framework integrated project, whose primary goal is

to create methods, tools and techniques for system integrators and service providers and to support the cost-effective development of service-centric applications [17], [18].

The SeCSE service composition methodology sup- ports the modeling of both the service interaction view and the service process view [19]. A service integrator needs to design both the abstract flow logic and the decision logic of the process-based composition. Therefore, the SeCSE composition language allows the definition of a service composition in terms of a process and some rules that determine its dynamic behavior [20]. Correspondingly, the flow logic can be represented by a BPEL specification, while the decision logic is defined by rules. Based on the architecture of the Sense platform, we built a transaction management tool called DecTM4B. It consists of three modules, namely The Preprocessor for T.M. Is used to identify and eliminate transaction dependencies occurring in the original BPEL specification. The output is the preprocessed BPEL specification.

The SeCSE platform will deal with the binding of abstract services before the BPEL engine executes the BPEL specification. The preprocessing executed by Preprocessor for T.M. happens just before the binding. Currently, ODE and Active BPEL [21] are two BPEL engines supported by the SCENE platform. The Event Adapter maps the low- level events from the BPEL engine onto the binding-related events. The first version of SeCSE event adapter is extended to support the mapping of transaction related events. The Transaction Manager is a separate component in the executor and deployed in the Mule container (Mule is a messaging platform based on ideas from Enterprise Service Bus (ESB) architectures).The Transaction Manager consists of the following two transaction- specific components...

1) TransLog is responsible for managing the lifecycle of transactions, such as creating transaction instances, maintaining the status of transaction instances, and destroying transaction instances.TransLog is also responsible for transferring the information among the components in the executor. For example, it listens the transaction related events from the Event Adapter, and it is responsible for the communication between Transaction Manager and JBoss Transaction Server.

2) Policy Operator retrieves the transaction policies from the XML file, and parses the transaction policies, and then maps transaction policies onto the coordination context. It provides a set of APIs which are to be called by the TransLog.

IV RESEARCH CHALLENGES FOR SERVICE ORIENTED SYSTEMS

The following is an attempt to classify research issues in the previously identified domains. The challenges listed under each category are still at a very high level.

They are based on a preliminary literature search, expert opinions from academia and industry, as well as the author's experience. This list is by no means complete and it is the intent of the authors to gather feedback from a wide community through exposure of the proposed classification and challenges.

Algorithm 5.1: IDENTIFYDEPENDENCY(S)

```
td = false
for each a_m ∈ S
    do { for each a_n ∈ S and a_m ≠ a_n
         do { if ∃p, and a_m -p-> a_n ∈ S
              then { ls = φ comment: ls is a set of links.
                     p -store transitions-> ls
                     for each link l ∈ ls
                     do { if l^c ≠ φ and OV_{a_m} ∈ l^c
                          then {td = true
                          else if l^c ≠ φ and OV_{a_i} ∈ l^c
                          and OV_{a_i} ∈ OV_{a_m}
                          then {td = true
return (td)
```

Algorithm 5.2: DEPENDENCYRESOLVER(S_t)

```
PS = S_t
for each a_m ∈ S_t
    do {
       for each a_n ∈ S_t and a_m ≠ a_n
       if IdentifyDependency(a_m, a_n, PS) = true and
       user_agrees_that it_is transaction then
       {PS ←- PS(a_m/a_n) return (PS)
```

V CONCLUSION

The Requirements, Challenges Proposed in our paper consist of business domain and the role of business domain is to focus on activities pertaining to the overall business process as well as on Compliance, trust and analytics. Management. The research pointers in the operations domain focus on activities pertaining to specific application domains, as well as monitoring, support, adoption, and usability. The challenges in the engineering domain focus on activities that relate to the life-cycle of the system from its requirements specification to its maintenance.

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A SURVEY ON MEDICAL IMAGE SECURITY DURING TRANSMISSION

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ABSTRACT

This paper presents the problem of secure transmission of medical images. There are many reviewed algorithms which are applied to images. In this paper a study of various papers is done, and in the reviewed papers the patient information is embedded in the medical image and after applying encryption sends the message to the receiver. The study in this paper show how different methods provide security to medical imagery during transmission, and also once this digital data is received.

Keywords*: *Datahiding, Decryption, Encryption, Segmentation, Watermarking

I INTRODUCTION

The necessity of fast and secure diagnosis is vital in the medical world. Nowadays, the transmission of images is a daily routine and it is necessary to find an efficient way to transmit them over the net. In this paper we study different techniques of medical image protection which is based on combination of watermarking and encryption. Our research deals with image cryptography, data hiding. There are several methods to encrypt binary or grey level images [1,2, 3].

The works presented in this paper show how encryption Algorithms provide security to medical imagery. The main objective is to guarantee the protection of medical images during transmission, and also once this digital data is archived. The subsequent challenge is to ensure that such coding withstands severe treatment such as compression, denoising. When a physician receives a visit from a patient, he often requires a specialist opinion before giving a diagnosis. One possible solution is to send images of the patient, along with a specialist report, over a computer network. We are therefore faced with a real security problem when sending data. For ethical reasons, medical imagery cannot be sent when such a risk is present, and has to be better protected. Encryption is the best form of protection in cases such as this. Many different techniques for the encryption of text already exist. Nowadays, a new challenge consists to embed data in encrypted images. Since the entropy of encrypted image is maximal, the embedding step, considered like noise, is not possible by using standard data hiding algorithms. [4]

In this paper, section 2, we recall watermarking encryption (block cipher, stream cipher, asymmetric and symmetric encryption)

In section 3 we will present combination of image encryption and watermarking method. Then in section 4 we describes the partial encryption, compression and watermarking methods. In the section 5 we describes the reversible watermarking method with encryption. In section 6 we describe the method of watermarking with segmentation and encryption and in section 7 we describe conclusion and future work.

II. WATERMARKING AND ENCRYPTION

Watermarking can be an answer to make secure image transmission. For applications dealing with images, the watermarking objective is to embed invisibly message inside the image.[1] To embed the encrypted image in the patient information.

There are two main groups of information hiding techniques: techniques in the spatial domain and techniques in the transform domain. Spatial domain techniques generally involve manipulation of pixel intensity. Lossless image formats are most suited for spatial domain techniques [5]. The most well-known technique of information hiding in the image domain is Least Significant Bit (LSB) algorithm. In this algorithm, the least significant bit, which will affect pixel colour the least, is examined and either changed or not changed so that it matches the bit that is to be embedded. The algorithm can either adjust every least significant bit or, for greater security, adjust only every nth bit with *n* being known only to the message recipient thus providing and additional level of security. [5] Hiding information in the transform domain is a multi step process. First an appropriate transform must be applied. The most popular are the Discrete Fourier Transform (DFT) and the DCT. The transform changes the signal to a frequency representation from a spatial representation. This has the effect of spreading the pixel values over a part of the image, usually an 8x8 block. The next step is to modify the transform coefficients to embed a desired bit. This has the effect on the image of modifying the brightness of the image. [5] The modified DCT coefficient blocks are then transformed back to the spatial domain to obtain the stego-image. [6]

The encryption can be done by block or by stream. But the encryption block methods applied to image, have presented two inconvenient. The first one was when you have homogeneous zones. all blocks of this kind are encrypted on the same manner. The second problem was that block encryption methods are not robust to noise. The stream cipher method is robust to moderate noise like JPEG compression with high quality factor.[1] In asymmetric algorithm we use two key private and public for encryption and decryption of the message. Private key keeps private and public key can accessed by any one And In symmetric encryption there is only one secret or private key for encryption and decryption of message and key keeps secret.

III.DESCRIPTION OF THE COMBINATION OF IMAGE ENCRYPTION AND WATERMARKING

In this section we study how it is possible to combine the techniques of encryption and watermarking in images. Indeed, we constructed a new method with encryption algorithm with secret key for the image, with encryption based on public private key for the secret key and with watermarking method. For example, if a medical doctor *M* wants to send, by network, a medical image to a specialist *S*, it should be made in a safe way. To do that, the doctor *M* can use a fast encryption algorithm with secret key *K* to cipher the image. In order to transfer *K*, *M* can encrypt the key *K* by using encryption algorithm with public key, like RSA for example [7]. If *pub* is a public key and *priv* a private key for RSA, then *M* possesses the public and private keys *pubm* and *privm*, and *S* the public and private keys *pubs* and *privs*. Firstly, *M* generates a secret key *K* for this session and encrypt the image with the stream cipher algorithm. Secondly, *M* should encrypt the key *K* with RSA algorithm by using his private key, *privm*, in order to get an encrypted key *K* .This encrypted key *K* is also encrypted with RSA by using the public key *pubs* of his corresponding *S* in order to generate *K*. This encrypted key *K* is then embedded in the ciphered image by using a DCT-based watermarking method [8]. Finally, the doctor *M* sends this image

to the specialist *S*. The specialist *S* receives the watermarked-encrypted image and extracts from it the encrypted key *K*. He can then authenticate *M* and decrypt the key *K* by using his self private key *privs* and the public key *pubm* of *M*. With the obtained key *K*, *S* can then decipher the image and visualize it. If the specialist *S* wants to send another image to the doctor *M*, he can create a new secret key *K*1 for this new session. The process will be the same, but the private and public key for RSA will not be applied in the same order. Even, if five keys are necessaries for each session, most of them are transparent for the users. Indeed, the private key can be associated to the software used by the receptor, and for the two correspondents it is not necessary to know the secret key which is encrypted and embedded in the image. However, for each session the value of the secret key *K* must change. Otherwise, if the key has no changing, all the people who have the software can decrypt the images.

IV.TH PARTIAL ENCRYPTION, COMPRESSION AND WATERMARKING METHODS

In this section a novel reversible method for fast and safe image transfer is proposed. The method combines compression, data hiding and partial encryption of images in a single processing step. The proposed approach can embed data into the image according to the message size and partially encrypt the image and the message without changing the original image content. Moreover, during the same process the image is lossless compressed. Nevertheless, the compression rate depends on the upper bound of message size to embed in the image. The main idea is to decompose the original image into two sub-images and to apply various processes to each sub-image in order to gain space and increase the amount of embedded data. The two sub-images are then scrambled and partially encrypted. The most significant characteristic of the Proposed method is the utilization of a single procedure to Simultaneously perform the compression, the reversible data hiding and the partial encryption rather than using three separate procedures. Our approach reduces then the computational effort and the required computation time. This method is specially suited for medical images where one can associate the patient diagnostic to the concerned medical image for safe transfer purpose [9]. The keywords of this work are fast and safe image transmission, lossless compression, reversible data hiding, partial encryption, image protection and real time image processing.

V. THE REVERSIBLE WATERMARKING METHOD WITH ENCRYPTION

Since several years, the protection of multimedia data is becoming very important. The protection of this multimedia data can be done with encryption or data hiding algorithms.To decrease the transmission time, the data compression is necessary. Since few years, a new problem is trying to combine in a single step, compression, encryption and data hiding. So far, few solutions have been proposed to combine image encryption and compression for example. Nowadays, a new challenge consists to embed data in encrypted images. Since the entropy of encrypted image is maximal, the embedding step, considered like noise, is not possible by using standard data hiding algorithms. A new idea is to apply reversible data hiding algorithms on encrypted images by wishing to remove the embedded data before the image decryption. Recent reversible data hiding methods have been proposed with high capacity, but these methods are not applicable on encrypted images. In this paper we propose an analysis of the local standard deviation of the marked encrypted images in order to remove the embedded data during the decryption step. We have applied our method on various images, and we show and analyze the obtained results [9].

VI. THE METHOD OF WATERMARKING WITH SEGMENTATION AND ENCRYPTION

In present times, identity protection is becoming increasingly jeopardized. Numerous ways of protecting one's personal, financial or medical information are therefore being utilized by individuals, businesses, and governments. When it comes to protecting patient information in medical images, we have developed an information hiding methodology that includes the RSA encryption algorithm and a Discrete Cosine Transform (DCT) based hiding technique. With this system, any medical image that will be electronically transferred (i.e. emailed, faxed, etc.) will have the patient's information hidden and embedded in the image outside of the Region of Interest (ROI). For example, an X-ray of a skull that is emailed will not have the patient information displayed during transmission, but will be readily available once it reaches its destination. This system is also unique in the fact that when a medical image is electronically delivered, the patient information and the picture are transferred in the same file, where as now an image and the corresponding patient information are transmitted in two different files.[2]

VI. CONCLUSION

In this review paper we have study combined approaches of cryptography and data hiding for protection of medical image. In all methods the original image and patient information is embedded and encrypted and then send the message to the receiver. We have found problem related to slow transfer of message and noise during embedding and to resolve this problem compression and segmentation is used but compression technique were not reversible,erasable, invertible and segmentation uses large data to embed with patient information and original image but due to large data the transmission takes more time. so For fast transfer the encrypted image is embedded using lossless data hiding method with patient information and for denoised transmission we have to apply reversible data hiding algorithm on encrypted image to remove the embedded data before the image decryption in the receiver side . So that we find more secured and less noisy medical image.

