A HYBRID APPROACH OF ENGLISH- HINDI NAMED-ENTITY TRANSLITERATION

Vaishnavi Singhal[1], Neha Tyagi[2]

[1,2]*Department of CSE &IT, Jaypee University of Information Technology, Waknaghat, H.P., (India)*

ABSTRACT

In recent years, machine transliteration has gained a center of attention for research. Both machine translation and transliteration are important for e-governance and web based online multilingual applications. As machine translation translate source language to target language which results in wrong translation for named entities. Named entities are required to be translated with preserving their phonetic properties. Thus we need named-entity transliteration is utmost required. In this paper, the main focus is on the English-to-Hindi Named-Entity transliteration and a hybrid approach is proposed. The main problem arises during the transliteration of English-Hindi is the possibility of combination of English alphabets to Hindi akshara. There is no specific rule set has been designed to convert Hindi akshara to particular English syllable yet. To solve this issue a hybrid approach has been proposed where syllabification and the uni-gram model is used. The syllabification is done based on rule-based approach. This approach is first syllabifies the English name into appropriate syllable using rule based approach which is termed as syllabification. Then syllables are matched into particular Hindi akshara on the basis of corpora that is designed on the basis of English-Hindi Name-pairs knowledgebase.

Keywords:* *Machine Translation, Named-Entity, Rule-Based Approach, Syllabification, Uni-Gram Model

I INTRODUCTION

Machine translation is playing an important role in research from last sixty years. But still we didn't get any good translation which will give the desired result. One of the drawbacks of machine translation system is improper translation of named entities (NEs). Named Entities are to be translated without losing their phonetic properties. Most of the existing machine translation systems are unable to address this issue and thus provide a poor quality translation. To resolve this issue, transliterators came into existence. Transliteration is thus a conversion of text from one script to another.

1.1 Named-Entity Transliteration

Named Entity Transliteration is a process of converting an input named-entity from source language to target language. The process of translating source word to target while preserving their phonetic properties is called Transliteration. For Example: the translation of word "Honey Singh" into Hindi language will be "मधु सिंह" whereas its transliteration will be "हनी सिंह". Hence in order to convert named-entities form source language to target language, the named-entity transliteration is done.

Machine Transliteration approach is characterized into two categories [7]:

- Grapheme-based approach

  In this approach, an orthographic method is follows and the source language grapheme/characters are directly mapped into target language grapheme/character.
- Phoneme-based approach

  In this approach, the phonetic process is follows and the source language phoneme is converted into target language phoneme.

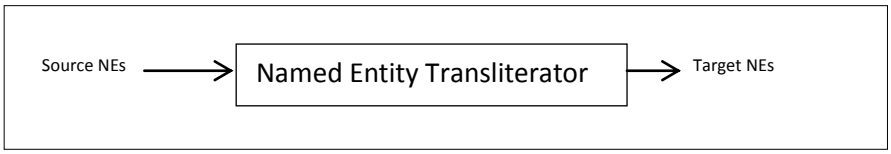

Figure 1- Named-Entity Transliterator

1.2 Named-Entities

According to [8], the entities which come under named-entities are:

- People: Individuals, fictional characters, small groups
- Organization: companies, agencies, political parties, sport teams
- Location: physical extents, mountains, lakes, seas
- Geo-Political Entities: countries, states, provinces, localities
- Facilities: bridges, buildings, airports
- Vehicles: planes, trains, automobile

1.3 English-to-Hindi Named Entity Transliteration

Transliteration is a process of converting a text string in the source writing system or orthography to another text string in the target writing system or orthography, such that the target language name is phonemically equivalent to the source name and conforms to the phonology of the target language.

There are 22 constitutionally recognized languages and 11 scripts in Indian constitution that are used in different regions spread across the country [7]. The factors which make the named-entity transliteration difficult are:

- Devanagari script is used by Hindi language which is much more difficult than Roman script used by English language.
- The characters used in English language are 26 which are much less than the aksharas used in Hindi language i.e. 52.
- We can also not recognize the named entities by the capitalized word in Hindi language because of no concept of capitalization like English or other European languages.
- Due to the Devanagari script, Hindi is highly phonetic and inflectional language than English.
- Indian place names are frequently homographic with the common words of person names, presence of exonyms and presence of endonyms.
- There can be more than one valid transliteration for a single English name into Hindi languagedue to no specified rule set of English syllable to Hindi akshara. For example: Rama- राम, रमा, रामा

The various issues occur during English-Hindi named-entity transliteration are orthographic variations, morphological variations, lexical ambiguity, tokenization, translation divergence conflation.

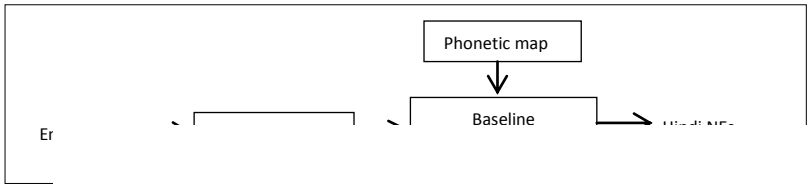

Figure 2- Architecture of Named-Entity Transliterator

The rest of the paper is structured as follows: section 2 contains the literature review required for this research. Section 3 explains the proposed methodology, its flow chart and corresponding algorithm which is explain by taking an example. The next section 4 shows the implementation result and the last section 5 concludes this research.

II RELATED STUDY

The base paper [2] which has been referred for this research used English-Hindi language pair for their experiments. First of all the rule-based approach is used in order to extract individual phonemes from the English words. Then that English phoneme is converted into corresponding Hindi phoneme using statistical approach. The accuracy gained by this approach was 83.40%. For the phonification process they used 7 different phonemes V, CV, VC, CVC, CCVC, CVCC and VCC respectively. They used probability calculation model to generate probability on English-Hindi phoneme knowledgebase for transliteration process.

Jiang et. al. [10] did translation of named-entities using transliteration with web-mining. They trained the classifier in pronunciation similarity, bilingual context and co-occurrence by using maximum-entropy based approach. A phonetic based algorithm is proposed by Joshi and Mathur [11] which created a mapping table and a set of rules for English-Hindi transliteration. Bhalla et. al. [12] translated the English-Punjabi name-entities by using Moses toolkit and clamed 88% of accuracy. .

Sharma et. al[13] trained a statistical machine translation system for successfully translating English-Hindi named entities using CRF-based approach. They showed 85.79% accuracy and showed that CRF is best suited for processing Indian languages. Similarly Manokaro et. al. [1] designed a Hindi to English transliteration of Named-entities using CRF. Ameta et. al[14] developed a transliteration system for Gujrati-Hindi language-pair.In [3] , the authors designed the translation system for English-Arabic language pairs. Whereas Wolodjaet. al. [4] builded a system which is multilingual for named entity disambiguation, translation and transliteration. In [5], [6], the authors also defined the various approaches for named entity transliteration and its improvement.

The major players in the machine transliteration of Indian Languages are C-DAC, NCST and Indictrans. C-DAC provides their technology based on ISCII in 1980 in the form of hardware based card called GIST [7]. NCST developed a phonemic code based scheme for effective processing of Indian languages in 2003 [15].

III PROPOSED METHODOLOGY

This paper focuses on the problem of English-Hindi named-entity transliteration. This is a challenging task because of the highly inflectional and phonetic characteristic of Hindi language. Named entity transliteration considers various issues like are orthographic variations, morphological variations, lexical ambiguity, tokenization, translation divergence conflation. To solve these issues we have proposed a hybrid approach for English-Hindi named-entity transliteration. For transliteration, a knowledgebase including the English-Hindi named pairs is used. The English name is firstly looked up into the knowledgebase and if it is found then the corresponding Hindi name is chosen. Otherwise the named-entity will go for Syllabification. Syllabification is a process of dividing the name into syllables i.e. C and V. Then these syllables are combined into corresponding 5 phonemes namely C, V, CV, CVC, VC. A corpora is designed for all the possible combination of English alphabets for these phonemes and their corresponding Hindi aksharas are mapped with it. From these corpora the corresponding Hindi akshara are chosen for the source name. Finally these Hindi aksharas are combined to result out the corresponding Hindi name.

3.1 System Design

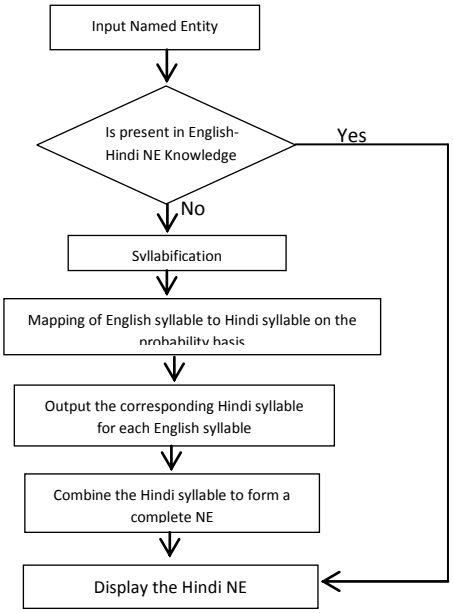

Figure 3- flow chart of proposed methodology

3.2 Proposed Algorithm

Step 1. Take the input i.e. the named entity.

Step 2. Check whether the corresponding Hindi name is present in the knowledge base.

Step 3. If yes then return back the corresponding Hindi name

Step 4. If no then Syllabification is done this will give the grouping of syllables

Step 5. Then mapping of each English syllable to Hindi syllable has been done from the English-Hindi syllable knowledge base. This will return the entire possible Hindi syllable for each English syllable.