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PREPARATION AND CHARACTERISATION OF DITHIOCARBAMATE BASED CALIX [4] PYRROLE ASSEMBLIES ON Ag NANOPARTICLES: POTENTIAL ANTIMICROBIAL AGENT

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ABSTRACT

In this communication, The synthesis of metal nanoparticles by eco-friendly and reliable processes is an important aspect in many fields. meso-tetra(methyl) meso-tetra (4-ethyl carbamodithioate) calix pyrrole (CPADTC) have been used as reducing as well as stabilizing agent for the preparation of silver nanoparticles via simple one pot method. Synthesized silver nanoparticles (CPADTC-AgNP) were characterized by UV-vis spectroscopy, transmission electron microscopy (TEM) Dynamic Light Scaatering (DLS), particle size analyzer (PSA) and Atomic force microscopy (AFM). The method used for the synthesis of silver nanoparticles was found to be rapid and it required no toxic chemicals. The meso-tetra(methyl) meso-tetra (4-ethyl carbamodithioate) calix pyrrole (CPADTC) capped silver nanoparticles (CPADTC-AgNP) were found to be highly stable over a long period of time. Further, the CPADTC-AgNP showed high antimicrobial and bactericidal activity against bacteria such as Escherichia coli, Bacillus megaterium, Staphylococcus aureus, Bacillus subtilis and found highly strain. CPADTC-AgNP were also found to exhibit reasonably good antimicrobial activity, when compared with standard Chloramphenicol, suggests its potential use as antimicrobial agent.

Keywords : AgNp, Antimicrobial effect, Calix, Pyrrole, Silver Nanoparticles,

I INTRODUCTION

The field of nanoscience has been established recently as a new interdisciplinary science and the need for nanotechnology will only increase as miniaturization becomes more important in areas such as computing, sensors, and biomedical applications [1]. Nanoscience can be defined as a whole knowledge on fundamental properties of nano-size objects[2]. Size and shape of nanoparticles provide an efficient control over many of their physical and chemical properties [3,4], and their potential application in optoelectronics [5,6], recording media [7,8], sensing

devices[9,10], medicine [11-13] and catalysis [14].It is well known that Ag ions and AgNPs were found to be highly toxic to microbes, with strong biocidal effects. Silver nanoparticles possess potential application to eliminate microorganisms and hold thepromise of killing microbes effectively [15,16].

Hence, synthesis and characterization of nanoparticles is, now a day, an important area of research. Silver nanoparticles have unique electronic and optical properties and hence they have been used in a broad range of fields, including catalysis, biological labeling and photonics etc.[17-22]. Various methods i.e. aerosol technique [23], electrochemical or sonochemical deposition [24,25], photochemical reduction[26], laser irradiation technique [27] etc have been reported over the last two decades for the synthesis of silver nanoparticles. Generally and widely used method is chemical reduction method which involve the reduction of metal salt with the help of different reducing agents such as citric acid ,borohydride (Lee and Meisel Method)[28], , N_2H_4 [29], NH_2OH[30], ethanol[31], ethylene glycol[32] and *N*,*N*-dimethyformamide (DMF)[33] which prevents the nanoparticles from aggregation. Other organic compounds like cetyl trimethylammonium bromide[34], sodiumdodecyl sulphate[35], poly(vinyl alcohol)[36] and poly(vinylpyrrolidone)[37] poly (lactic Acid)[38]poly (methyl vinyl ether)[39] have also been used which not only act as reducing agent but also stabilize them and increase their shelf life.

Most of the methods used for the formation of Ag nanoparticles from calix system limit their potential application either because some of them are prepared in organic solvents because of the poor solubility of calix molecules in aqueous media [40-43]or poor shelf life[44,45,41]. Recently, Chao - Guo yan made a study of resorcinarenes as a ligand for the fabrication of water-soluble noble nanoparticles such as AgNPs, AuNPs, Pt-NPs, and PdNPs.(Sun et al. 2010)

The functionalization of metal substrate with such organic ligands has become a standard practice in surface science and nanomaterial chemistry Perhaps the most prevalent example is the chemisorptions of the ligand containing dithiocarbamate group on silver nanoparticles. Dithiocarbamates are organosulfur compounds and are commonly used in agriculture as pesticides, in rubber industry as antioxidants and vulcanization accelerators.Molecules with dithiocarbamate group have superior chemisorptions property and gained substantial attention in nanotechnology due to the ease with which they can be synthesized and the fact that small interatomic distance between two sulfur atoms. Dithiocarbamates are considered unstable in acidic form and are often prepared as metal salt by the condensation of primery or secondary amines with CS_2 under strong basic condition.

Here, we show that primary amine can condense with carbon disulfide at room temperature without addition of base to form dithiocarbamate ligand. We describe the spontaneous assembly of dithiocarbamate calix[4]pyrrole ligands on silver nanoparticles. Dithiocarbamate calix[4]pyrrole derivative and its self-assembly on a nano structured metal, has been shown to be a good strategy to design new sensitive and selective surface.

II EXPERIMENTAL SECTION

2.1Chemicals and Reagents

All the reagents and metal salts of AR grade were purchased from Sigma-Aldrich and used without further purification. Solvents used for spectroscopic studies were purified and dried before use

2.2Instruments and Measurements

All aqueous solutions were prepared from quartz distilled deionized water which was further purified by a Millipore Milli-Q water purification system (Millipack 20, Pack name: Simpak 1, Synergy). Melting points (uncorrected) were taken in a single capillary tube using a VEEGO (Model No: VMP-DS, India) melting point apparatus. FT-IR spectra were recorded on Bruker, tensor 27Infrared spectro-photometer as KBr pellets. ^{1}H NMR spectra were recorded on a Bruker-ARX 500MHz instrument, using tetramethylsilane as internal standard. Mass Spectra were recorded on MICROMASS QUATTRO II triple quadruple mass spectrometer using ESI capillary (3.5 KV, 40 V).The spectra were recorded at room temperature. Absorption spectra were studied on a Jasco V-570 UV-Vis recording spectrophotometer. pH of the solutions was measured using pH analyzer LI 614- Elico. The particle size and zeta potential were determined by using the Malvern Zetasizer (Model; ZEN3600) as such without dilution. TEM images were recorded in MACK/*model* JEOL, JEM 2100 at an accelerated voltage of 200 kV. A drop of dilute solution of a sample in water on carbon coated copper grids was dried in vacuum and directly observed in the TEM.The antimicrobial susceptibility of nanoparticles was evaluated using the disc diffusion or Kirby-Bauer method and zones of inhibition were measured after 24 hours of incubation at 35 °C.

2.3 Synthesis of Ethyl (4-acetylphenyl)carbamodithioate

Carbon disulfide (5.6g, 0.0736mol) was added to p-amino acetophenone(5g, 0.036mol) in DMSO. The reaction mixture was stirred under vigorous stirring at room temperature for 5-6 h. Ethyl iodide (5.7g, 0.036mol) was added to the reaction mixture drop wise and kept for stirring for about 3-4 hours. After completion of reaction time the reaction mixture was poured in ice cold water with stirring. Yellow colored precipitates separated were washed several times with methanol and recrystalized in a mixture of methanol and DMF to obtain the pure product. The purified form was further utilized for the formation of calix[4]pyrrole derivative.

2.4 Synthesis of meso-tetra(methyl) meso-tetra (4-ethyl carbamodithioate) calix pyrrole (CPADTC)

A solution of ethyl (4-acetylphenyl)carbamodithioate (4mmol, 1g) in absolute ethanol (ml) was added to the stirring mixture of pyrrole (4mmol, 0.31ml) and 2 ml of $BF_3.(OEt)_2$. After stirring at 60c for 24 hours the reaction mixture was brought to room temperature and was poured in 500 ml of ice cold water. The precipitates found were directly extracted from aqueous layer to the organic layer of ethyl acetate. This method of extraction was repeated (3 X100ml). The organic layer was separated and dried over anhydrous Na_2SO_4 The solvent was removed in vacuo to give desired product and the crude product was recrystallized in ethanol to obtained pure product.(Fig.1)

2.5 Synthesis of meso-tetra(methyl) meso-tetra (4-ethyl carbamodithioate) calix pyrrole capped Ag nanoparticles (CPADTC-AgNP)

The synthesis of the silve nanoparticles was carried out according to the method reported by Lee and Meisel. A total of 1 mL of a 1%w/v trisodium citrate aqueous solution was added to 50 mL of a boiling 10^{-3} M silver nitrate aqueous solution, and boiling was continued for 1 h. The colloid obtained showed a turbid gray. First, the Ag NP suspensions were aggregated by adding an aliquot of potassium nitrate solution up to a final concentration of 3 x 10^{-2} M, and then an aliquot of the CPADTC solution (5 x 10^{-2} M) was added (Fig.2).

III RESULTS AND DISSCUSSION

3.1 Characterization of CPADTC-AgNp by UV-Vis Spectroscopy

In UV vis absorption spectra a very pronounced peak of silver nanooparticles, dithiocarbamate calix[4]pyrrole and dithiocarbamate calix[4]pyrrole AgNp assembly can be seen at λmax 421 nm, 310 nm and 306,445nm respectively, which is characteristic of nanometer-sized Ag particles and formation of nano assembly of dithiocarbamate calix[4]pyrrole-AgNp. (Fig.3)

3.2 Characterization of CPADTC-AgNp by Atomic force microscopy (AFM)

The particle dimensions were calculated by AFM measurements, in which a drop of the particle solution was spread onto a freshly peeled mica surface and dried under a gentle nitrogen stream. The AFM micrographs exhibit very visible and well-dispersed nanosized particles. Because of tip convolution, particle core diameter was estimated by the heights in AFM measurements. The AFM result for AgNp shows the average particles size around 70nm where as CPADTC-AgNp shows the average particle size around 185nm and roughness is around 905pm(Fig.4).

3.3 Characterization of CPADTC-AgNp by Dynamic light scattering (DLS)

Dynamic light-scattering (DLS) profiles show that the average diameters of silver nanoparticels around 70nm where as the average diameter of CPADTC capped silver nanoparticles was found around 195nm.(Fig.4)

3.4 Characterization of CPADTC-AgNp by transmission electron microscopy (TEM)

The morphology and particles size of CPADTC-AgNp were studied by Transmission Electron Microscopy (TEM). (Fig.) depicts that the sample was composed of a large quantity of well dispersed spherical silver nanoparticles with an average particle size of 8±2 nm. The size distribution of the CPADTC-AgNp was also determined by particle size analyser and the average hydrodynamic diameter of silver nanoparticles was found to be 9 nm. These higher values were due to the light scattered by the core particle and the layers formed on the surface of the particles. Energy-dispersive X-ray (EDX) analysis spectrum recorded in the spot-profile mode from one of the densely populated CPADTC-AgNp regions on the surface of film, strong signals from Ag atoms while weaker signals from C, O, Si, Cu and Ca atoms were observed (Fig.5 a,5b and 5c)

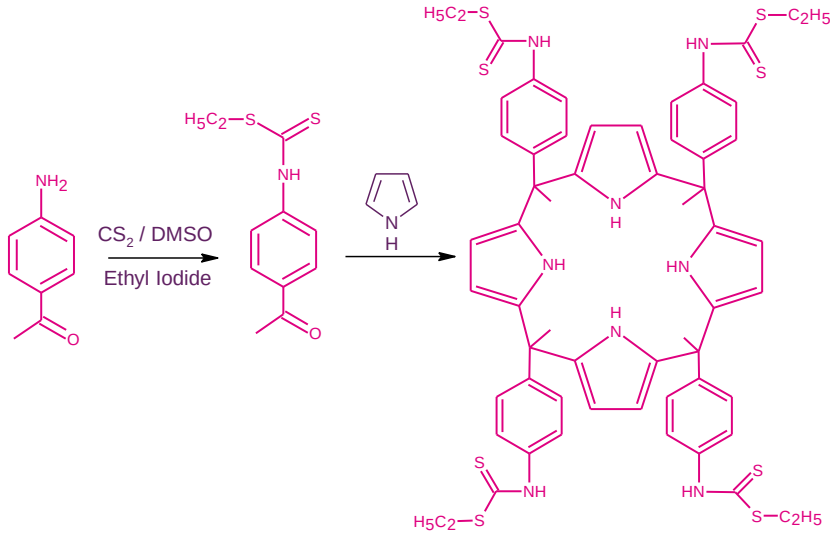
3.5 Anti bacterial Assays study of silver nanoparticles

The antimicrobial susceptibility of silver nanoparticles was evaluated using the disc diffusion or Kirby-Bauer method. The antibacterial assays were done on bacterial organisms like *Escherichia coli, Staphylococcus aureus.* by Muller Hinton Agar (MHA) plates. Sterile paper disc of 20mm diameter containing 100mg/liter silver nanoparticles and standard antibiotic chloroemphenicol (100µg/ml) containing discs were placed in each plate as control. The plates were incubated at 37◦C for overnight. Next day the inhibition zones around the discs were measured.

Here we shows the antimicrobial activity of synthesized Ag nanoparticles against two different bacteria such as *E.coli, S.auereus.* As it showed a clear inhibition zone. the synthesized Ag nanoparticles were highly effective in their activity against than antibiotics. Standard antibiotic disc (100µg/ml) chloremphenicol was used as control. Bacterial membrane proteins and DNA makes preferential sites for silver nanoparticles interaction as they possess sulphur and phosphorus compounds and silver have higher affinity to react with these compounds. Antibacterial effect of silver nanoparticles obeyed a dual action mechanism of antimicrobial activity, (i.e.) the bactericidal effect of Ag+ and membrane disrupting effect of the polymer subunits(Table 2)

The nanoparticles smaller than 10 nm interact with bacteria and produce electronic effects, which enhanced the reactivity of nanoparticles. Thus, it is corroborated that the bactericidal effect of silver nanoparticles is size dependent [46]. The nanoparticles release silver ions in the bacterial cells, which enhance their bactericidal activity (Fig.7) [47,48]. In this study, the antibacterial effect of synthesised compounds (1 – 4) was also investigated against various microorganisms with their inhibition zone diameter, as shown in Table 1. Among all, CPADTC-AgNps was found to be the most effective in inhibition of bacterial growth have comparatively less antibacterial activity to that of the other standard antibiotics such as chloramphenicol.

IV. FIGURES AND TABLES



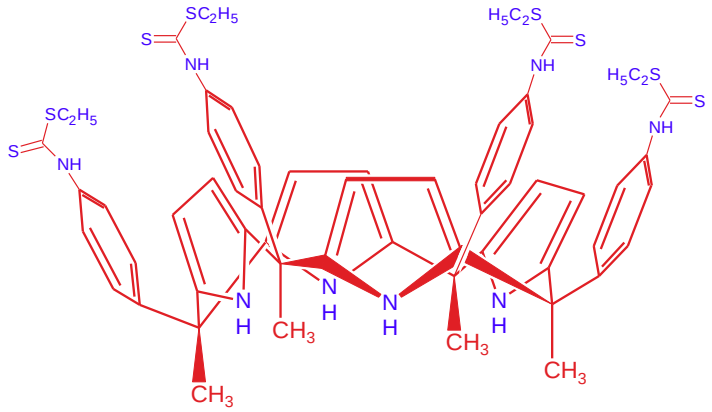


Fig.1 Synthesis Scheme of meso-tetra(methyl) meso-tetra (4-ethyl carbamodithioate) calix pyrrole (CPADTC)

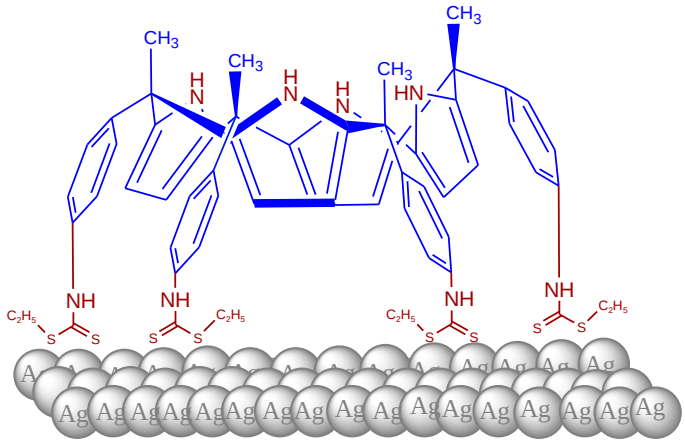


Fig.2 Synthesis of Silver Nanoparticles

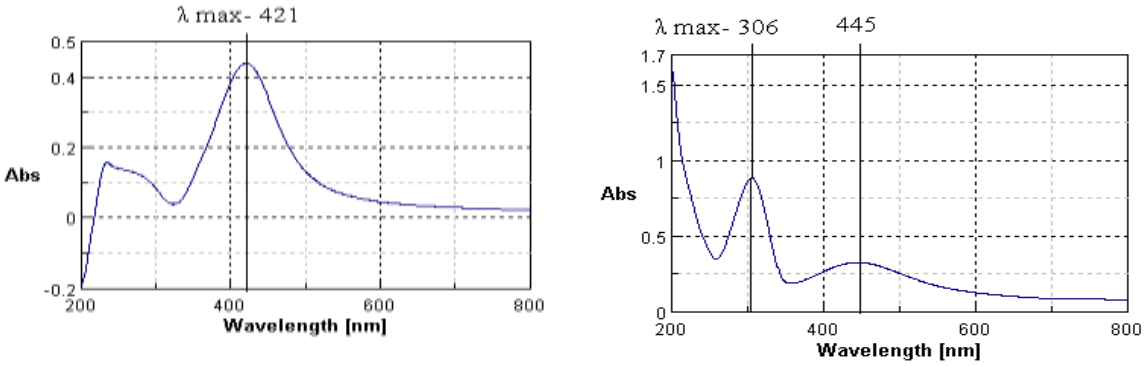


Fig.3a UV spectra of AgNp and CPADTC

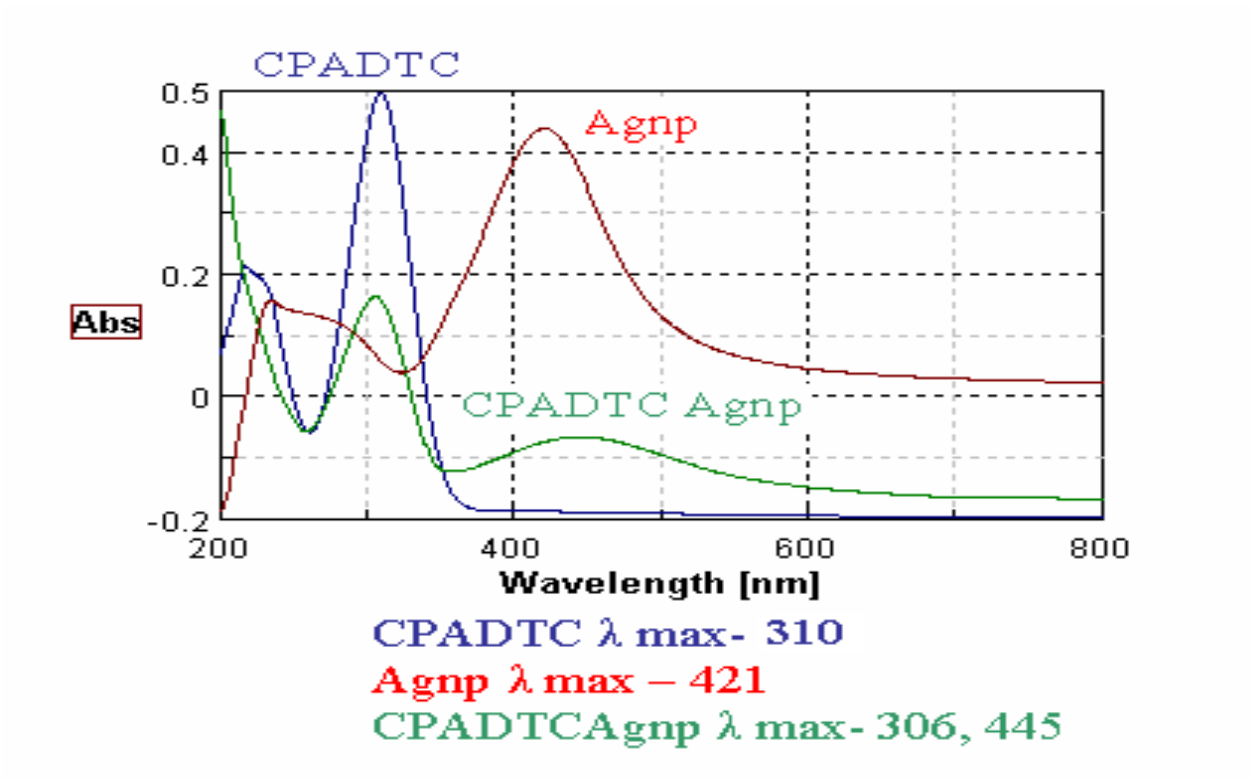
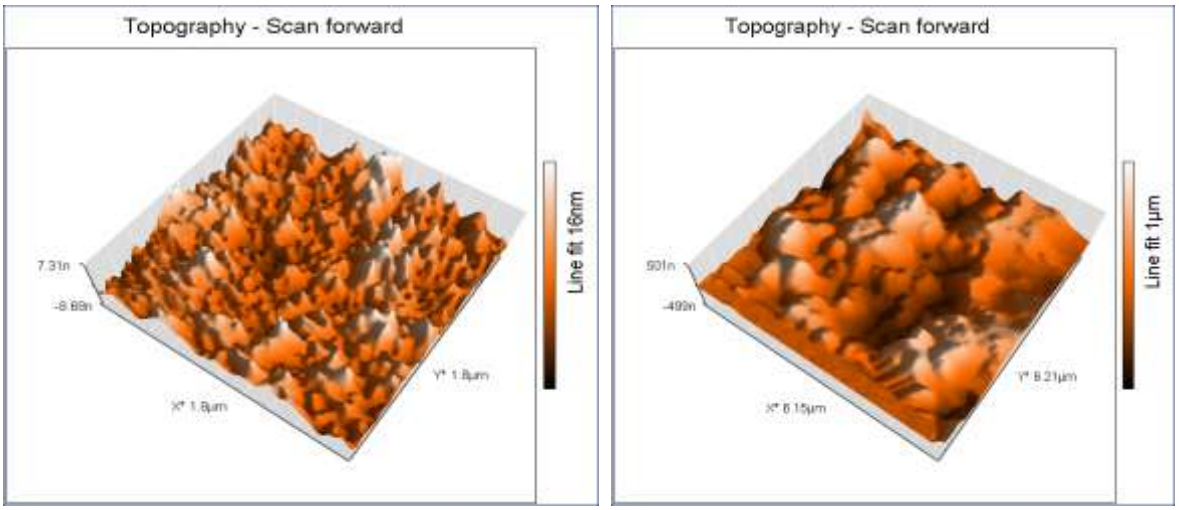
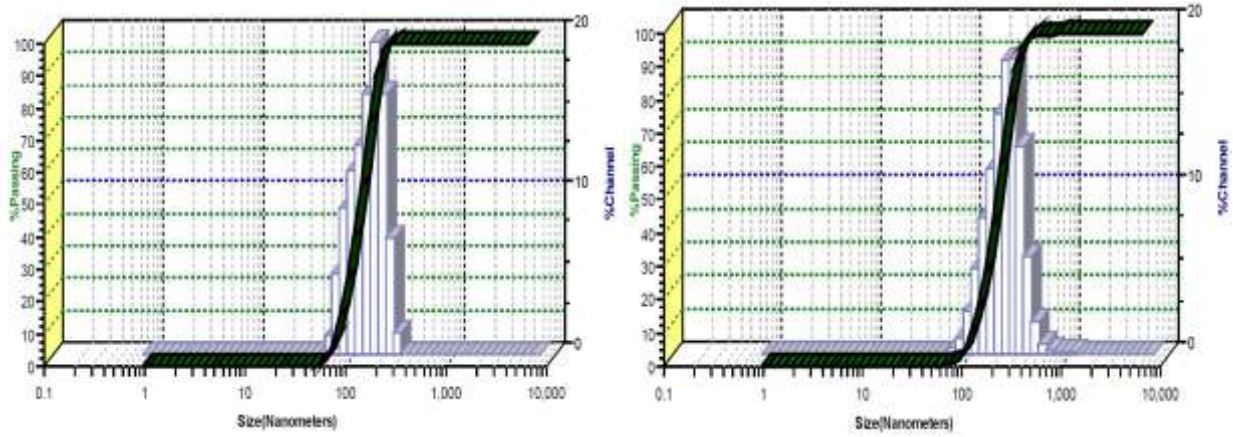


Fig.3b The typical UV/Vis spectra of a) silver nanoparticles in water (10^{-3}m) b) CPADTC in methanol (10^{-3}m) c) CPADTC capped AgNp (10^{-3}m)



AgNps and CPADTC- AgNps



AgNps **CPADTC- AgNps**

Fig.4 Characterization of CPADTC-AgNp by Atomic force microscopy (AFM) and Dynamic light scattering (DLS)

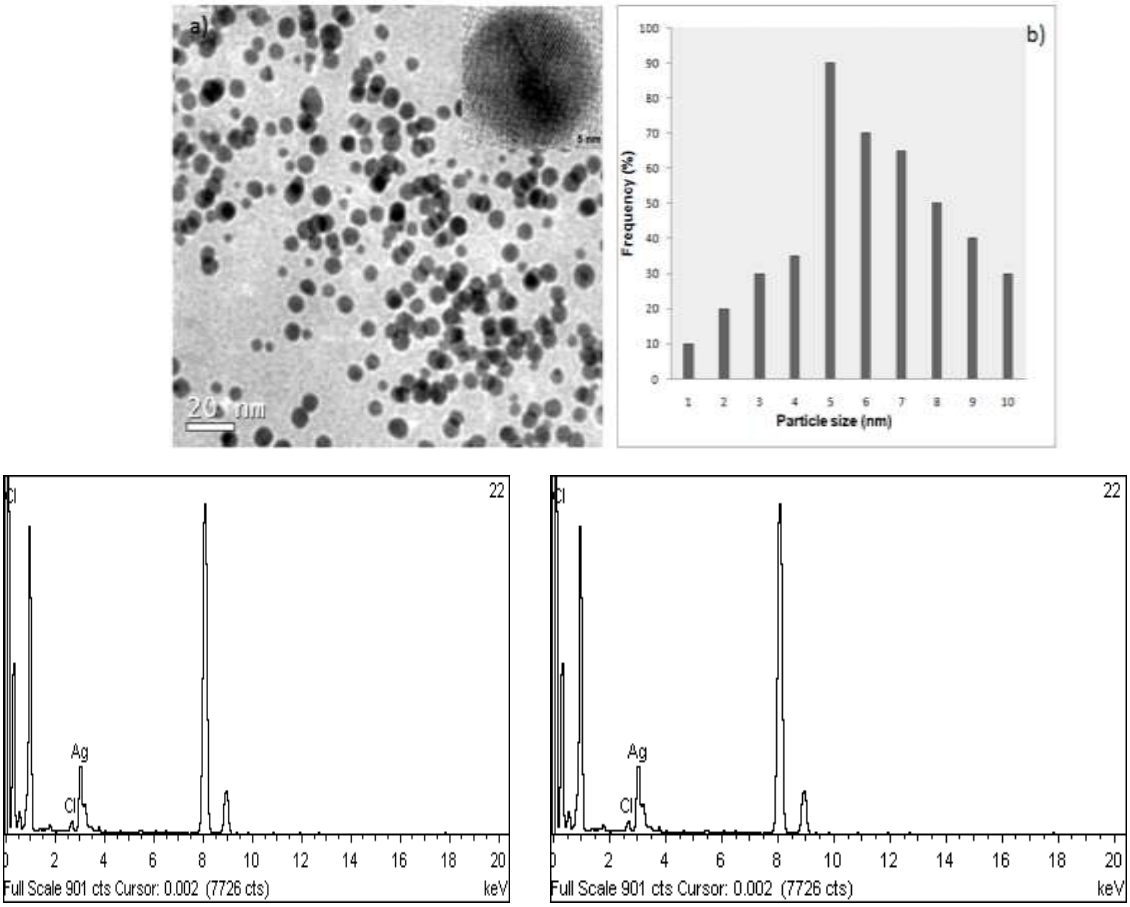


Fig.5a)TEM image of CAH reduced AgNPs and (b) particle size distribution graph. (c)EDX results of silver nanoparticles