Step 6. From the resulted Hindi syllable, the syllable which has maximum probability of matching English to Hindi syllable is chosen.

Step 7. All the resulted Hindi syllable of each English Syllable is then combined to display the final Hindi transliterate of English named entity.

3.3 Syllabification

A. Label each English character into syllable as C (consonants) or V (vowels).

B. Then grouping of the syllables into phoneme is done by defining some rules. This grouping is done in two filters.

C. For each syllable[i]

a. If syllable[i] = V

i. If char[i+1] = “m” or “n” then combine char[i] & char[i+1] into char[i] and label the syllable[i] as “VC”

ii. If syllable[i+1] = “V” then combine char[i] & char[i+1] into char[i] and label the syllable[i] as “V”

iii. Else syllable[i]= “V”

b. Else

i. If syllable[i+1] = “C” and syllable[i+2] = “C” then check whether this combination of char[i], char[i+1] and char[i+2] is combine to a single Hindi akshara. If yes then combine char[i], char[i+1] and char[i+2] into char[i] and label the syllable[i] as “C”. Otherwise continue

ii. Else if syllable[i+1] = “C” then check whether this combination of char[i], char[i+1] and char[i+2] is combine to a single Hindi akshara. If yes then combine char[i], char [i+1] into char[i] and label the syllable[i] as “C”. Otherwise continue

iii. Else continue

c. Return syllable

For example:

Take input “Vaishnavi” convert into lowercase “vaishnavi”

Syllabification: CVVCCCVCV

Grouping of Syllabification: CVVCCCVCV

C V C VCV→CV CV CV

vaishnavi→ v ai shn a v i→ vai shna vi

Hindi mapping of each syllable from the knowledgebase: v (व) ai(ै, ाइ)

shn(ष्ण) a(ा, ा)

v(व) i(ि, ी)

Now combination is:

vai: वै, वाइ

shn: ष्ण, ष्णा

vi: वी, वि

Now the corresponding Hindi syllable will be chosen which will have maximum probability in the English-Hindi pair syllable created by checking the pairs which named entity generally used from the corpora.

Suppose the probability of vai is maximum for "वै" similarly for shn is "ष्ण" but there is no data found for the combination "vi" then randomly any combination will be considered.

Finally combine all Hindi syllables: वैष्णवी will be the output from this algorithm.

IV IMPLEMENTATION AND RESULT

The proposed algorithm is implemented on the JAVA platform. Here the knowledgebase is used to calculate the probabilities of English-Hindi pairs. This knowledgebase is designed by taking the English-to-Hindi named entities from various sources like newspaper, online repositories and magazines.Some examples of English-to-Hindi name-pairs are tested on the simulation environment.

The evaluation result has been shown below.

Table 1- Evaluation Table of Proposed System

English Named Entity	Transliterated Hindi Named Entity	Process	Correct/wrong
Vaishnavi	वैष्णवी	knowledgebase	Correct
Mohak	मोहक	Syllabification	Correct
Robin	रोबिन	Syllabification	Correct
Sanjay	सन्जय	Syllabification	Wrong
Archana	अर्चाना	Syllabification	Wrong
Jhalak	झलक	Syllabification	Correct
Dev	डिव	Syllabification	Wrong
Neha	नेहा	Syllabification with unigram	Correct
Rahul	राहुल	Syllabification	Correct
Rakesh	राकिश	Syllabification	Wrong
Shanti	शान्ति	Syllabification	Correct
Khushi	खुशि	Syllabification	Wrong
Nikita	निकिता	Syllabification	Correct
Aradhya	आराध्या	Knowledgebase	Correct
Lokendra	लोकिन्द्रा	Syllabification	Wrong
Ram	राम	Syllabification	Correct
Ankur	अंकुर	Syllabification	Correct
Amitabh	अमिताभ	Syllabification	Correct
Naksh	नाक्ष	Syllabification	Wrong

Rashi	राशि	Syllabification	Correct
Anshul	अंशुल	Syllabification	Correct
Aashish	आशिश	Syllabification	Wrong

The accuracy is calculated with the help of precision and recall. It is observed that this system is 84.23% accurate for transliterating English-Hindi named-entities.

V CONCLUSION

In this project we've developed a system for the Hindi-English named-entity transliteration. First of all syllabification is done. Here we've used only 5 phonemes for the syllabification process i.e. C, V, CV, VC, and CVC as compared to 7 phonemes used in [2]. After that mapping of each English syllable with the all possible Hindi syllable is done by looking to the English-Hindi pair knowledgebase. From all the combinations of Hindi syllable, one syllable is chosen by using unigram statistical model. After that the combination of the all the syllable is done so that the corresponding Hindi transliteration of English named-entity will be resulted. This approach gives accuracy of 84.23% which is improvement over the approach given in [2].

As it is mentioned earlier that named-entity transliteration plays an important role in e-governance and web-based online multilingual applications. Thus we can use this approach to various applications where Hindi-to-English named entity transliteration is required.

This system is only designed and tested for the person name-entity only. This can be extended for the other name-entities too.Sharma et.al. in [13] mentioned that CRF-based approaches are better for the Indian languages. Thus, we will try to combine our approach with CRF-based approach in future and try to improve the accuracy of the system.

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HOLOGRAPHIC PROJECTION AND ITS APPLICATIONS IN FUTURE

B Vikas Deep[1], Tanmoy Sarkar[2]

[1, 2] *Department of Electrical and Electronics, CVR College of Engineering (India)*

ABSTRACT

Holography is "lensless photography" in which an image is captured not as an image focused on film, but as an interference pattern at the film. It enables the viewer to view a true three-dimensional image which exhibits parallax, this represents a recording of information from the light source. Projecting a hologram includes properties like Interference and Diffraction [1]. *Here the focus will be on the introduction and history of holograms , basic factors in which holography depends (Inference and diffraction and their effect on holography with variation in patterns and synchronizing basic holographic model),basic projection by Helium-Neon laser on diverging lens the young's double slit experiment plays a vital role in the basic holography prototype , types of holograms i.e. transmission , reflection and cylindrical holograms and there formation without using mirror through He-Ne Laser, holography vs. photography comparison based on their visual display and other factors , projection variation and several other factors, application of hologram like surgery of a patient in medical science using holographic interface and restoring sights using gene therapy and 3D projection glasses , globe playscreen and mapping and its future aspect with reference to modern world*.

Keywords: Diffraction, Emulsion, Holography, Holoplate, Interference, Wavefronts.

I. INTRODUCTION

Holography is a technique that enables a light field, which is generally the product of a light source scattered off objects, to be recorded and later reconstructed when the original light field is no longer present, due to the absence of the original objects [2]. Not only that a holography can also be used for storing and recording of wavefronts and documents for future use. The projected hologram resembles mainly two main properties that are interference and diffraction. Hologram consists of an apparently random structure of varying intensity, density or profile [3][4].

1.1 History

The Hungarian-British physicist Dennis Gabor (in Hungarian: Gábor Dénes) was awarded the Nobel Prize in Physics in 1971 "for his invention and development of the holographic method" [5]. His work done in the late 1940s, built on pioneering work in the field of X-ray microscopy by other scientists including Mieczysław Wolfke in 1920 and WL Bragg in 1939 [6].The discovery was an unexpected result of research into improving electron microscopes at the British Thomson-Houston (BTH) Company in Rugby, England, and the company filed a patent in December 1947. The technique as originally invented is still used in electron microscopy, where it is known as electron holography, but optical holography did not really advance until the development of the

laser in 1960.The word holography comes from the Greek words ὅλος (hólos; "whole") and γραφή (graphḗ;"writing" or "drawing").In its early days, holography required high-power expensive lasers, but nowadays, mass-produced low-cost semi-conductor or diode lasers, such as those found in millions of DVD recorders and used in other common applications, can be used to make holograms and have made holography much more accessible to low-budget researchers, artists and dedicated hobbyists.

1.2 Principle of Projection

When the two laser beams reach the recording medium, their light waves, intersect and interfere with each other. It is this interference pattern that is imprinted on the recording medium. The pattern itself is seemingly random, as it represents the way in which the scene's light interfered with the original light source but not the original light source itself. The interference pattern can be considered an encoded version of the scene, requiring a particular key the original light source in order to view its contents. This missing key is provided later by shining a laser, identical to the one used to record the hologram, onto the developed film. When this beam illuminates the hologram, it is diffracted by the hologram's surface pattern. This produces a light field identical to the one originally produced by the scene and scattered onto the hologram. The image this effect produces in a person's retina is known as a virtual image [9].

1.3 Factors During Projection

There are two main factors that occur during projection i.e. Interference and Diffraction.

1.3.1 Interference

The process in which two or more light, sound, or electromagnetic waves of the same frequency combine to reinforce or cancel each other, the amplitude of the resulting wave being equal to the sum of the amplitudes of the combining waves. [10]

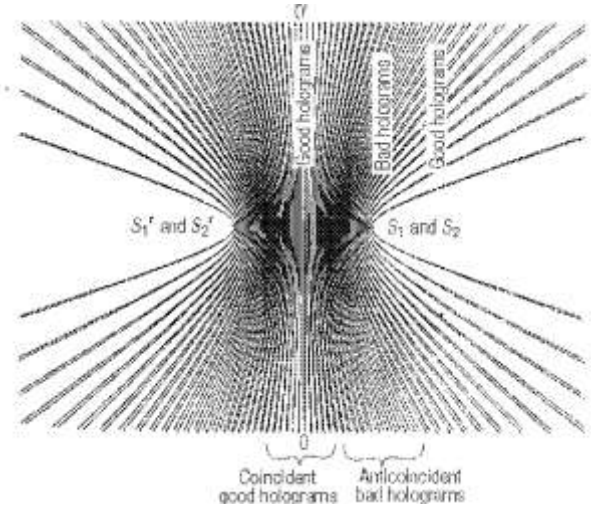

Figure-1: Basic Interference Pattern

Types-

1.3.1.1 Wave Interference

It is the phenomenon that occurs when two waves meet while traveling along the same medium. The interference of waves causes the medium to take on shapes that result from the net effect of the two individual waves upon the particles of the medium.

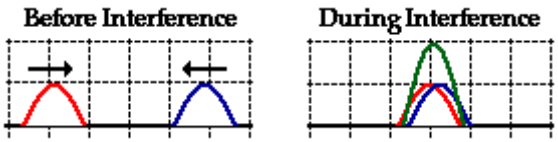

Figure-2: Wave Interference Pattern

1.3.1.2 Constructive Interference

The interference that occurs at any location along the medium where the two interfering waves have a displacement in the same direction. In this case, both waves have an upward displacement; consequently, the medium has an upward displacement that is greater than the displacement of the two interfering pulses.

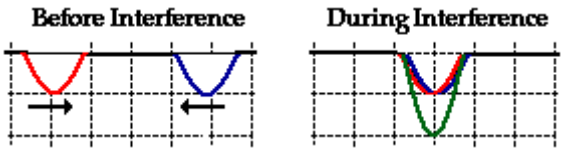

Figure-3: Constructive Interference Pattern

1.3.1.3 Destructive Interference

It is a type of interference that occurs at any location along the medium where the two interfering waves have a displacement in the opposite direction.

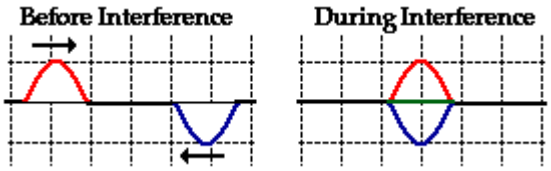

Figure-4: Destructive Interference Pattern

1.3.2 Diffraction

Diffraction is the slight bending of light as it passes around the edge of an object. The amount of bending depends on the relative size of the wavelength of light to the size of the opening. If the opening is much larger than the light's wavelength, the bending will be almost unnoticeable. However, if the two are closer in size or equal, the amount of bending is considerable, and easily seen with the naked eye.

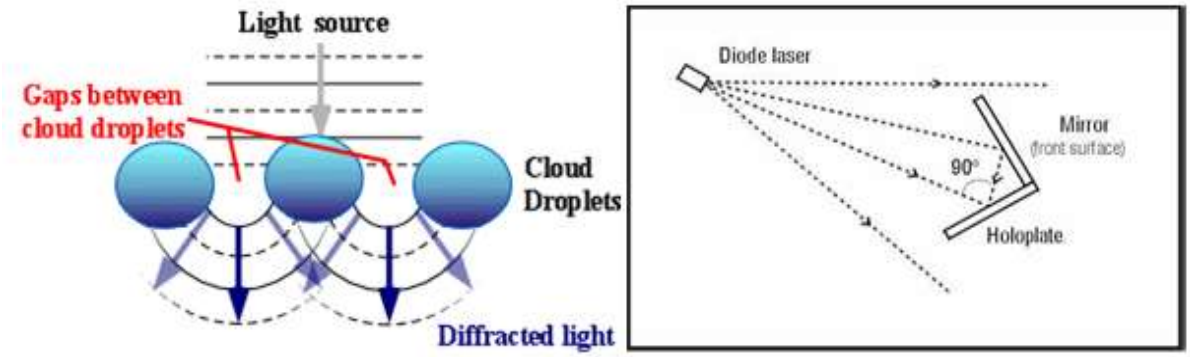

Figure-5(A): Effect of Diffraction on Light (B) Diffraction on Holoplate

In the atmosphere, diffracted light is actually bent around atmospheric particles -- most commonly, the atmospheric particles are tiny water droplets found in clouds. Diffracted light can produce fringes of light, dark or colored bands. An optical effect that results from the diffraction of light is the silver lining sometimes found

around the edges of clouds or coronas surrounding the sun or moon. The illustration above shows how light (from either the sun or the moon) is bent around small droplets in the cloud. [11]

1.4 Holography Vs Photography

Holography may be better understood via an examination of its differences from ordinary photography:

- A hologram represents a recording of information regarding the light that came from the original scene as scattered in a range of directions rather than from only one direction, as in a photograph. This allows the scene to be viewed from a range of different angles, as if it were still present.
- A photograph can be recorded using normal light sources (sunlight or electric lighting) whereas a laser is required to record a hologram.
- A lens is required in photography to record the image, whereas in holography, the light from the object is scattered directly onto the recording medium.
- A holographic recording requires a second light beam (the reference beam) to be directed onto the recording medium.
- A photograph can be viewed in a wide range of lighting conditions, whereas holograms can only be viewed with very specific forms of illumination.
- When a photograph is cut in half, each piece shows half of the scene. When a hologram is cut in half, the whole scene can still be seen in each piece. This is because, whereas each point in a photograph only represents light scattered from a single point in the scene, *each point* on a holographic recording includes information about light scattered from *every point* in the scene. It can be thought of as viewing a street outside a house through a 4 ft x 4 ft window, then through a 2 ft x 2 ft window. One can see all of the same things through the smaller window (by moving the head to change the viewing angle), but the viewer can see more *at once* through the 4 ft window.[12]
- A photograph is a two-dimensional representation that can only reproduce a rudimentary three-dimensional effect, whereas the reproduced viewing range of a hologram adds many more depth perception cues that were present in the original scene. These cues are recognized by the human brain and translated into the same perception of a three-dimensional image as when the original scene might have been viewed.

II. PROJECTION USING HELIUM-NEON LASER

Helium-neon lasers are versatile devices that have many useful applications. They are often found in integrated bar code readers (the hand-held bar code readers use red semiconductor lasers or red LEDs.) Because they can emit visible light, helium-neon lasers are used in laser surgery to position the powerful infrared cutting beams. Surveyors take advantage of the helium-neon laser's good beam quality to take precise measurements over long distances or across inaccessible terrain. Red helium-neon lasers are also used in holography. [13]The typical helium-neon laser consists of three components: the laser tube, a high-voltage power supply, and structural packaging. The laser tube consists of a sealed glass tube which contains the laser gas, electrodes, and mirrors. Depending on the power output of the laser, the tube may vary in size from one to several centimeters in diameter, and from five centimeters to several meters in length. The laser gas is a mixture of helium and neon in proportions of between 5:1 and 14:1, respectively [14]. Electrodes situated near each end of the tube, discharge electricity through the gas. Mirrors, located at each end of the tube, increase efficiency. The power supply

provides the high voltages needed (10kV to start laser emission and 1-2kV to maintain it.) The structural packaging consists of mounts for the laser tube and power supply [15]. The laser may also include safety shutters to prevent random exposure and external optics to fine-tune the beam.

2.1.1 Equipments Needed

Equipment and materials include part number PFG-01, 200 x 250mm and 200 x 200mm holographic film and JP-2 developer purchased from Integraph LLC, glass holographic plates, plate glass, sand box, solid state diode laser, HeNe laser, electronic shutter, enlarger timer, computer programmed to control shutter, air cushioned optics table, holographic developer chemicals, tire inner tube, steel sheet, rubber gloves, green safe-light spherical concave mirror and various clamps and stands [4].

2.1.2 Process

To understand holography, it is first necessary to understand one of the most important studies of wave theory known as Young's double-slit experiment conducted in 1801 by Thomas Young. His apparatus consisted of a sheet of material with two close spaced slits with a viewing screen. If light consisted of particles, one would expect two bright lines on the screen. A series of bright lines is observed and explained it as wave-interference. This diffraction pattern is what is observed in developed holograms under white light. A hologram is made by a single source of coherent light, part of which strikes the holographic medium (reference beam). Light is reflected from the object to the medium (object beam). The two beams pass through each other creating an interference pattern. This interference pattern is what is being photographed on the holographic film [4].

An interference pattern is formed when a point source of a coherent light encounters light of the same wavelength reflected from an object. The initial point source is the reference beam. The light reflected from the object is the object beam. When the developed hologram is illuminated by the reference beam the diffraction pattern recreates wave-fronts from the original object. The viewer sees an image of the original object [4].