Comp.	M.P.	UV	Elemental analysis					H^1NMR (ppm)					
			C	H	N	S	O	CH_3	Ar	Ar C-NH	Py NH	Py B-CH	CH2-CH3
CPADTC AgNps	>200	306,445	60.23 (62.46)	9.27 (9.71)	5.11 (5.59)	21.98 (22.23)		1.75 (m)	6.4-6.8 (m)	4.1 (m)	5.1 (s)	5.65 (m)	2.91 (q) 3.1(t)
CPADTC	190-192	317	51.90 (52.20)	5.21 (5.47)	5.51 (5.85)	26.2 (26.79)	6.45 (6.68)	2.55 (s)	6.5-7.1	4.0 (s)	-	-	2.91 (q) 3.1(t)

Table 1. Characterization of CPADTC by UV, NMR and Elemental analysis

Name of compound	**Zone of inhibition (mm)**							
	E.coli		*B.subtilis*		*S.aureus*		*B.megaterium*	
	50 ppm	100 ppm	50 ppm	100 ppm	50 ppm	100 ppm	50 ppm	100 ppm
A*	9	8	10	10	9	8	9	7
1	6	4	7	4	8	8	6	5
2	6	5	4	5	5	5	5	5
3	7	6	6	6	5	5	6	5
4	7	8	9	8	6	5	8	7

A* = Chloramphinicol (Antibiotic control)

Table 2. Antimicrobial activity (Zone of inhibition in mm) of Compounds 1-4.

1. **4-Amino Acetophenone**
2. **Ethyl (4-acetylphenyl)carbamodithioate**
3. **CPADTC**
4. **CPADTC-AgNP**

V. CONCLUSION

In conclusion, an efficient, eco-friendly and simple process has been developed for the synthesis of silver nanoparticles using CPADTC as reducing, capping as well as stabilizing agent. The Silver nanoparticles exhibited antibacterial activity against the common pathogens. Dithiocarbamate calix[4]pyrrole assembly was synthesized and characterized by UV, Mass, NMR and Elemental analysis. Silver nanoparticles has been successfully synthesized by citrate method and characterized by UV and DLSDithiocarbamate calix[4] pyrrole capped silver nanoparticles assembly was characterized by UV, DLS and AFM from AFM and DLS the average particles size of calix[4]pyrrole dithiocarbamate capped silver nanoparticles assembly was found around 185-190nm which indicates the successfull formation of nano assembly of dithicoarbamate calix[4]pyrrole capped silver nanoparticles. The results of the antibacterial activity study clearly demonstrated that the colloidal silver nanoparticles inhibited the growth and multiplication of the tested bacteria, including highly multi resistant bacteria such as *Staphylococcus aureus*, *Escherichia coli*, *Bacillus megaterium* and *Bacillus subtilis* . Such high antibacterial activity was observed at very low total concentrations of silver nanoparticles. These stable silver nanoparticles synthesised by cost effective reduction method seems to be a promising and an effective antibacterial agent and can have innumerable applications in different biological fields.

VI. ACKNOWLEDGEMENTS

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EXTRACTION TECHNIQUES OF NATURAL EMULSIFIERS AND CHARACTERIZATION OF EMULSIONS-A REVIEW

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ABSTRACT

An emulsifier is a molecule with a hydrophobic/lypophilic end and hydrophilic end,respectively. Emulsifiers are used in stabilizing various oil-in-water and water-in-oil emulsions by reducing the surface energy and surface tension of the two interfaces. They find wide applications in food and pharmaceutical industries. Many of the emulsifiers can be obtained from natural sources. Some of them include soya bean, egg yolk, lady's finger, orange peels, beeswax etc. This paper is intended to review various extraction techniques and characterization of naturally obtained emulsifiers. Rheological properties of the extracted yolk-based emulsions and gel networks of the emulsifiers are also discussed. pH, temperature effects on the emulsions are also enlisted in this review.

***Keywords*: *Egg-Yolk, Emulsion, Lecithin, Okra, Orange Peel, Pectin, Rheology*.**

I.INTRODUCTION

Emulsions are one of the most important colloidal systems in which one liquid is dispersed in another immiscible liquid in the form of tiny droplets as mentioned by(PallabGhosh, 2009)**[1]**.These systems are a very complex system to be investigated for their intended end use. Emulsions find use in metallurgical, pharmaceuticals, food cosmetic, building roads, paint industries to name a few. These emulsions from various industries are ultimately discharged into water bodies and find their way into soil and aquatic ecosystems. Emulsions in water bodies affect mucous layers in fish that results in easy infection by bacteria, virus and parasites. They cause damage to the gills. Presence of emulsions also lowers the surface tension, as a result of which organic chemicals are easily absorbed by fish. They also create oxidative stress on the aquatic life. Emulsions in large concentrations when discharged into the ecosystem, thus pose serious threat to it. Hence it becomes important to find emulsifiers that are natural in origin and can suitably be used to replace synthetic emulsifiers that have an adverse impact on the environment in order to maintain eco-friendly environment.

II. RESEARCH OBJECTIVES

Natural emulsifiers extracted from organic sources such as egg-yolk, orange peels and okra seeds have been discussed in this review.

III.EXTRACTION OF LECITHIN FROM EGG YOLK

Hen's yolk can be found in a number of food products such as mayonnaise, bakery products, salad dressings etc. The most promising emulsifying components in egg yolk are phospholipids, lipoproteins and proteins (livetin and phosvitin). As discussed by (Kiosseoglou,2008)**[2]**,preparation and stability of yolk-based products depend to a large extent on yolk constituent ability, either to adsorb at o/w interfaces and form a strong cohesive film around oil droplets that stabilises them against coalescence

In the technical note by (Maximiano, Silva, Daghastanl,Araujo, Chaimovich, and Cuccovia 2008)**[3]**a simple process of purification of lecithin from egg yolk is illustrated. The common steps in the process include a) homogenization and extraction of yolks was carried out from fresh eggs using acetone, b) solubilization with ethanol and solvent elimination and c) repeated solubilization/precipitation was carried out with petroleum ether or acetone. This crude extract was chromatographed on alumina which was neutral in nature, and was exhaustively washed with chloroform before elution with chloroform and methanol, which helped in the sequential separation of fatty acids and lecithin. This fast procedure yields fatty acid-free lecithin at a competitive cost.

Emulsifying properties of egg yolk as a function of pH and oil volume were studied by (Y. Mine 1998)**[4]** as depicted by Fig. 1 and Fig. 2. Egg yolk proteins formed larger emulsion particles at pH 3 and mean droplet size of the emulsions were decreased with increasing pH. Egg yolk proteins led to the formation of thicker multilayers at low oil content. However, total protein adsorption ratio against original proteins was 55-65%, independent to protein as well as oil concentration. Also, Electrophoretic analysis of the egg yolk emulsions revealed that the main components to adsorb at the interface were granular lipovitellins. The results indicated that the main contributor for egg yolk emulsion is granules and it can affect the emulsifying properties of egg yolk at different pH values.

The emulsions prepared from egg yolk are found to have high functional and textural value. Stability and rheological properties are intimately related to interactions taking place among adsorbed protein molecules either within the interfacial film or between neighbouring oil droplets. The rheological properties of this system depend heavily on the size of the oil droplets as well as on oil volume fraction. Spray-dried yolk produces emulsions exhibiting higher viscoelasticity compared to those of native yolk as discussed by(Chen, Zhang, Sun and Wei 2014)**[8]**.

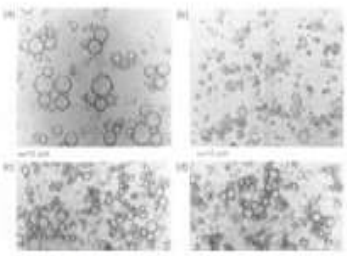

*Fig.1: Micrographs of egg yolk emulsions at a) pH 3, b) pH 5, c) pH 7 and at d) pH 9. Emulsions were prepared using 2 % (w/w) egg yolk

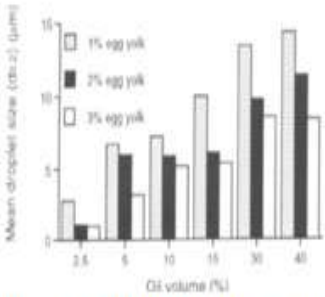

*Fig.2: Changes of mean droplet size of emulsions as a function of oil volume at different pH values. Emulsions were prepared with 2% (w/w) egg yolk (Y. Mine, 1998) [4].

IV.EXTRACTION OF PECTIN FROM ABELMOSCHUS ESCULENTUS

Abelmoschus esculentus or okra has a substantial content of polysaccharide present it that confers it athick and slimy nature. In the work done by (Georgiadis ,Ritzoulis, Sioura, Kornezou, VasiliadouandTsioptsias, 2011)**[5]**,okra polysaccharide extracts were investigated for their composition and structure. Emulsifier was characterized for protein content, zeta potential and subjected to high pressure size exclusion chromatography. Emulsions were prepared by mixing equal volumes of stock emulsion (A) and an okra extract solution (B) of either hot buffer soluble solids (HBSS) or chelating agent soluble solids (CHSS) or diluted alkali soluble solids (DASS). It was found that the HBSS extract exhibited extensive flocculation, strong shear-thinning rheology and fast creaming at low concentration. However at a high concentration (1.25% - 2.5%) creaming greatly reduces. On the other hand CHSS exhibiting almost the same behaviour did not reduce creaming even at a concentration of 2.5%. DASS exhibited intermediate behaviour and a concentration of more than 1.65% delayed creaming.

In another work done by (Gangurde, 2012)**[6]**, emulsifier was extracted from the mucilage content of okra. Immature fruits were homogenized and extracted using sodium metabisulphate and ethanol. The brown colour emulsifier powderobtained was pulverized and screened using 80# sieve. The extraction process was followed by phytochemical evaluation and determination of viscosity, particle size distribution and stability. Results indicated better properties exhibited by the okra gum as compared to acacia gum.

The emulsifying efficiency and capacity of gum extracted from okra pods in model acidic emulsions of hexadecane in water at pH 3.0 was investigated by (Alba, Ritzoulis, Georgiadis and Kontogiorgos, 2013)**[7]**. Isolation of pectin, a heteropolysaccharide, was carried out at a pH of4.0, Okra Extract4 (OE4) and 6.0(OE6)(Fig. 3). OE6 proved to be more stable in terms of droplet size distribution and average droplet size after 30 days of storage whereas OE4 exhibited Ostwald's ripening. Interms of viscosity, OE6 showed a value twice that of OE4.

The effect of extraction parameters of pectin from okra extracts was studied by (Chen,Zhang, Sun and Wei,2014)**[8]**. In their work, the parameters studied were effect of pH, temperature, extraction time and liquid-solid ratio on the pectin yield. Response surface methodology, a statistical method that reduces the number of trials, was used to optimize the experimental conditions (Fig. 4). Rheological properties were also studied and a polynomialregression model was used to describe the results. The optimal conditions were a temperature of 40°C, extraction time of 64 minutes, liquid-solid ratio of 42:1 and a pH of 3.9. The emulsions depicted pseudoplasticbehaviour, high viscosity and shear-thinning behaviour.

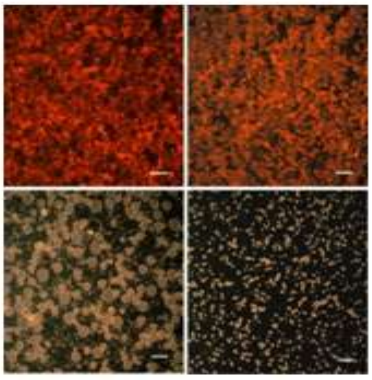

*Fig.3: Fluorescent micrographs of emulsions containing 1.44% w/v OE4 (top left) and OE6 (top right) after 6 hours of preparation. The bottom micrographs and depict the same after dilution (1:1000). Scale bars represent 100 µm (Alba, Ritzoulis, Georgiadis, and Kontogiorgos, (2013) [7].

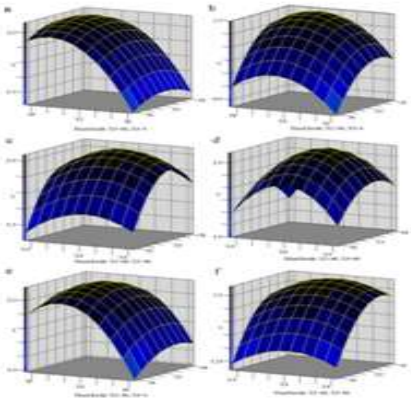

*Fig.4: Response surface (3D) showing the effect of different extraction parameters on the okra pectin yield. Y: okra pectin yield; X1: extraction temperature, °C; X2: liquid-solid ratio, X:1; X3: extraction time, minute; X4: pH (Chen,Zhang, Sun, and Wei, 2014) [8].