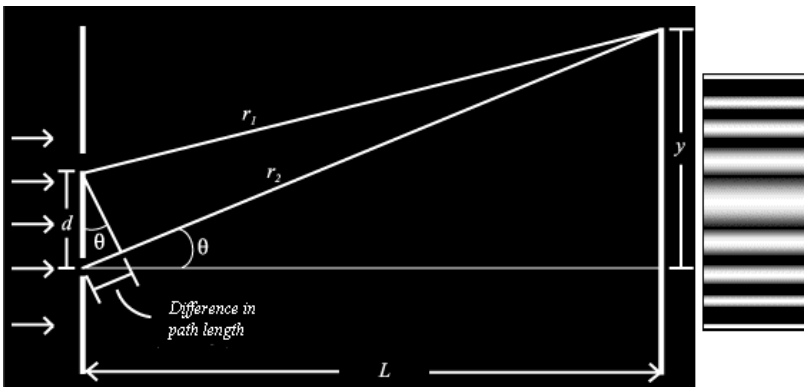

Figure6- This figure shows the effect of Young's double-slit experiment.
Bright fringes when $\sin\Theta = m\lambda$
$m = 0,1,2,...$
Dark fringes when
$\sin\Theta = (m+1/2)\lambda \quad m = 0,1,2,...$

Young showed that bright fringes can be calculated by:

$$\sin\theta = m\lambda \qquad m = 0,1,2,... \tag{1}$$

Dark fringes can be calculated by:

$$\sin\theta = (m+1/2)\lambda \qquad m = 0,1,2,... \tag{2}$$

Where m=number of fringes on each side of the center fringe, λ=wavelength [16]

III. TYPES

3.1 Reflection Holograms

The reflection hologram, in which a truly three-dimensional image is seen near its surface, is the most common type shown in galleries. The hologram is illuminated by a "spot" of white incandescent light, held at a specific angle and distance and located on the viewer's side of the hologram. Thus, the image consists of light reflected by the hologram. If a mirror is the object, the holographic image of the mirror reflects white light; if a diamond is the object, the holographic image of the diamond is seen to "sparkle." Although mass-produced holograms such as the eagle on the VISA card are viewed with reflected light, they are actually transmission holograms "mirrorized" with a layer of aluminum on the back.

3.1.1 Introduction

In a reflection hologram, the object and reference beams are incident on the plate from opposite sides of the plate. The reconstructed object is then viewed from the same side of the plate as that at which the re-constructing beam is incident. Only volume holograms can be used to make reflection holograms, as only a very low intensity diffracted beam would be reflected by a thin hologram.

3.1.2 Equipments Needed

Darkened room with green safe-light, sturdy table or counter, optical table supported by "lazy balls," mounted diode laser system, object on platform with three-point support, shutter, processing trays with chemicals, and holographic plates.

3.1.3 Process of Formation

A. Choose a solid object that looks bright when illuminated with laser light and whose size is not bigger than the hologram to be made. Mount (hot glue) it on a small platform made of wood or sheet metal (15 cm ´ 15 cm) with three round-head short screws underneath (to prevent rocking). Mount the laser on a stand about 25 cm High and direct the light down at 45° at the object, with the light spreading horizontally. The distance between the laser and the object is about 40 cm. Now turn on the safe light and turn off the room light.

B. After the laser has been warmed up for at least five minutes, block the light from reaching the object using a self-standing black cardboard. (We will call this the shutter.).

C. Lean a holoplate directly on the object, with the sticky side touching it. Wait at least 10 seconds.

D. Lift the shutter, *but still blocking the light*, for 2 seconds, to allow any vibration to subside. Then lift the shutter away completely to allow the light to pass through the holoplate. The exposure is usually about 5 seconds. (Consult the instructions that accompany the plates.) Then block the light again.

E. Develop the hologram according to instructions from the manufacturer.

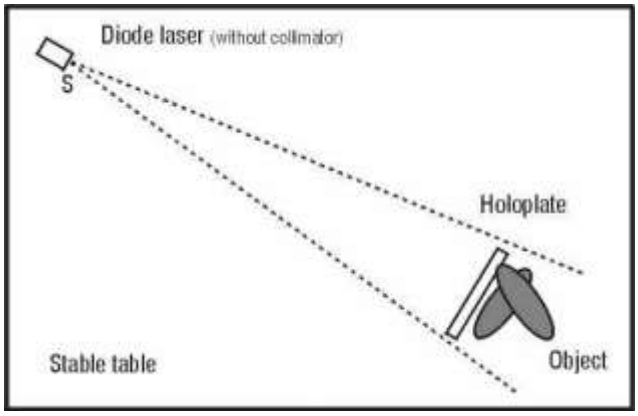

Figure-7: Formation of Reflection Hologram

After the hologram is dried, view it with a spot light such as a pen light, projector, or direct Sunlight. Optional: Spray paint the sticky side (emulsion side) with a flat (or "antique") black Paint to provide a darker background and greatly improve the visibility of the image.

3.2 Transmission Hologram

The typical transmission hologram is viewed with laser light, usually of the same type used to make the recording. This light is directed from behind the hologram and the image is transmitted to the observer's side. The *virtual image* can be very sharp and deep. For example, through a small hologram, a full-size room with people in it can be seen as if the hologram were a window. If this hologram is broken into small pieces (to be less wasteful, the hologram can be covered by a piece of paper with a hole in it), one can still see the entire scene through each piece. Depending on the location of the piece (hole), a different perspective is observed. Furthermore, if an undiverged laser beam is directed backward (relative to the direction of the reference beam) through the hologram, a real image can be projected onto a screen located at the original position of the object.

3.2.1 Introduction

A transmission hologram is one where the object and reference beams are incident on the recording medium from the same side. In practice, several more mirrors may be used to direct the beams in the required directions. Normally, transmission holograms can only be reconstructed using a laser or a quasi-monochromatic source, but a particular type of transmission hologram, known as a rainbow hologram, can be viewed with white light.

3.2.1 Equipments Needed

Same as for the "reflection hologram" above. In addition, a stand-alone plate holder is needed. Make one exactly the same way as the object platform described above. Instead of the object, install two long (12 cm) screws on top with a separation less than the width of the holoplate to be used. Paint the screws a diffused black color.

3.2.2 Process of Formation

A. Set up the system as shown in Figure. The diode laser is mounted 5 cm above the optical table with the beam spreading horizontally. One side of the beam illuminates the object or objects, and the other side serves as reference beam.

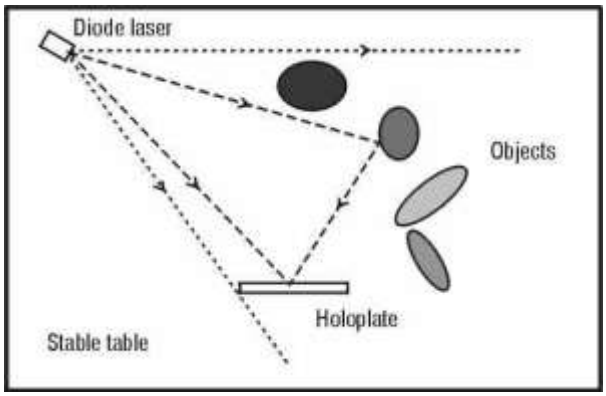

Figure-8: The Simplest Configuration for Making a Transmission Hologram

B. Block the beam with the shutter, turn off the room light, and, on the stand-alone plate holder, lean a holoplate vertically against the black screws with the sticky side facing the object(s). Wait 10 seconds.

C. Lift the shutter and expose for about 30 seconds. Note: If there is a draft across your system, the long exposure time of 30 seconds requires you to put a large box over the entire system during the exposure.

D. Develop and dry as before.

E. This hologram must be viewed with laser light. To do so, lean the finished hologram back on the black screws the same way as during exposure. Cover or remove the objects and look through the hologram toward the location of the objects. A *virtual image* can be seen as if the object is still there.

F. To observe the *real image*:

- Relocate the finished hologram in the position where it was exposed.
- Remove the object and, in its place, position a vertical white screen (cardboard) facing the hologram.
- Darken the room and direct a collimated laser beam *through* the center of the hologram in a direction that is 180° from the original reference beam, i.e., back toward the location of the diode laser used for making the hologram.

All light paths are now reversed and a two-dimensional image is projected onto the screen. Move the laser beam to different locations of the hologram and observe the changing perspectives of the image.

IV. APPLICATIONS

4.1 Medical Care

The medical sector is usually at the forefront of technological deployment. Any innovation that has the potential to drive discovery in research, improve medical operations and enhance patient care is likely to see some implementation. While some deployments have more wide-ranging and long-lasting effects than others, technology continues to spur understanding and progressive treatment in this essential field.

3D holography, in particular, stands to enhance visual understanding of the human body. What 3D holographic technologies offer that other visual forms cannot is the ability to show parts of the human body in a real-life fashion. Furthermore, they are interactive, enabling medical practitioners to not only study images of the body, but to do so easily and from multiple perspectives. The capacity for enhanced visual engagement can benefit research, diagnostic efforts and treatments, as sophisticated 3D software, displays and holograms can be synthesized for a realistic, real-time look at patient conditions. One issue in medical training that previously seemed insurmountable was the lack of tools that allowed students to interact consistently with real human

anatomy. If training is mostly confined to images seen in textbooks and on film, as well as occasional work with cadavers, many students have limited opportunities to engage directly with human anatomy. With 3D holograms, such as those Zebra Imaging produces, students can get better insight into the human form. The interactive, detailed human anatomy hologram lets students examine the actual 3D structure of the human body, rather than the 2D images that would be available in textbooks and computer-based learning tools. One study found that students who use medical holograms perform better than their textbook-informed counterparts, as they have a greater understanding of the myriad, minute spatial relationships in the human body.

4.2 Sight Restoration

Holographic imaging systems designed for safe and efficient activation of photovoltaic retinal prosthesis enable the projection of contour images with high efficiency, high irradiance and much lower total power than traditional LCD or DMD-based displays. Integration of light over the photosensitive elements reduces speckling noise to acceptable levels for diodes as small as 20 µm. Very compact design of video goggles is based on defocusing of the zero diffraction order, and refocusing the image using Fresnel lens added to the hologram of the encoded image. Solutions to various challenges associated with the holographic approach, such as the presence of multiple diffraction orders, speckles, transitions between the holograms and difficulties in hologram computation were presented. As a proof of concept, the system was successfully tested in-vivo by measuring cortical responses to alternating gratings, thus demonstrating feasibility of the holographic approach to near-the-eye display. The presence of speckles and the zero diffraction order background, it is possible to obtain contrast of 10:1 for images consisting of 50% white and 50% black, and over 100:1 for sparse contour images. The problem of the random light redistribution during hologram transitions can be overcome by high frequency exchange of alternative versions of the holograms encoding the same images. Using this technique, we demonstrated cortical response to motion in rats. However, in applications requiring short-pulse illumination, such as photovoltaic array, proper synchronization of the pulse of light with the display refresh timing will eliminate this problem altogether.

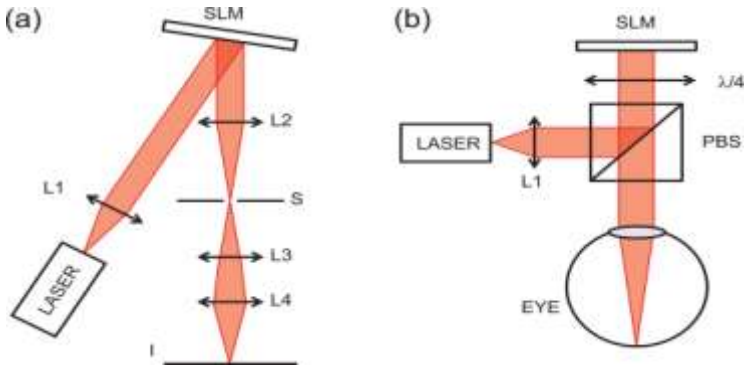

Figure-9: Optical layouts for Fourier imaging. (a) Schematic of a holographic system. A laser beam collimated by a lens (L1) is incident on a (SLM). A Fourier lens (L2) creates an image in an intermediary image plane, where a physical aperture (S) blocks unwanted diffraction orders. A telescope (L3, L4) then projects only the first diffraction order onto the image plane (I). (b) Holographic imaging system with the eye as a Fourier lens. The beam is deflected by polarizing beam-splitter cube (PBS), onto a quarter wave plate (λ/4). After reflection off the polarization-insensitive SLM, the beam propagates back through the quarter wave plate and the beam-splitter, before the lens of the eye finally creates an image on the retina. There is no intermediate image plane where a physical aperture could be introduced to block the unwanted diffraction orders.

4.3 Globe Play Screen and Mapping

Paper and such kind materials or plastic materials are used to produce maps. Conventional materials have some lacks to present the real geographic information such as terrain model and geographical features. Hologram as a map publishing material is at the point of covering these lacks .up to now, cartographic display technologies have been concerned with developing for the computer based presentations. Producing holomaps would be possible once the fundamentals of computer aided cartography and holography are associated. Some handicaps of holography restrict the cartographic production to meet the end user's requirements. By the cooperation of General Command of Mapping Turkiye, and MTM corporation. Since 2008, an R and D project has been carried out to produce holomaps and some of the basic principles of holographic cartography.

V. CONCLUSION

Holographic projection or Holography is the only visual recording and playback process that can record our 3 dimensional worlds on a 2 dimensional recording medium playback the original object or scene to the unaided eyes as a 3 dimensional image. The image demonstrates complete parallax and depth of field and floats in space either behind, in front of, or straddling the recording medium. In both the types whether it is reflection or transmission the formations of holograms have same nature and dimensions. Holography has a wide range of applications in the field of medical. Space science, military etc. Unlike photography the limitations in the case of a holographic projection and its devices are very limited and less.

VI. ACKNOWLEDGEMENT

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AMBULANCE TRACKING AND ALTERNATE ROUTING

E.Abinaya[1], M.Arul Kumar[2], N.Abinaiya[3], RA.Saraswathi[4]

[1,2]PG student / VLSI Design, SNS College of Technology, Coimbatore, (India)

[3]PG student / Communication System, SNS College of Technology, Coimbatore, (India)

[4]PG student / Communication System, Sri Guru Institute of Technology, Coimbatore, (India)

ABSTRACT

Nowadays, the automation plays a vital role in the industries. Microcontrollers are widely used for the automation to reduce the cost and to improve the efficiency. The traffic signal nowadays is very terrific to reach the ambulance in time. Many lives are in trouble due to this heavy traffic. There should be a special care for the life saving vehicles. In the ambulance, GPS and GSM units are used to send the exact location of the ambulance to the control room. If the spot is identified, the information is sent to the hospital through the control room. By tracking the ambulance position, traffic signals can be controlled from remote place. The main concept is to control the traffic signal through wireless communication. In the control room, LabVIEW software is used for the effective interface. This system helps to control all the traffic signals from the control room through the computer and provide a easy route for the ambulance to move.

Keywords* : *Ambulance Tracking , GPS, GSM, LabVIEW, Microcontrollers.

I. INTRODUCTION

An embedded system is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today. National Instruments, has developed a quickly graphical programming language called LabVIEW specifically designed for data acquisition, analysis and control. It is easy to learn and use, powerful and flexible, efficient, and self-documenting. It resembles no other significant computer language. We can develop a user interface, or Front Panel. Almost all the physics labs in Berkeley, and many throughout the world, have adopted LabVIEW as their programming standard, and LabVIEW is widely used in industry.

II. EXISTING SYSTEM

The whole system is implemented with the help of the internet connection. The vehicle position is found with the help of the GPS. The Location of the vehicle is sent to the control room with the help of the GSM.

Fig. 1 Existing System of Ambulance Tracking

Vehicle location tracked used GPS is sent via GSM which is fixed in every vehicle along with the GPS Module as shown in Fig, 1. The current location of the vehicle continuously received through GSM is monitored in the control room with the help of servers and through internet every process is monitored.

III. PROPOSED SYSTEM

When the vehicle met with an accident, the impact sensor senses it and the alarm will be activated. If any person inside the vehicle is conscious and finds accident doesn't have more impact, will press the reset switch and alarm is deactivated. If no one is conscious and accident is severe and the alarm is not deactivated within the particular time period, the location of the accident is obtained from GPS and alert will be sent along with the location to the control room via GSM. The GPS and GSM module is fixed in every ambulance vehicle, so that the exact location of the ambulance will be monitored continuously in the control room. The current location of the vehicle continuously received through GSM is monitored in the control room with the help of LabVIEW software. The Traffic light signals used in the path of the vehicle is made green and routes are cleared for the vehicle from the control room itself. This helps the vehicles to reach the hospitals in time and it saves many lives. Fig. 2 shows the Block Diagram of Ambulance Tracking system.

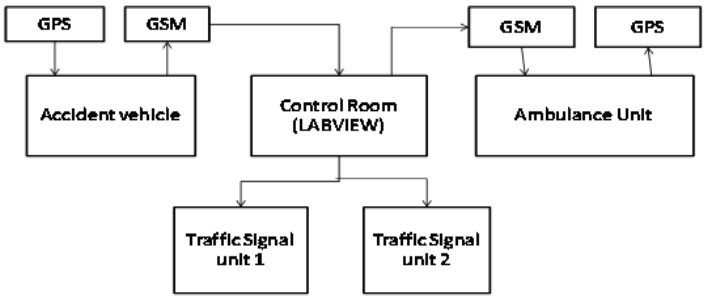

Fig. 2 Block Diagram of Ambulance Tracking System

Our project helps to save many lives by doing three main processes as shown in the basic block diagram. The first process is that, when the vehicle met with an accident, the impact sensor senses it and the alarm will be activated. If any person inside the vehicle is conscious and finds accident doesn't have more impact, will press the reset switch and alarm is deactivated. If no one is conscious and accident is severe and the alarm is not deactivated within the particular time period, the location of the accident is obtained from GPS and alert will be sent along with the location to the control room via GSM. Now from the control room, the information sent to the ambulance and the exact location will be provided. The second process in our project is that, the ambulance fixed with GPS module sends the exact location of the ambulance to the control room with the help of GSM continuously. The third process is monitoring the location of the ambulance continuously in the control room with the help of LabVIEW software and the traffic signals are cleared in the path of the ambulance from the control room.