V.EXTRACTION OF PECTIN FROM ORANGE PEEL

Orange peel is a rich source of pectin. Pectin is a natural food-additive used extensively in food industries as a thickener, a texturizer, a stabilizer and other applications include fat replacer in spreads, salad dressing, ice-cream etc. as discussed by (Liu, Shi and Langrish, 2006)**[9]**. Also, according to (Yeoh, Shi and Langrish, 2008)**[10]** the world market demand for pectin is an excess of 30000 tons annually and growing by 4-5% per annum. Therefore, it is necessary to establish a method by which the pectin could be extracted in a shorter time and in better quality.

In a technical note by(Maran, Sivakumar,ThirugnanasambandhamandSridhar ,2013)**[11]**, extraction of pectin from orange peel using microwave is described. It has many advantages like shorter time, less solvent, higher extraction, better products with lower cost. The steps associated with this extraction are a) Removal of peels, fine cutting and drying in a hot oven at 60° C until it attains a constant weight. b) Addition of different amount of distilled water (10-20-30 ml) with different pH (1-1.5-2) to 1 g of orange peel powder placed in 250 ml Pyrex beaker. c) Exposure to microwave at different powers (160-320-480 w) for selected irradiation time (60-120-180 s).d) Cooling down to room temperature and filtering using filter. e) Centrifuging filtered extract and precipitation of supernatant with equal volume of 95% (v/v) ethanol. f) Washing of coagulated pectin with 95% (v/v) ethanol for three times. g) Drying of wet pectin at 50° C in hot air oven until weight was constant and weighed.Pectin yield was calculated from following equation proposed by (Li, Jia, Wei and Liu, 2012)**[12]**.

PY= (m_o/m) ×100(1)

m_o= weight of dried pectin (g)

m= weight of dried orange peel powder (g)

By studying the experimental data (Fig.5) it was found that extraction efficiency was improved by raising microwave power from 160 to 480 W. Pectin yield was increased steadily and reached maximum at 125 s, but excessive time exposure in microwave field may cause the degradation of pectin which was investigated by (Xianzhe, Fangping, ChenghaiandXiangwen, (2011)**[13]**. Pectin yield was increasing with decreasing pH value and increasing solid-liquid ratios (upto 1:16 g/ml).

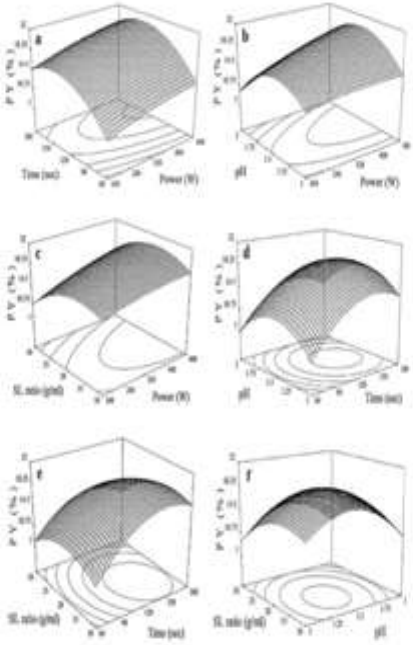

***Fig.5: Effect of process variable on extraction yield of pectin PY% v/s-(a) Time,P^H (b) P^H, Power (c)SL.Ratio,Power (d) P^H,Time (e) SL.Ratio, Time and (f) SL.Ratio, pH(Maran, Sivakumar, Thirugnanasambandham and Sridhar, 2013)[11].**

VI. RESULTS AND DISCUSSION

The review clearly lists down inexpensive and feasible methodologies to extract useful emulsifiers from natural organic sources. It also explicitly depicts the effect of various parameters on the extraction procedure that would result in optimization.The emulsions prepared from egg yolk are found to have high functional and textural valuewhile the extraction of pectin from okra indicated better properties exhibited as compared to acacia gum. The extraction of pectin from orange peel is also feasible in shorter time, using less solvent, giving higher extraction and better products with lower cost.Thus; the nature of extracted emulsifiers makes them suitable for practical applications.

VII. CONCLUSION

Although we have identified few potential sources for extracting the emulsifiers, it becomes important to look into other potent natural sources. Economizing on the quantity of the initial raw material is also an important consideration to bear in mind. Varying the initial raw material amount to achieve the best emulsification can

form the further scope of this review. Extension of the above mentioned laboratory scale extraction to the commercial scale should also be further looked into.

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IMPLEMENTATION OF TRUST RANK ALGORITHM ON WEB PAGES

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ABSTRACT

On every e-commerce web sites how to use web mining technology for providing security is a big issue. The connection between web mining security and ecommerce analyzed based on user behavior on web . Based on customer behavior different web mining algorithms and security algorithm are used to provided security on e-commerce web sites. In order to provide security this application will develop false hit database algorithm, nearest neighbor algorithm and trust rank algorithm to provide security on e-commerce web site.

***Keyword*: *Web Mining,Security, E- Commerce*.**

I INTRODUCTION

The World Wide Web popularity leads to a revolution towards electronic commerce. Network transactions, electronic payments and on-line receipts are changing the traditional ways of doing business. Many companies take benefits of the e-commerce chances and other institutions will follow. The rapid growth of e-commerce is attracting the attention of businesses with its characteristics high-efficiency, low cost, high-profitability and global application. However, Security fears cause million dollars loss for e-commerce retailers .

Lack of trust is one of the main reasons which can make e-commerce less attractive because of the fear of credit card numberor sensitive information being stolen[4]. The increasing number of the web security attacks causes fears to consumers that resulted in lack of trust. Hence, many businesses and internet users are reluctant to use the new technology.

According to the largest internet security company McAfee , almost half of consumers had terminated an order or due to security fears. Even in an attempt to get a good deal, 63% consumers will refuse to purchase from a Website that does not show a Trustmark or security policy. Usually, e-commerce firms seek to get trust of their users by creating and advertising new security strategies, but the security threat is still growing and affecting e-commerce firms negatively. The issues of available reliable security technology and exploitation are not only limited to e-commerce technologies, but also broadly impacting computer and information systems throughout the world

especially in developing countries because there are many gaps and lack of awareness as they are still at the exploratory stages.

1.1 E-Security Issues and Trust

"A security threat has been known as a situation, or event with the potential to effect economic adversity to data or network resources in the form of destruction, disclosure,modification of data, denial of service, and/or fraud, waste, and abuse Security, then, is the protection against these threats". Under this definition, threats can be made either through network and data transaction attacks, or via unauthorized access by means of defective authentication. This definition must be tailored in order to be appropriate to consumer transactions to acknowledge that consumer information has value. For customers, it must be recognized that economic hardship encompasses damages to privacy as well as theft, of credit information and authentication issues for consumers will be overturned; as in whether the Web site is 'real' rather than whether the purchaser's identity is real. This modified definition explains the security threats from a consumer's point of view. Security inB2C electronic commerce is reflected in the technologies used to secure customer data. Security concerns of consumers may be addressed by many of the same technology protections as those of businesses, such as encryption and authentication[1].

Because of all these security issues there is a great need of web security. Therefore the proposed system will implement the security by implementing the Trust Rank algorithm. The Proposed System consist of three phase's web structure mining analysis, Web Content Mining analysis, decision analysis.

II. WEBMINING FRAMEWORK SYSTEM

Web mining is the use of data mining techniques to automatically discover and extract knowledge from web documents.web mining is the information service centre for news, e-commerce, and advertisement, government, education, financial management, education, etc. We have developed Web mining framework for evaluating ecommerce web sites[1] .In general web mining task can be classified into web content mining, web structure mining and web usage mining. Some of the well-known classification techniques for web mining such as like, page rank algorithm and trust rank algorithm is used in this paper.

III. WEB STRUCTURE MINING ANALYSIS

This phase analyses a web site by using both page rank algorithm and trust rank algorithm. The ranking of a page is determined by its link structure instead of its content. The trust rank algorithm is procedure to rate the quality of web sites. The output is quality based score which correspond to trust assessment level of the web site. The initial step is collects information from web sites and stores those web pages into web repository.

3.1 Page Rank Algorithm

Page Rank algorithm used by search engine .We have computed page rank of web sites by parse web pages for links, iteratively compute the page rank and sort the documents by page rank engine .Page Rank algorithm is in fact calculated as follows

PAR(A)=(1-d) +d(PAR(T1)/OG(T1)+….+PAR(TN)/OG(TN)

Where PAR(A) is the PageRank of page A

0G(T1) is the number of outgoing links from page T1

d is a damping factor in the range 0<d<1 ,usually set to 0.85

The PageRank of web page is calculated as sum of the PageRank of all pages linking to its divided by the number of links on each of those pages its outgoing link.

3.2 Trust Rank Algorithm

The trust rank algorithm is procedure to rate the quality of web sites. Taking the linking structure to generate a measure for quality of a page. Steps of Trust Rank algorithm.

1 The starting point of the algorithm is the selection of trusted web pages.

2 Trust can be transferred to other page by linking to them.

3 Trust is propagating in the same was as Page Rank

4 The negative measure is propagating backwards and is a measure of bad pages

5 For the ranking algorithm both measures can be taken into account.

Trust Rank algorithm is in fact calculated as follows

Trust Rank = Trust Rank Of the User + Trust Rank of the Web Page

Trust Rank Of The User : It uses nearest neighbor algorithm.

Whenever user register into the system he has to give the reference of the previous trusted user. The trust value of the user is calculated as

Trust Value = Trusted value of the referenced user / 2

Trust rank of Web pages :

As the user visit the web page he has to assign the rank value to that particular page.

The number of user visited to that page will give the different rank values to that page. Therefore the final trust rank of the page is calculated as

Trust value of the Page = Average trust value assign by each user to the page

IV. WEB CONTENT MINING ANALYSIS

Web content mining is defined as searching of new information from web data. Data is retrieved for desired topic by user. In Web content mining analysis we have taken example product categories & their features associated with them.

We are performing a cluster analysis on the products in two phases. Hierarchical agglomerative Clustering is the first step to identify unique skill set clusters. The classification of product is validated into clusters by performing k-means cluster analysis.

4.1 Hierarchical Agglomerative Clustering

Hierarchical clustering is a bottom-up clustering method where clusters have sub-clusters, which in turn have sub-clusters, etc. The classic example of this is species taxonomy. Gene expression data might also exhibit this hierarchical quality (e.g. neurotransmitter gene families). Agglomerative hierarchical clustering starts with every single object (gene or sample) in a single cluster. Then, in each successive iteration, it agglomerates (merges) the closest pair of clusters by satisfying some similarity criteria, until all of the data is in one cluster. The hierarchy within the final cluster has the following properties: Clusters generated in early stages are nested in those generated in later stages. Clusters with different sizes in the tree can be valuable for discovery. A Matrix Tree Plot visually demonstrates the hierarchy within the final cluster, where each merger is represented by a binary tree.

Process: Assign each object to a separate cluster. Evaluate all pair-wise distances between clusters . Construct a distance matrix using the distance values. Look for the pair of clusters with the shortest distance. Remove the pair from the matrix and merge them.Evaluate all distances from this new cluster to all other clusters, and update the matrix. Repeat until the distance matrix is reduced to a single element.

Advantages: It can produce an ordering of the objects, which may be informative for data display. Smaller clusters are generated, which may be helpful for discovery.

4.2 K-Means Cluster Analysis

K-means clustering is a method of cluster analysis which aims to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean. It is similar to the expectation-maximization algorithm for mixtures of Gaussians in that they both attempt to find the centers of natural clusters in the data as well as in the iterative refinement approach employed by both algorithms.

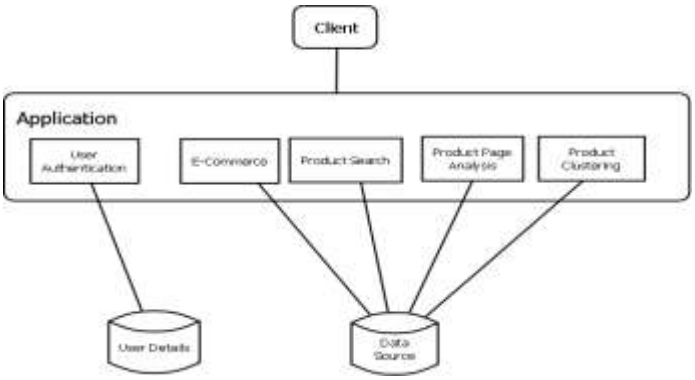
Process: The dataset is partitioned into K clusters and the data points are randomly assigned to the clusters resulting in clusters that have roughly the same number of data points. For each data point: Calculate the distance from the data point to each cluster. If the data point is closest to its own cluster, leave it where it is. If the data point is not closest to its own cluster, move it into the closest cluster. Repeat the above step until a complete pass through all the data points results in no data point moving from one cluster to another. At this point the clusters are stable and the clustering process ends. The choice of initial partition can greatly affect the final clusters that result, in terms of inter-cluster and intra cluster distances and cohesion.

Advantages: With a large number of variables, K-Means may be computationally faster than hierarchical clustering (if K is small).K-Means may produce tighter clusters than hierarchical clustering, especially if the clusters are globular.

V.DECISION ANALYSIS

This phase uses the total trust of web page generated from Web structure mining analysis phase to perform the Trust calculation of web site.