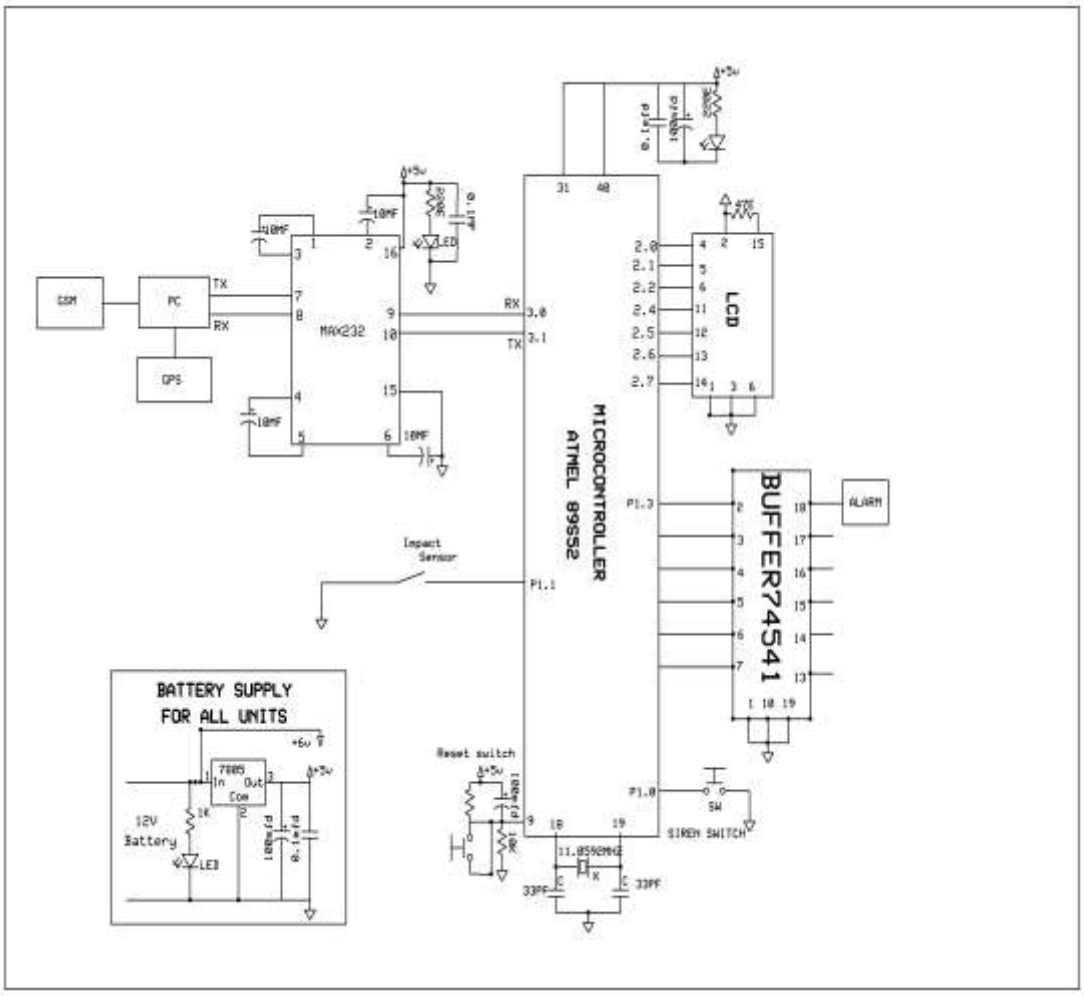

Fig. 3 Circuit Diagram of Vehicle Unit Section

Vehicle Unit section consists of Battery, Microcontroller, Alarm, Siren switch, GSM module, GPS module and Interfacing circuit as shown in Fig. 3. The output of GPS module is fed to Microcontroller AT89S52. It is used to

monitor the location of the vehicle. The location is sent to the control room using GSM module.

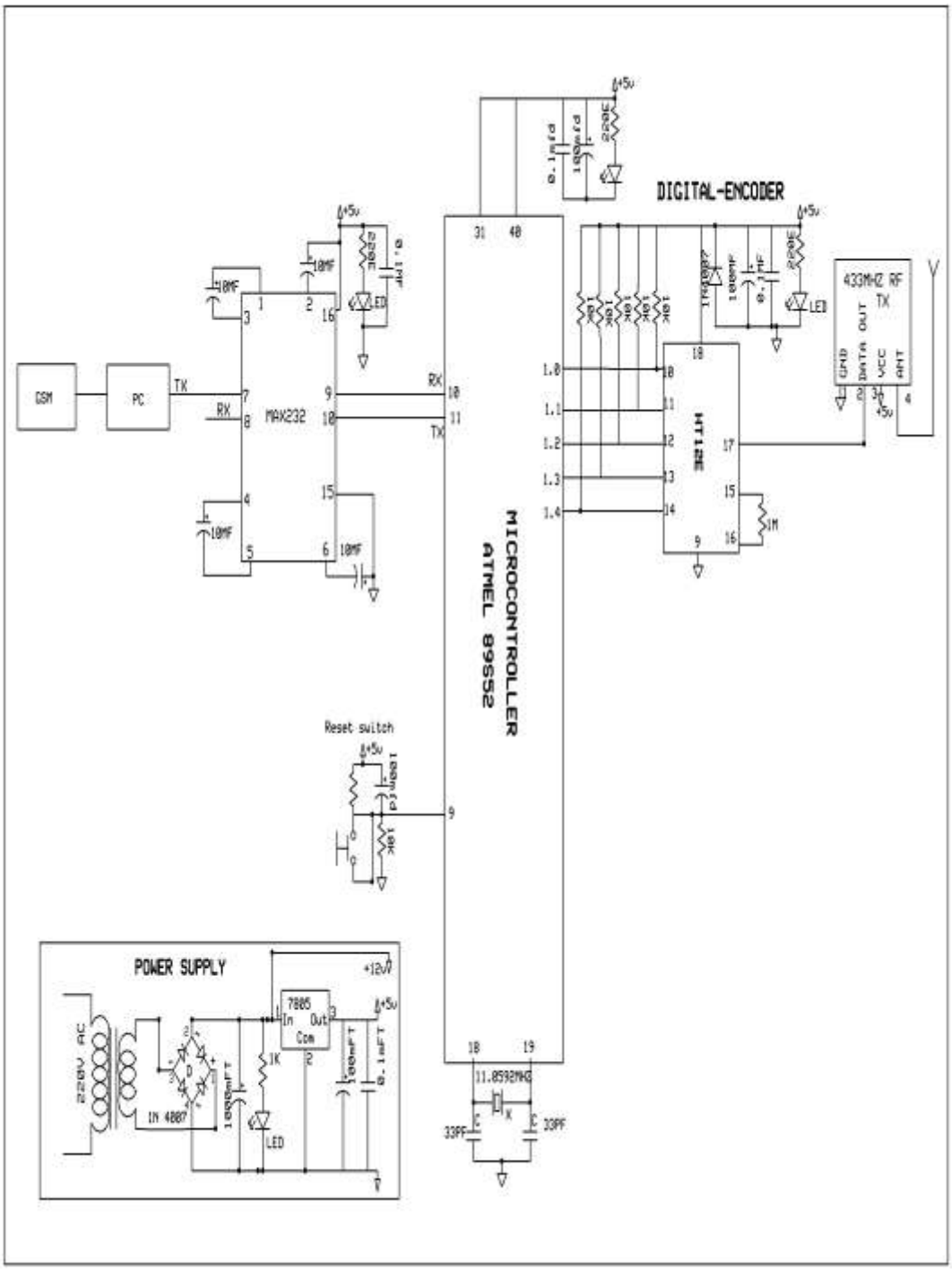

Fig. 4 Circuit Diagram of Control Room Section

Control room section consists of Microcontroller, GSM Module, Interfacing circuit, PC or Laptop, Encoder and Wireless RF Receiver as shown in Fig. 4. The Location Information sent from Vehicle is received via GSM and sent

to the system using the interfacing circuit. Through the LabVIEW software the location of the vehicle is continuously monitored and the control signal for the traffic signal lights is then sent to the corresponding area with the help of Microcontroller, Encoder and Wireless RF Transmitter.

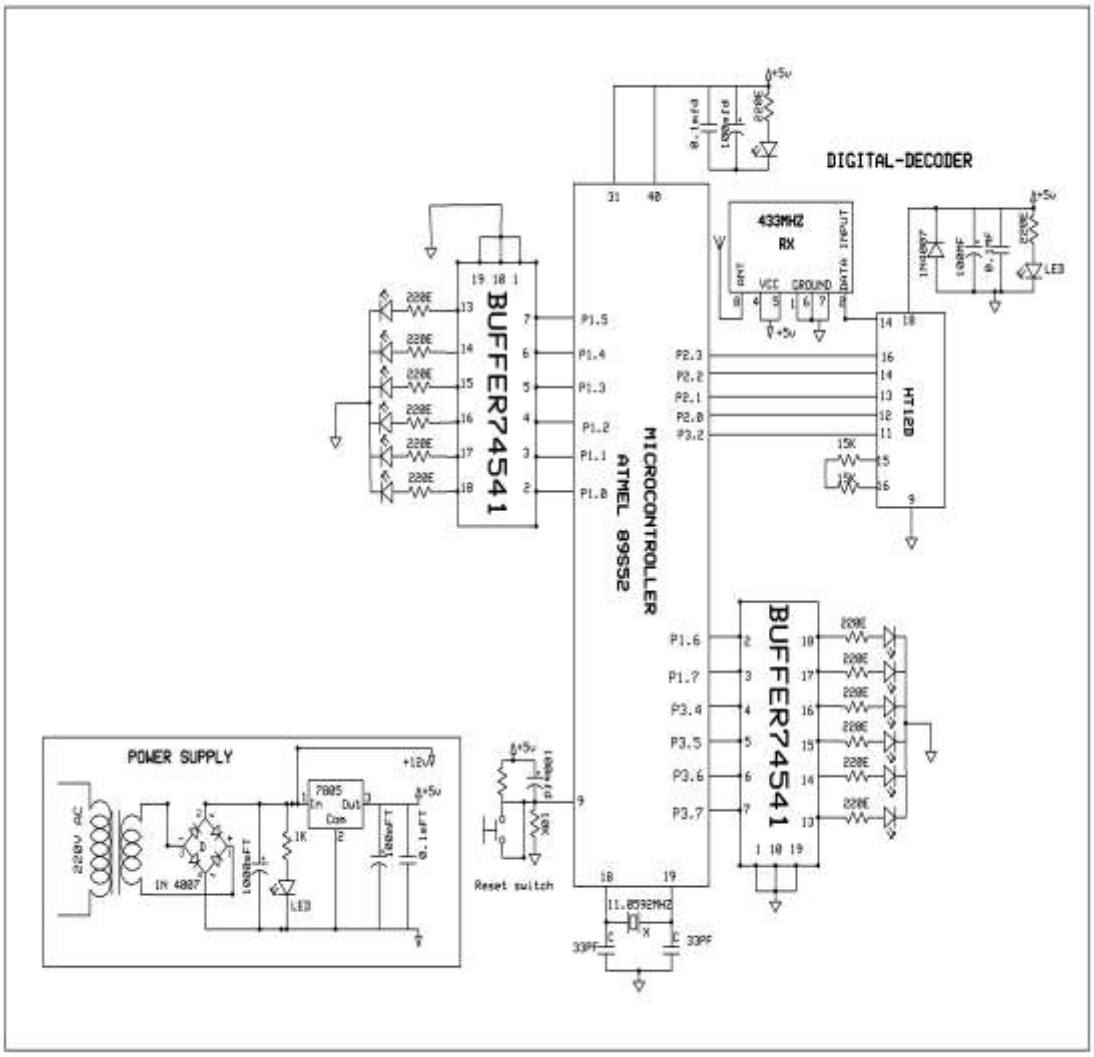

Fig. 5 Circuit Diagram of Traffic Light Signal Section

Traffic Light Signal section consists of Traffic signal module, Microcontroller, Decoder and Wireless RF Receiver as shown in Fig.5. The Data sent from Wireless transmitter is received through the wireless receiver. The received data is then decoded and sent to the Microcontroller AT89S52. The Traffic signal lights interfaced with microcontroller is used to display the signal.

IV. HARDWARE DESCRIPTION

The AT89S52 provides the following standard features: 8Kbytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bit timer/counters, six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock

circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the AT89S52 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

4.1 RF Transmitter

It is an ideal for remote control applications where low cost and longer range is required. The transmitter operates from a 1.5-12V supply, making it ideal for battery-powered applications. The transmitter employs a SAW-stabilized oscillator, ensuring accurate frequency control for best range performance. Output power and harmonic emissions are easy to control, making FCC and ETSI compliance easy.

4.2 RF Receiver

It is an ideal for short-range remote control applications where cost is a primary concern. The receiver module requires no external RF components except for the antenna. It generates virtually no emissions, making FCC and ETSI approvals easy. The super-regenerative design exhibits exceptional sensitivity at a very low cost.

Transmitter section from vehicle unit is the module fixed in every vehicle so that when the vehicle met with an accident, the impact sensor senses it and the alarm will be activated as shown in Fig.6. If any person inside the vehicle is conscious and finds accident doesn't have more impact, will press the reset switch and alarm is deactivated. If no one is conscious and accident is severe and the alarm is not deactivated within the particular time period, the location of the accident is obtained from GPS and alert will be sent along with the location to the control room via GSM. The GPS and GSM module is fixed in every ambulance vehicle, so that the exact location of the ambulance will be monitored continuously in the control room.

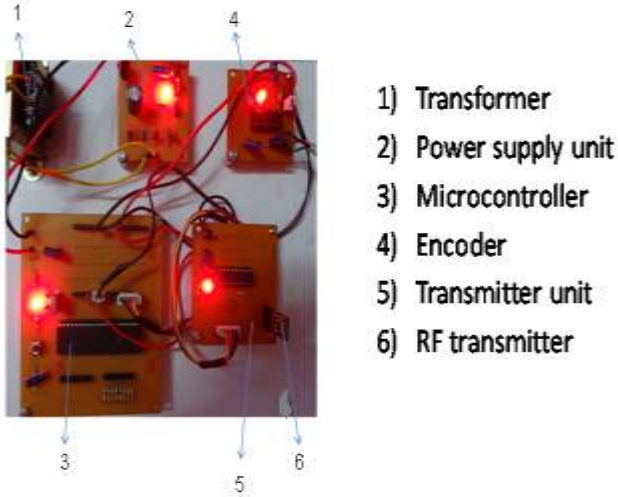

Fig. 6 Transmitter Section from Vehicle Unit

Fig. 7 shows the traffic signal light unit in the particular road. The data from the control room is received via RF receiver and corresponding signal change is done.

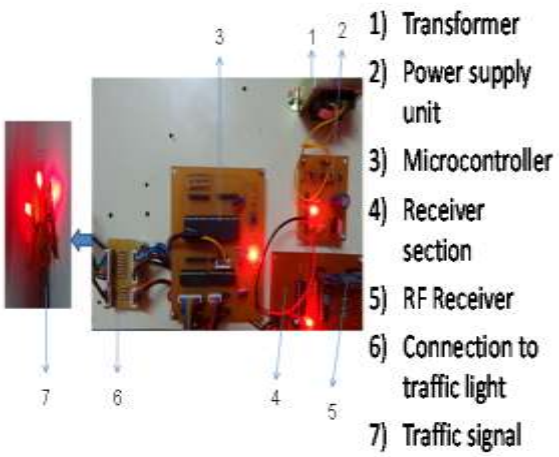

Fig. 7 Receiver Section in Traffic Light Signal Unit **Fig. 8 Accident Sensor Unit in Vehicle**

Fig. 9 GSM Unit to Receive Accident Occurrence

Fig. 8 and Fig.9 shows the Accident occurrence identification and GSM unit connected with the PC/Laptop to receive the alert from the accident vehicle and the location of the ambulance from the ambulance vehicle.

Initially, the traffic light signals are programmed in all the areas in order to vary from red to yellow, yellow to green and green to red within particular time interval. When one face is green, all the signals in other faces are in red. The variation of those faces is shown in the Fig. 10.

When the accident is identified, and alarm is not deactivated, the location of the accident is sent to the control room. The information is received in the control room and it is viewed in the Lab VIEW software. When the information

sent to ambulance and the ambulance along with the patient is moving to the hospital, the location of the ambulance is continuously sent to the control room and it is viewed in the Lab VIEW software.

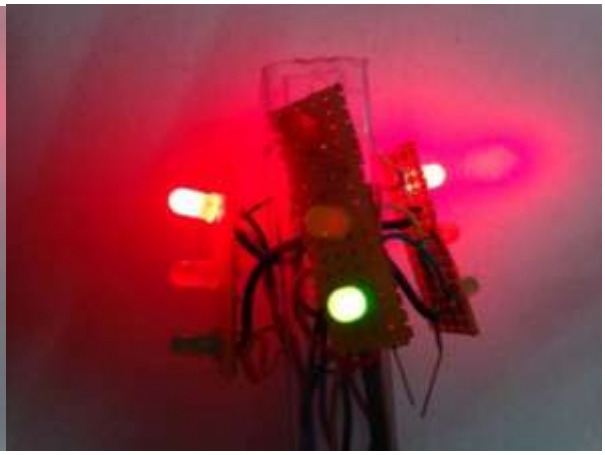

Fig. 10 Traffic Signals in Normal Condition **Fig. 11 GSM Unit to receive accident occurrence**

According to the location of the ambulance, the corresponding path is made free by clearing the traffic signals in that particular path. This can be done in the control room and the corresponding signal is made green as shown in the Fig. 11.

V. CONCLUSION

This System helps to track the accident vehicles and Ambulance vehicles using GPS. The GPS module will be fixed on those vehicles and the vehicle's location is sent to the control center using GSM. The continuous monitoring of those vehicles location is done in the control room and the corresponding road's traffic signal is made green. This system helps the ambulance to reach the hospitals in time. This system can be effectively done by using long distance and advanced transmitters and receivers in real time.

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INTEGRATED WATER RESOURCE MANAGEMENT FOR THIRUPARANKUNDRAM

M. Surya[1], R. K. C. Jey Kumar[2]

[1]*Department of Civil Engineering, Thiagarajar Collage of engineering (India)*

[2]*Assistant Professor, Department of Civil Engineering, Thiagarajar Collage of Engineering (India)*

ABSTRACT

Thiruparan kundram is a town in Madurai city in the Indian state of Tamil Nadu. This Panchayat has been added to the Madurai corporation and the first local body election for corporation was held on 18th October 2011. As per 2011 census, the town had a population of 48,810. It is a famous pilgrimage place, so there is floating population also during the festival and holy days. The main problem in the local planning area is mainly due to rapid increase in the population and hence present infrastructure of water and sanitation is not sufficient. Also there is tremendous growth of industrialization and agriculture production activities in the area which has led to increase in demand for water and the need for water supply infrastructure. The objective of this project is to improve the efficacy of water supply system by integrating the water resources for Thiruparankundram area.

Keywords: Water Resource Management, System Dynamics, Decision Support.

I. INTRODUCTION

Water-related problems are series threats to humankind. Water use has more than tripled globally since 1950, and one out of every six persons does not have regular access to safe drinking water. Lack of access to a safe water supply and sanitation affects the health of 1.2 billion people annually (WHO and UNICEF, 2000). The latest global environmental outlook of the United Nations Environmental Program (UNEP) reports that about one third of the world's population currently live in countries suffering moderate-to-high water stress, where consumption is more than 10% of renewable freshwater resources. The problems may be attributed to many factors. Inadequate water management is accelerating the depletion of surface water and ground water resources. Water quality has been degraded by domestic and industrial pollution sources as well as non-point sources. In some places, water is withdrawn from the water resources, which become polluted owing to a lack of sanitation infrastructure and services.

Adequate water infrastructure (like dams, reservoirs and artificial recharge structures) is required to ensure the sustainability of water resources to overcome scarcity problems. Infrastructure like pipe line network is also required to provide water related services, primarily water supply and sanitation, for the population, agriculture and industry, as well as for treatment and disposal of waste water.

Water supply and sanitation in India continue to be inadequate, despite longstanding efforts by the various levels of government and communities. The level of investment in water and sanitation, albeit low by international

standards, has increased during the 2000's. Access has also increased significantly. No major cities in India is known to have a continuous water supply and an estimated 72% of Indians still have lack access to improved sanitation facilities.