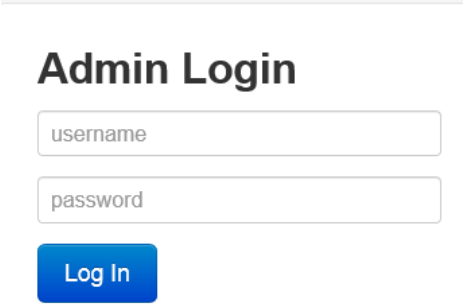
VI. MODULES OF THE PROPOSED SYSTEM& ITS ARCHITECTURE



Architecture of the proposed system consist of the following modules

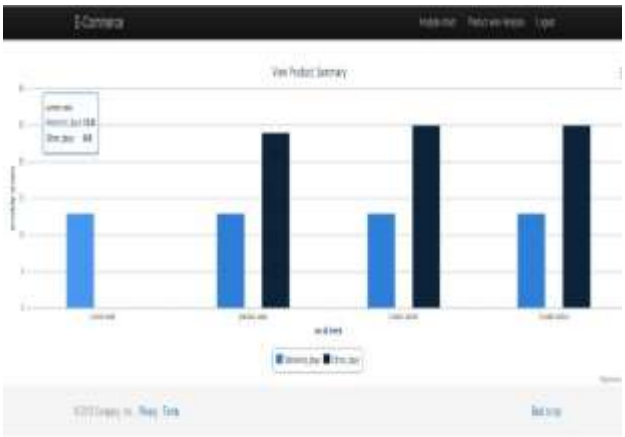
6.1 User Identification

Users are of different categories. New Users will get registered in the system. Existing users can logon to their account. Administrator has the highest priority. Generate user profiles based on their access patterns.The administration login module is as follows.



The user login module is as follows.

After admin has login into the system he can view number of approved users in the system,productwise analysis of the system & analysis chart of the system. With the help of analysis chart admin can analysis the last 4 weeks products updates.

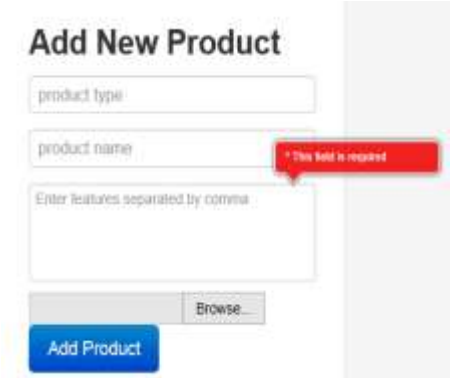


6.2 E-Commerce Module

This will facilitate users to add products and their features into the system in a particular format. It will also facilitate to view the valid product list populated. This will lead to generation of pages related to products which will be validated for its trust level based on the Trust Rank mechanism.

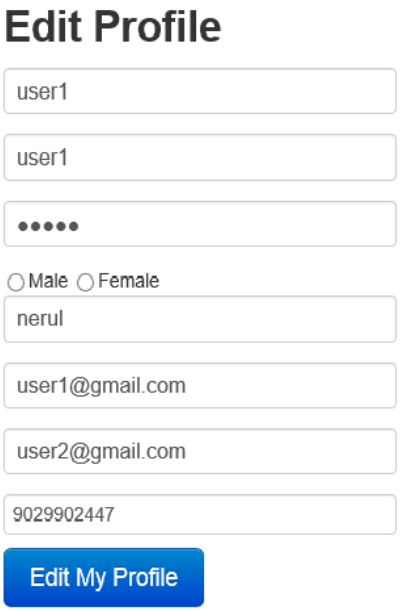
1) Add Product Module

This module facilate the user to add the products & their features into the system



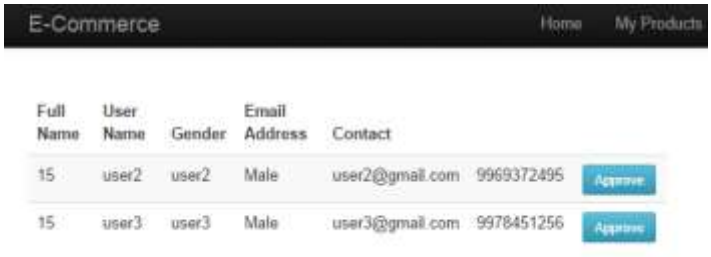
2) Edit Profile Module

User can edit his own profile by using this module.g.change address, change email-id etc.



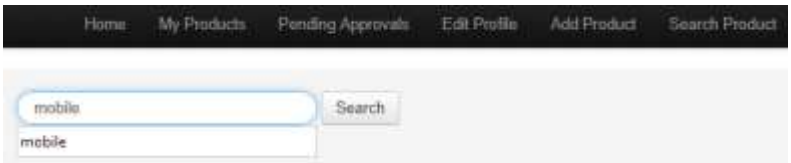
3) Pending Approval Module

As each user registered in the system he has to give reference email address of another user. User can enter into the system if the refered user will approve him. This module will display the pending approval for the user.

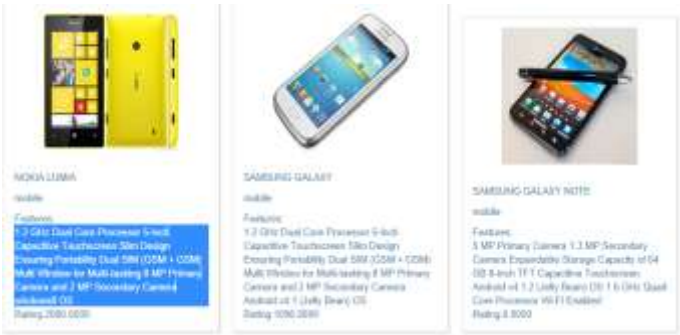


6.3 Product Search Module

This module will facilitate searching of the products present in the product list based on the keyword specified as well as the Trust Rank associated with the product. Thereby, the user will be facilitated to perform an accurate searching of products.



As the user enter the product to be search it will display all the products available in the system according to the keyword & the features of the product.



6.4 Product Clustering

This module will facilitate the system to categorize the products into various categories based on a selected set of characteristics. These clustered products will be utilized for performing the search process. The cluster database are as shown

6.5 Product Page Analysis

This module will facilitate the system to analyze various product pages and finalize the Trust Rank associated with them. Thereby, the product validity will be decided by the system based on the Rank associated with them. Thus, only valid products will be displayed by the application on the product page.

VII. CONCLUSION

In this paper we have proposed web mining framework for e-commerce web sites. In web mining framework we have developed three phases' web structure mining analysis, Web Content Mining analysis, decision analysis. In web structure mining analysis we have used page rank algorithm and trust rank algorithm. In Web Content Mining analysis we have used Hierarchical agglomerative clustering and k-means cluster analysis. In decision analysis we have used trust calculation of web site to analyses the result of the evaluation.

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RELIABLE QSAR FOR ESTIMATING KOC FOR PERSISTENT ORGANIC POLLUTANTS: CORRELATION WITH MOLECULAR CONNECTIVITY INDICES

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ABSTRACT

Persistent organic pollutants (POPs) are chemicals that persist for a very long time in the environment and consequently may concentrate to a high level (10^6) in the food chain. They may also cause toxic effects on the animal and human reproduction, development and immunological function. Several recent studies have shown that the logarithmic n-octanol/water partition coefficient (logKow) may not be a good predictor for estimating soil sorption coefficients of persistent organic pollutants (POPs), defined here as chemicals with LogKo/w greater then 5. Thus an alternative QSAR model was developed that seems to provide reliable estimates for the soil sorption coefficients of persistent organic pollutants (POPs). Quantitative structure–activity relationship (QSAR) model for soil absorption coefficients of 18 persistent organic pollutants (POPs) is analyzed using multiple linear regression analysis (MLRA) followed by statistical evaluation by SPSS software (IBM). In order to indicate the influence of different molecular descriptors on soil sorption coefficients values and well understand the important structural factors affecting the experimental values, a set of physiochemical and topological parameters were taken into consideration. The proposed models gave the following results: the square of correlation coefficient, R^2, for the models with one, two and three molecular descriptors are 0.5960, 0.6738 and 0.8948.

Keywords: Persistent Organic Pollutant (Pops) , Quantitative Structure Activity Relationship (QSAR), SPSS .

I. INTRODUCTION

Persistent organic pollutants (POPs) are chemicals that persist for a very long time in the environment and consequently may concentrate to a high level (10^6) in the food chain. The Stockholm Convention, held in May 2001, focuses on eliminating or reducing releases of 12 POPs, the so-called “Dirty Dozen”. These 12 chemicals include aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, and toxaphene used principally as pesticides, two

industrial chemicals polychlorinated biphenyls and hexachlorobenzene used in industry but also produced unintentionally together with dioxins and furans. The chemicals known as persistent organic pollutants act as powerful pesticides and serve a range of industrial purposes. Some POPs are also released as unintended by-products of combustion and industrial processes.While the risk level varies from POP to POP, by definition all of these chemicals share four properties:

1) They are highly toxic;

2) they are persistent, lasting for years or even decades before degrading into less dangerous forms;

3) they evaporate and travel long distances through the air and through water; and

4) they accumulate in fatty tissue.

This is a dangerous combination. The persistence and mobility of POPs means that they are literally everywhere in the world, even in the Arctic, Antarctica, and remote Pacific islands. Their attraction to fatty tissue, known as "bioaccumulation", means that even though a poison is first dispersed widely and thinly it gradually starts to concentrate as organisms consume other organisms as they move up the food chain. The chemicals reach magnified levels – up to many thousands of times greater than background levels – in the fatty tissues of creatures at the top of the food chain, such as fish, predatory birds, and mammals, including human beings. Worse still, during pregnancy and breastfeeding these POPs are often passed on to the next generation. Human beings and other mammals are thus exposed to the highest levels of these contaminants when they are most vulnerable – in the womb and during infancy, when their bodies, brains, nervous systems, and immune systems are in the delicate process of construction.

Direct contact with POPs can cause acute effects – accidents with pesticides, for example, have killed and seriously sickened agricultural workers. But the kind of harm caused to human beings by low levels of POPs – cancer, immune-system disruption, nervous-system damage, liver damage, memory loss, endocrine disruption, birth defects, other reproductive problems – can be difficult to prove conclusively. It is hard to demonstrate that someone's immune system is weaker than it might have been, let alone that a particular chemical is the culprit. Nervous-system damage may result in something as basic and yet as nebulous as a lower level of intelligence. Once again, this can be hard to demonstrate beyond challenge. But unless precautionary action is taken to curtail exposure to these chemicals, millions of people – not to mention millions of other creatures ranging from lake trout to penguins – are likely to suffer terrible harm. They may also cause toxic effects on the animal and human reproduction, development and immunological function.[1]

Typical examples of these chemicals are Polychlorinated bi phenyls (PCBs), Polychlorinated dibenzo p-dioxims and furans, polycyclic aromatic hydrocarbons (PAHs) and pesticides such as DDT, Chlordane and Heptachlor. To deal with POPs, the nations of the world really will have to work together as a team. That will be good for eliminating the use of these dangerous chemicals and if such cooperation becomes a habit, it could be good for facing up to many other global problems as well.

One chemical property that is of particular importance in evaluating the fate and persistence of POPs in the environment is the soil/water partition coefficient normalizes to organic carbon (Koc). Since measured Koc data are not available for majority of those chemicals, numerous correlations have been developed relating Koc to other

physicochemical or structural descriptors, in particular with the n-octanal/water partition coefficient (Kow).[2-3] This has enabled simple and fast estimation of Koc for POPs.[4]

However, *Aleksandar Sabljic* et al have observed the breakdown in linear relationship between LogKoc and LogKow as a chemical's LogKow reached the range of 6 to 7. Furthermore, Baker et all [5] Have demonstrated using a high quality database of LogKoc test using a high quality database of Koc values for 18 POPs that there is only a week correlation between LogKoc and LogKo/w (R^2=0.2940) and its application will result in predicted values which may be off by a factor of 15.[6-9] Many coworkers has shown correlation with LogKoc.

II. MATERIALS AND METHODS

2.1. Data Set

All data of the present investigation were obtained from the reference *(Aleksandar Sabljic et al., 2000)*. The data set for this investigation consisted of 18 POPs is reported into (Table no. 1).

2.2. Molecular Descriptor Generation

To obtain a QSAR model, compounds are often represented by the molecular descriptors. The calculation process of the molecular descriptors was described as below: The two-dimensional molecular structures of 18 POPs were drawn by Chem Sketch 12.0 then calculated some parameters. Then this optimize structure files were exported into software Dragon 6.0 to calculate all kinds of descriptors. The software Dragon 6.0 can calculate Physicochemical parameters, constitutional, topological, geometrical, descriptors and has been successfully used in various QSAR researches. Then value of all parameters put into NCSS statistical and data

analysis software or SPSS (We can also use MSTAT & NCSS instead of SPSS) statistical and data analysis software to get data regression and correlation. Constitutional descriptors are related to the number of atoms and bonds in each molecule. Topological descriptors include valence and non-valence molecular connectivity indices calculated from the hydrogen-suppressed formula of the molecule, encoding information about the size, composition, and the degree of branching of a molecule. The topological descriptors describe the atomic connectivity in the molecule. The geometrical descriptors describe the size of the molecule and require 3Dcoordinates of the atoms in the given molecule. The electrostatic descriptors reflect characteristics of the charge distribution of the molecule. The quantum chemical descriptors offer information about binding and formation energies, partial atom charge, dipole moment, and molecular orbital energy levels.

III. RESULTS AND DISCUSSION

By using the multiple linear regression analysis (MLRA) method of QSAR, regression models were developed for 18 POPs. To select the sets of descriptors that are most relevant to logKow & logKoc values and effectively show the relation between descriptors , logKow & logKoc values of these compounds, three subsets with the descriptors from one to three were determined to establish the QSAR models. However, Baker et al have observed the breakdown in linear relationship between LogKoc and LogKow as a chemical's LogKow reached the range of 6 to

7. Multi-linear regression method for descriptor selection proceeds with a reselections of descriptors by sequentially eliminating descriptors which do not match any of the following criteria: (i) the F-test greater than one unit; (ii) R^2 value less than a value defined at the start (default 0.01); (iii) the student's t-test less than that defined (default 0.1); and (iv) duplicate descriptors having a higher squared inter-correlation coefficient than a predetermined level (usually 0.8). The next step involves correlation of the given property with (i) the top descriptor in the above list with each of the remaining descriptors, and (ii) the next one with each of the remaining descriptors, etc. The goodness of the correlation is tested by the correlation coefficient (R^2) and The stability of the correlations was tested against the cross-validated coefficient (R^2 CV). Besides, it will demonstrate which descriptors have bad or missing values, which descriptors are insignificant, and which descriptors are highly intercorelated .This information will be helpful in reducing the number of descriptors involved in the search for the best QSAR/QSPR model. Comparison with *Aleksandar Sabljic* et al we have observed that in our case R^2 for models with one, two and three molecular descriptors are 0.5960, 0.6738 and 0.8948. Our results are much more superior then the result reported by *Aleksandar Sabljic* et al. Therefore simple 2D QSAR reported by us is much betters then the QSAR modeling of *Aleksandar Sabljic* et al.

Following topological indices have been calculated using Dragon software and they are reported in (Table no. 2). The calculating connectivity indices have been calculated is in (Table no. 3). Topological parameters used for modeling LogKoc value for set of 18 compound's used in present sturdy, when single parameter is used 17 mono-parametric model have been obtained. No significant mono-parametric model is obtained. When two parameter are taken together 10 bi-parametric model have been obtained. Out of 10 bi-parametric models the best model contains LogKow and J. The R^2 value of best model is 0.6377.The best model is as given below.

3.1 Best Bi-Parametric Model

LogKoc=0.3730(±0.1448)LogKow -1.0270(±0.2722)J +5.2507

N=18, Se=0.0805, R^2=0.6377, R^2A=0.5894, F-Ratio=13.2040, Q=9.9200

In the above model LogKow has positive coefficient and J has negative coefficient. Suggesting that the high value of LogKow and low value of J will favor the modeling of LogKoc.

When three parameters are taken together eight tri-parametric models have been obtained. These models are statistically are better then there bi-parametric models. The best model contains BAC, J and Jhetm having R^2 value 0.8277. The model is as given below.

3.2 Best Tri Parametric Model

LogKoc=0.039(±0.0082)BAC -6.3928(±1.0153)J 1.9091(±0.3849)Jhetm +11.4779

N=18, Se=0.0574, R^2=0.8277, R^2A=0.7908, F-Ratio=22.4230, Q=15.8498

In the above model BAC and Jhetm have positive coefficient and J has negative coefficient, suggesting that the high value of BAC and Jhetm and low value of J will favor the modeling of LogKoc.

The observed and estimated activity along with difference the LogKoc values for the compounds used in the present study using the best model are reported in (Table no. 5). Also the predictive power of the model comes out to be

0.8277 as demonstrated in (Figure no. 1). This is also confirm on the basis of cross-validated parameters as reported in (Table no. 7). A study of (Table no. 6) shows that compound no. 6 is serious outlier there for it is not considered in deriving new models. However we observed improvement in quality of statistics only in all the previously discussed models. They are reported in (Table no. 8). The new tri-parametric model has now R^2 value 0.8948 and in the best using model the LogKoc values calculated for different compounds and they are reported in (Table no. 9). A plot between observed and estimated LogKoc values has been drawn which shown in (Figure no. 2). The cross-validated parameters are for these models are reported in (Table no. 10). The best model after deleting of compound no. 6 is as given below.

3.3 Best Tri Parametric Model without considereing compound no. 6

LogKoc=0.0335(±0.0068)BAC -6.1480(±0.8094)J 1.8226(±0.3067)Jhetm +11.4419

N=18, Se=0.0453, R^2=0.8948, R^2A=0.8706, F-Ratio=36.8700, Q=20.8816

IV. CONCLUSION

A quantitative structure–activity relationship model was derived to study the logKow and LogKoc values of a diverse set of 17 POPs. Three QSAR models were developed with the squared correlation coefficient ($R^{2)}$ of one, two and three molecular descriptors are 0.5960, 0.6738 and 0.8948. These models showed strong predictive ability. The present work provides an effective method for the prediction of the logKow and LogKoc values for the POPs. This study also showed that the utility of the QSAR treatment involving descriptors derived solely from chemical structure and the correlation equation and descriptors can be used for the prediction of the logKow and LogKoc values for unknown structures. Following conclusion may be drawn on the basis of above discussion. To understand the correlated values among the parameters a correlation matrix has been obtained which is demonstrated in (Table no. 4). Close look at this matrix has been obtained which is demonstrated in (Table no. - 4).Close look at this table revels that…

CO-RELATION

1. The LogKoc has poor co-relation with the Topological parameters used.
2. LogKow has poor co-relation with all the parameter we have used.
3. W has moderate co-relation with Balaban and Balaban type indices, poor co-relation with BAC and good co-relation with 0X, 1χ, 2χ and 1χv.
4. J and all the Balaban type indices have good co-relation with among themselves and with 0χ, 1χ, 2χ and 3χ.
5. BAC has poor co-relation with all the parameters used.
6. All the Ranadic and Kiren Hall type of connectivity type indices has good co-relation among themselves except 3χv which has poor co-relation.

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Table- 1 Details of compounds with their activity LogKoc and logKow values used in the present study.

S.No.	Chemical name	logKoc	logKow
1	Benza[a]anthracene	5.6200	5.7900
2	Benzo[a]pyrene	6.6400	5.9700
3	Chlordane	5.3600	5.8000
4	4,4'-DDT	4.6700	6.9100
5	1,2:5,6dibenzaanthracene	5.9400	6.5000
6	Fluoranthene	4.8800	5.1600
7	Hexachlorobenzene	4.3100	5.7300
8	Methoxychlor	4.9000	5.0800
9	2,2',3,4,4',5'hexachlorobiphenyl	5.9300	7.2500
10	2,2',3,4',5',6hexachlorobiphenyl	5.7900	6.8600
11	2,2',4,4',5,5'hexachlorobiphenyl	5.8600	7.4400
12	2,2',5,5'tetrachlorobiphenyl	5.4100	6.0900
13	2,2',3,4,5'pentachlorobiphenyl	5.7300	6.8500
14	2,2',3,5',6 pentachlorobiphenyl	5.5500	6.5500
15	2,2',3,4',5' pentachlorobiphenyl	5.6900	6.6700
16	Pentachlorobenzene	4.5900	5.1800
17	pentachlorophenol	4.5200	5.1200
18	2,3,7,8-TCDD	6.6600	6.4200

Table - 2 Values of calculated topological parameters for the compounds used in the present study.

Comp.no.	W	J	JhetZ	Jhetm	Jhetv	Jhete	Jhetp	BAC
1	553.0000	1.5120	1.9630	1.9630	1.9630	1.9630	1.9630	0.0000
2	680.0000	1.4870	2.1490	2.1490	2.1490	2.1490	2.1490	0.0000
3	469.0000	2.1490	2.5950	2.6050	2.2070	2.3180	2.3080	65.0000
4	678.0000	2.0370	2.6890	2.6940	2.4740	2.5390	2.5330	27.0000
5	971.0000	1.3460	1.7390	1.7390	1.7390	1.7390	1.7390	0.0000
6	364.0000	1.6770	2.5160	2.5160	2.5160	2.5160	2.5160	0.0000
7	174.0000	2.7600	4.8310	4.8680	3.6040	3.9230	3.8940	37.0000
8	932.0000	1.9910	2.5950	2.5970	2.1810	2.5190	2.1530	35.0000
9	571.0000	2.0620	3.3050	3.3160	2.9000	3.0180	3.0080	37.0000
10	555.0000	2.1260	3.4170	3.4280	2.9830	3.1090	3.0980	37.0000
11	573.0000	2.0550	3.2930	3.3030	2.8910	3.0080	2.9980	37.0000
12	412.0000	2.0240	3.2050	3.2130	2.8800	2.9760	2.9680	17.0000
13	486.0000	2.0500	3.2690	3.2780	2.8960	3.0050	2.9960	26.0000
14	472.0000	2.1160	3.3830	3.3930	2.9820	3.0990	3.0890	26.0000

15	486.0000	2.0490	3.2670	3.2760	2.8940	3.0040	2.9940	26.0000
16	140.0000	2.6250	4.5490	4.5810	3.4560	3.7430	3.7180	26.0000
17	174.0000	2.7600	4.6700	4.6980	3.4020	3.9330	3.5650	37.0000
18	571.0000	1.6880	2.5360	2.5400	1.5460	2.3980	1.4670	17.0000

Table - 3 Values of calculated connectivity indices for the compounds used in the present study.

Comp.no.	0χ	1χ	2χ	3χ	0χv	1χv	2χv	3χv
1	11.9490	8.9160	7.9860	7.2780	10.1350	6.4820	5.0250	3.9710
2	13.1040	9.9160	9.1280	8.6240	11.1880	7.2500	5.7440	4.6730
3	13.6190	8.1690	8.8580	8.8770	14.5350	8.4150	9.1900	9.2800
4	14.0440	8.8760	8.9320	6.1370	13.3660	7.3430	7.3200	3.8930
5	14.5180	10.8990	9.8910	9.2130	12.5500	8.1720	6.4820	5.2780
6	10.5350	7.9490	7.1390	6.7330	8.7740	5.5650	4.2550	3.4120
7	9.4640	5.4640	5.1550	4.9760	9.8030	4.9020	4.1520	4.0040
8	15.4580	9.9520	9.2700	6.9530	13.9140	7.4340	6.8900	3.8800
9	13.4470	8.4140	8.0040	6.9970	13.1130	6.9670	5.8540	4.6640
10	13.4470	8.4140	8.0350	6.8230	13.1130	6.9670	5.8780	4.4770
11	13.4470	8.3970	8.1340	6.7300	13.1130	6.9610	5.9360	4.3800
12	11.7070	7.5750	7.1190	5.5900	11.0000	5.9940	4.9360	3.2760
13	12.5770	8.0030	7.4960	6.4280	12.0560	6.4830	5.3540	4.1120
14	12.5770	8.0030	7.5280	6.2540	12.0560	6.4830	5.3780	3.9260
15	12.5770	8.0030	7.4980	6.4100	12.0560	6.4830	5.3540	4.1050
16	8.5940	5.0370	4.7680	4.1970	8.7470	4.4120	3.7300	3.2040
17	9.4640	5.4640	5.1550	4.9760	9.1170	4.5580	3.8080	3.4430
18	12.8610	8.5420	8.3640	7.1850	11.6610	6.3940	5.2590	3.8570

Table- 4 Correlation matrix showing inter-correlation among all the parameters with the activity.

	logKoc	*log kow*	*W*	*J*	*JhetZ*	*Jhetm*	*Jhetv*	*Jhete*	*Jhetp*	*BAC*
logKoc	1.0000									
log Kow	0.5422	1.0000								
W	0.4987	0.3304	1.0000							
J	-0.6917	-0.2210	-0.7349	1.0000						
JhetZ	-0.5818	-0.1600	-0.7944	0.9534	1.0000					
Jhetm	-0.5825	-0.1613	-0.7947	0.9537	1.0000	1.0000				
Jhetv	-0.5820	-0.0450	-0.7402	0.8612	0.9211	0.9204	1.0000			
Jhete	-0.5595	-0.1243	-0.7796	0.9339	0.9918	0.9913	0.9374	1.0000		
Jhetp	-0.5894	-0.0489	-0.7481	0.8723	0.9270	0.9265	0.9982	0.9361	1.0000	
BAC	-0.3108	0.1137	-0.2498	0.6787	0.4967	0.4969	0.4179	0.4765	0.4339	1.0000
0χ	0.5177	0.4997	0.9206	-0.5903	-0.7016	-0.7025	-0.6349	-0.6760	-0.6433	0.0661
1χ	0.6224	0.3479	0.9568	-0.8733	-0.9101	-0.9106	-0.8119	-0.8881	-0.8225	-0.3651
2χ	0.6044	0.3997	0.9313	-0.7932	-0.8844	-0.8847	-0.8137	-0.8716	-0.8184	-0.1690
3χ	0.6555	0.2308	0.7347	-0.7815	-0.8445	-0.8438	-0.7999	-0.8646	-0.7916	-0.1866
0χv	0.3623	0.5755	0.6829	-0.2438	-0.4070	-0.4076	-0.3626	-0.3966	-0.3592	0.4686
1χv	0.5231	0.4528	0.8394	-0.6241	-0.7605	-0.7604	-0.6732	-0.7649	-0.6666	0.0855
2χv	0.2347	0.3069	0.6243	-0.3153	-0.5448	-0.5443	-0.5078	-0.5669	-0.4924	0.4074
3χv	0.2037	0.1110	0.2143	-0.1229	-0.3097	-0.3080	-0.3179	-0.3711	-0.2850	0.4927

	0χ	*1χ*	*2χ*	*3χ*	*0χv*	*1χv*	*2χv*	*3χv*
0χ	1.0000							
1χ	0.8887	1.0000						
2χ	0.9410	0.9676	1.0000					
3χ	0.7190	0.8427	0.8662	1.0000				
0χv	0.8981	0.6188	0.7553	0.5547	1.0000			
1χv	0.9291	0.8640	0.9461	0.8647	0.8700	1.0000		
2χv	0.8025	0.6114	0.7756	0.6846	0.8886	0.9059	1.0000	
3χv	0.3983	0.2719	0.4389	0.6621	0.5819	0.6611	0.7912	1.0000

Table- 5 Regression parameters and quality of correlation with Topological and connectivity indices.

Model No.	Parameter used	Ai=(1…3)	B	Se	R^2	R^2A	F –Ratio	Q=R/Se
1	**LogKow**	0.4927(±0.1909)	2.3988	0.1088	0.2940		6.6617	4.9836
2	**W**	0.0015(±0.0007)	4.6669	0.1122	0.2487		5.2961	4.4447
3	**J**	-1.1816(±0.3084)	7.8441	0.0935	0.4784		14.6744	7.3974
4	**Jhetz**	-0.4505(±0.1574)	6.8480	0.1053	0.3385		8.1870	5.5252
5	**Jhetm**	-0.4458(±0.1555)	6.8379	0.1052	0.3393		8.2165	5.5370
6	**Jhetv**	-0.6773(±0.2366)	7.2408	0.1053	0.3388		8.1968	5.5276
7	**Jhete**	-0.6107(±0.2262)	7.1763	0.1073	0.3130		7.2904	5.2140
8	**Jhetp**	-0.5978(±0.2048)	7.0796	0.1046	0.3474		8.5164	5.6348
9	**BAC**	-0.0123(±0.0094)	5.7555	0.1231	0.0966		1.7105	2.5248
10	**0χ**	0.1918(±0.0792)	3.0674	0.1108	0.2680		5.8573	4.6722
11	**1χ**	0.2779(±0.0874)	3.1933	0.1013	0.3873		10.1160	6.1434
12	**2χ**	0.2866(±0.0944)	3.2426	0.1032	0.3653		9.2077	5.8565
13	**3χ**	0.3399(±0.0979)	3.1743	0.0978	0.4297		12.0559	6.7026
14	**0χv**	0.1397(±0.0898)	3.8156	0.1207	0.1313		2.4173	3.0020
15	**1χv**	0.3214(±0.1309)	3.3533	0.1103	0.2736		6.0276	4.7422
16	**2χv**	0.1204(±0.1247)	4.7745	0.1259	0.0551		0.9330	1.8644
17	**3χv**	0.1036(±0.1245)	4.9994	0.1268	0.0415		0.6924	1.6065
18	**LogKow** **Jhete**	0.4362(±0.1604) -0.5456(±0.1927)	4.2928	0.0907	0.5399	0.4786	8.8010	8.1012
19	**J** **Jhetm**	-2.5690(±0.9898) 0.6518(±0.4434)	8.6253	0.0903	0.5441	0.4833	8.9500	8.1686
20	**J** **Jhetz**	-2.5699(±0.9865) 0.6601(±0.4471)	8.6080	0.0902	0.5446	0.4838	8.9680	8.1814
21	**LogKow** **Jhetz**	0.4188(±0.1602) -0.3934(±0.1365)	4.0791	0.0902	0.5455	0.4849	9.0010	8.1882
22	**LogKow** **Jhetm**	0.4182(±0.1603) -0.3890(±0.1350)	4.0732	0.0901	0.5456	0.4850	9.0050	8.1980
23	**3χ** **LogKow**	0.2905(±0.0880) 0.3752(±0.1542)	1.1832	0.0855	0.5911	0.5366	10.8420	8.9921
24	**1χv** **2χv**	1.0639(±0.2391) -0.6844(±0.1997)	2.3390	0.0853	0.5927	0.5384	10.9120	9.0254
25	**LogKow** **Jhetv**	0.4698(±0.1475) -0.6502(±0.1889)	4.2621	0.0840	0.6055	0.5529	11.5130	9.2635
26	**LogKow** **Jhetp**	0.4676(±0.1464) -0.5722(±0.1634)	4.1166	0.0833	0.6116	0.5598	11.8080	9.3883

27	**LogKow** **J**	0.3730(±0.1448) -1.0270(±0.2722)	5.2293	0.0805	0.6377	0.5894	13.2040	9.9200
28	**1χv** **J** **Jhetm**	0.4616(±0.1567) -4.0014(±0.9405) 1.7008(±0.5069)	5.2507	0.0734	0.7185	0.6582	11.9100	11.5482
29	**0χv** **J** **Jhetz**	0.2178(±0.0677) -4.0986(±0.9086) 1.4988(±0.4373)	6.5561	0.0708	0.7381	0.6819	13.1490	12.1345
30	**BAC** **J** **Jhete**	0.0304(±0.0092) -4.6496(±0.9736) 1.7656(±0.5197)	9.1212	0.0706	0.7397	0.6839	13.2590	12.1821
31	**3χ** **2χv** **LogKow**	0.4728(±0.0969) -0.2783(±0.0980) 0.4527(±0.1300)	1.0389	0.0705	0.7406	0.6850	13.3210	12.2068
32	**2χv** **J** **Jhetm**	0.4690(±0.1388) -6.0829(±1.2880) 2.5336(±0.6527)	7.2625	0.0694	0.7489	0.6951	13.9190	12.4695
33	**2χv** **J** **Jhetz**	0.4698(±0.1382) -6.0761(±1.2791) 2.5615(±0.6561)	7.1841	0.0692	0.7504	0.6969	14.0300	12.5181
34	**BAC** **J** **Jhetz**	0.0391(±0.0082) -6.3584(±1.0123) 1.9185(±0.3883)	11.4034	0.0576	0.8269	0.7898	22.2950	15.7871
35	**BAC** **J** **Jhetm**	0.0393(±0.0082) -6.3928(±1.0153) 1.9091(±0.3849)	11.4779	0.0574	0.8277	0.7908	22.4230	15.8498

Table- 6 Observed and calculated activity for the compounds using model- 35 (Table - 5)

Comp. No.	**Observed log koc**	**Calculated log koc**	**Residual**
1	5.6200	5.5600	0.0600
2	6.6400	6.0740	0.5660
3	5.3600	5.2650	0.0950
4	4.6700	4.6590	0.0110
5	5.9400	6.1930	-0.2530
6	4.8800	5.5600	-0.6800
7	4.3100	4.5800	-0.2700
8	4.9000	5.0820	-0.1820
9	5.9300	6.0790	-0.1490
10	5.7900	5.8840	-0.0940
11	5.8600	6.0990	-0.2390
12	5.4100	5.3400	0.0700
13	5.7300	5.6510	0.0790
14	5.5500	5.4490	0.1010
15	5.6900	5.6540	0.0360
16	4.5900	4.4630	0.1270
17	4.5200	4.2550	0.2650
18	6.6600	6.2030	0.4570

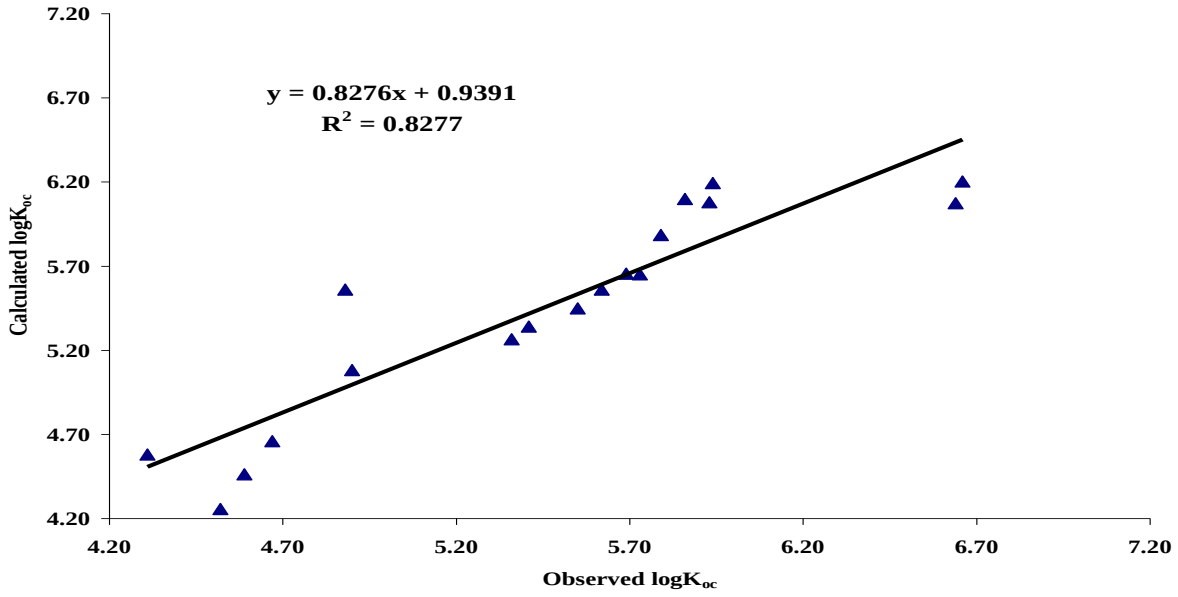

Fig- 1 Correlation between Observed and Calculated activity using model no-35 (Table- 5)

Table- 7 cross validated values for Topological and connectivity indices.

S.no.	Parameters used	PRESS	SSY	PRESS/SSY	R^2cv	PSE	S_{PRESS}
1.	J	4.1513	3.8074	1.0903	-0.0903	0.4802	0.5093
2.	logKow,J	2.8830	5.0756	0.5680	0.4320	0.4002	0.4384
3.	J,Jhetm,BAC	1.3710	6.5877	0.2081	0.7919	0.2759	0.3129

Table- 8 Regression parameters and quality of correlation with Topological and connectivity indices after deleting one compound (Compound no. 6).

Modeln o.	Parameter used	Ai=(1…3)	B	Se	R^2	R^2a	F Ratio	Q=R/Se
1	J	-1.3224(±0.2811)	8.1906	0.0826	0.5960	-	22.1311	9.3463
2	log Kow J	0.2786(±0.1525) -1.1598(±0.2762)	6.1167	0.0769	0.6738	0.6272	14.4620	10.6742
3	J Jhetm BAC	0.0335(±0.0068) -6.1480(±0.8094) 1.8226(±0.3067)	11.4419	0.0453	0.8948	0.8706	36.8700	20.8816

Table- 9 Observed and calculated activity for the compounds after deleting one compound (compound no. 6) using model no. 3 (Table - 8).

Comp. No.	Observed log koc	Calculated log koc	Residual
1	5.6200	5.7240	-0.1040
2	6.6400	6.2170	0.4230
3	5.3600	5.1540	0.2060
4	4.6700	4.7330	-0.0630

5	5.9400	6.3360	-0.3960
6	4.3100	4.5850	-0.2750
7	4.9000	5.1070	-0.2070
8	5.9300	6.0470	-0.1170
9	5.7900	5.8580	-0.0680
10	5.8600	6.0670	-0.2070
11	5.4100	5.4240	-0.0140
12	5.7300	5.6840	0.0460
13	5.5500	5.4870	0.0630
14	5.6900	5.6860	0.0040
15	4.5900	4.5230	0.0670
16	4.5200	4.2750	0.2450
17	6.6600	6.2630	0.3970

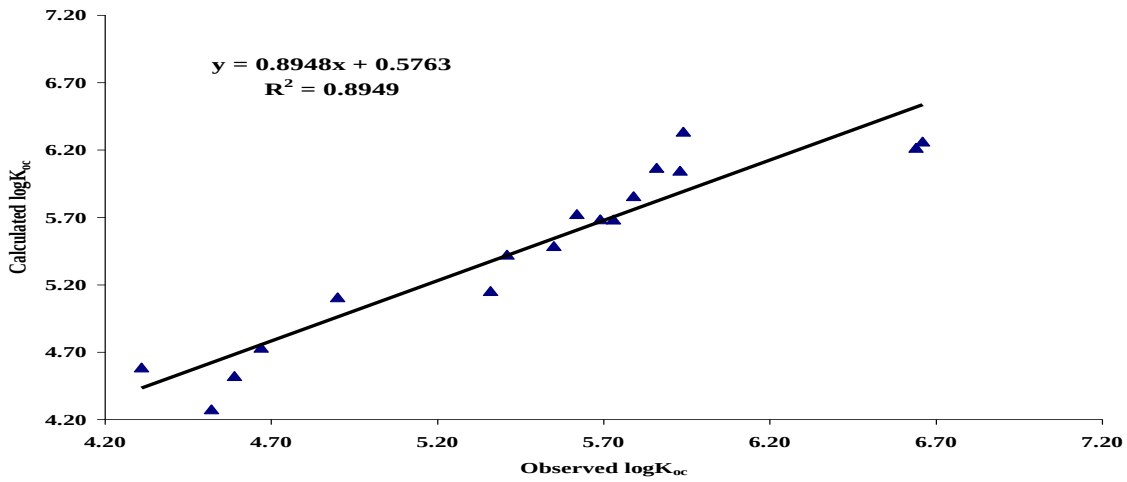

Fig- 2 Correlation between Observed and Calculated activity using model no. 3 (Table- 8)

Table- 10 cross validated values for Topological and connectivity indices after deleting of one compound (compound no. - 6).

S.no.	Parameters used	PRESS	SSY	PRESS/SSY	R^2cv	PSE	S_{PRESS}
1.	**J**	3.0775	4.5405	0.6777	0.3223	0.4254	0.4529
2.	**logKow,J**	2.4847	5.1333	0.4840	0.5160	0.3823	0.4212
3.	**J,Jhetm,BAC**	0.8011	6.8168	0.1175	0.8825	0.2170	0.2482