Hence it is proposed to develop a closed loop management system by improving infrastructure facilities for Thirupparankundram area.

II. INTEGRATED WATER RESOURCE MANAGEMENT

IWRM is an approach for urban water utilities to plan and manage urban water systems (i.e., water supply, waste water and storm water) to minimize impact an natural environment, to maximize their contribution to social and economic vitality and to engender overall community improvement (Maheepala and Blackmore, 2008).This approach emerged from the perception that water is an integral part of the ecosystem, a natural resource, and a social and economic good (United Nations, 1992). The overall benefits of adopting the IWRM approach in its potential to provide solutions to the common challenges faced by the urban water industry such as climate change, population growth, rising cost for new infrastructure and meet ecological requirements. Some specific and potential benefits of the IWRM approach include

- Providing Water security
- Reducing Impacts on the environment
- Improving governance
- Improving system wide performance

III. SYSTEM DYNAMICS

System Dynamics (SD) is an approach to understanding the behaviour of complex systems over time .It captures internal feedback loops and time delays that affect the entire system. Developed by Professor Jay Forrester in the1960s and popularized by the Club of Rome's *Limits to Growth* in the 1970s.SD has been successfully applied to study demographics , economic growth, business development, water and natural resources management, and environmental systems . Its capabilities to quantitatively simulate the dynamic consequences of various policies make it an ideal decision support tool for strategic policy testing and selection.

The current modelling studies of water resources mainly focus on the irrigation system of the agricultural industries. For example, SD has been used to study Yellow River in China, water for irrigation in Spain, water resources in Canada and water balance in Mono Lake, California.

IV METHODOLOGY

1. Literature Review
2. Base Map Preparation
3. Data Collection
4. Problem Identification
5. Analysis
6. Outcome

4.1 Data Collection

These are the data used as the input for the problem identification and analysis purpose.

- Rainfall
- Population
- Water availability
- Water Requirement
- Water Supply

4.2 Problem Identification

Water is the basic requirement of the human needs for their day to day life.It is very important to have sufficient water for their fullfillment. So the water scarcity can be determined by using following way.

Availability of water > Requirment of water ⟶ There is no water scarcity

Availability of water < Requirment of water ⟶ There is water scarcity

If water scarcity exits, water demand can be find out by using the following method

- Water demand = Requirement of water – Availability of water
- Requirement of water = Population x Percapita demand

By using the above methods, the water scarcity problem that identified in Thiruparankundrum area.

4.3 Analysis

4.3.1Geographical Information System(GIS)

- Used for base map preparation
- Mapping is a key output of GIS but is not the whole story.
- GIS stores the spatial data that is used to make maps.
- GIS is an analysis tool

4.3.2 System Dynamics

System Dynamics is an effective and useful method for the analysis of complex systems, integrating the subsystems and parts into a whole, which can then be simulated to develop insight into its dynamic behaviour. Even without simulation, the causal diagrams improve the understanding of the structure and the key determinants of system behaviour. By using this system Dynamics tool, integrated water resource management can be formed.

V. CONCLUSION

From the above mentioned studies, we can know the importance of water resource management. Now a days, India could not give much importance to water resource management if this level is continue then India faces severe water scarcity. By assessing and managing the water give good efficient water. Thus, the need of study about the water resource management will become the mandatory thing in the future and it will have a great scope to work through. The objective of the study is to improve the efficacy of water supply system by integrating the available water resources of Thiruparankundram area. In this project the study area identified as

Thiruparankundram. The IWRM provides many sources of water as alternatives and drastically reduces the water scarcity in a sustainable manner. Hence, it is proposed to develop a closed loop IWRM system of water resources by improving infrastructure facilities for Thiruparankundram area. By using the integrated water resource management, we can reduce the water demand at least 40% of this area. If it works efficiently it can be used for nearby areas and the water scarcity is decreases drastically.

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GROWTH OF NANOSTRUCTURED ZnO THIN FILMS VIA SPIN COATING TECHNIQUE FOR ACETONE SENSING APPLICATIONS AT ROOM TEMPERATURE

M. Chitra[1], K. Uthayarani[2], N. Rajasekaran[3], N. Neelakandeswari[4], E. K. Girija[5]

[1,2]Department of Physics, [3,4] Department of Chemistry, Sri Ramakrishna Engineering College, Coimbatore - 641022, Tamilnadu, (India)

[5]Department of Physics, Periyar University, Salem – 636011, Tamilnadu, (India)

ABSTRACT

This paper reports on the effect of precursor solution on the formation of nanostructured zinc oxide (ZnO) thin films via spin coating technique. The thin films are characterized by X-ray Diffraction (XRD) and scanning electron microscopy (SEM). The optical property of the thin films is also studied. Based on the analytical data, the well grown ZnO nanostructured thin film is subjected to gas sensing applications.

Keywords: Nanostructures, Gas Sensor, Spin Coating, Thin Films, Zinc Oxide

I INTRODUCTION

Varieties of chalcogenides like ZnS, ZnO, CdS, CdTe, etc., are used as chemical/gas sensors [1]. Among them, Zinc oxide (ZnO) gains substantial interest in the research community owing to its novel properties like piezoelectric, luminescent, catalytic, photoconducting, semiconducting as well as its low cost, non-toxicity and chemical stability.[2]. Reports revealed that the semiconducting property of ZnO thin films is highly pronounced in the gas sensing applications [3 - 4]. Acetone, the irritant vapor leads to hepatotoxic effects when inhaled. Long - term exposure to acetone causes kidney, liver and nerve damage. Hence, it is necessary to sense acetone even at its low concentration. Among the commonly adopted techniques for the deposition of ZnO thin films, spin coating [5] is more advantageous due to its capability of producing relatively uniform films. In this work, we report the preparation and characterization of nanostructured ZnO thin films for acetone sensing application.

II EXPERIMENTAL DETAILS

All the chemicals purchased from Rankem were used without further purification. The films were deposited on cleaned glass substrates by spin coating. To study the effect of precursor on the sensing property of the film, three different approaches were carried out. In the first approach (ZnO I), 0.1M aqueous solutions of zinc

acetate (ZA) and hexamethylene tetramine (HMT) is mixed with 1% poly vinyl alcohol (PVA) and the precursor solution was spin coated at 2500 rpm. After coating, the film was dried at 400°C for 10 min. The spinning and drying procedure was repeated for 15 cycles to enhance the film growth and was calcined at 400°C for 3 hrs. In the second approach (ZnO II), 0.1 M ZA and HMT were mixed with tetrahydrofuran and the pH of the reaction medium was adjusted to 10 by adding triethanolamine (TEA). The prepared sol is spin coated and calcined as per the above protocol. In the third approach (ZnO III), pH of the solution of precursor used for first approach is adjusted to 10 by adding TEA in drops and used for coating.

The prepared ZnO films were characterized using PANalytical X-ray diffractometer (XRD) for phase identifications and the surface morphology was determined using the JEOL JSM Field emission scanning electron microscopy (FE – SEM). The optical and electrical properties were studied using the absorbance spectra and nyquist plot taken by JASCO – Ultraviolet - Visible (UV-Vis) spectrophotometer and Gamry Reference 600 potentiostat respectively. A set – up for analysing the gas sensing property of the nanostructured ZnO thin films was fabricated (not described in this paper) and an attempt is made to sense acetone. In the present study, the sensitivity (S) of the films is determined using the formula reported elsewhere [6].

III RESULTS AND DISCUSSION

The XRD patterns of ZnO thin films given in Fig.1 are comparable with the standard JCPDS (File No: 36 – 1451), suggesting the formation of wurtzite phase of ZnO [6]. In the case of ZnO II and ZnO III, the Bragg angles at 35.14° (002) and 32.39° (100) correspondingly revealed the orientation of growth along the c-axis [3] and a-axis [7]. The average crystallite size (D) calculated by Scherrer formula [6] as 51.4 nm, 53.9 nm and 137.2 nm respectively for ZnO I, ZnO II and ZnO III.

Fig.2 shows the SEM images of the prepared films. SEM image of the ZnO I film shows a uniform distribution of hexagonal shaped grains whereas ZnO II film paves a pillar like morphology for the group of nanorods with almost uniform size distribution. ZnO III film possesses a rock like morphology. These results are in accordance with the growth along a-axis and c-axis obtained from XRD for ZnO III and ZnO II films respectively.

Fig.3 depicts a UV-vis spectrum of the ZnO films in which an absorption peak centered around 315 nm (3.93 eV) for all the three samples resulting in a blue-shift with respect to bulk ZnO. This sharp absorption onset of the films exhibits the optical quality and low concentration of defects such as voids.

Fig.4 shows the nyquist plot of the ZnO films from which the intercept of impedence on the X - axis gives the dc resistance of the films. It is observed that ZnO II shows higher resistance than the other two films.

3.1 Gas Sensing Measurements

In the present study, on careful observation of all the three samples, the film of ZnO II possessed the pillar like structure leading to larger surface area in addition to large number of adsorption-desorption sites [8] which favors the interaction of gas molecules. Hence the sensitivity measurement for acetone was carried out with the ZnO II. Fig.5 represents the sensing characteristics of ZnO film with respect to concentration at room temperature. Acetone is injected in steps of 20 ppm inside the test chamber and the sensitivity is found to

increase from 0 ppm to 100 ppm and gets saturated beyond 100 ppm. The mechanism behind the decrease of resistance of ZnO after the injection of acetone is due to the release of electrons on the surface and beyond 100 ppm, the saturation in the sensitivity value is observed due to the formation of multimolecular layers on the film surface.

FIGURES

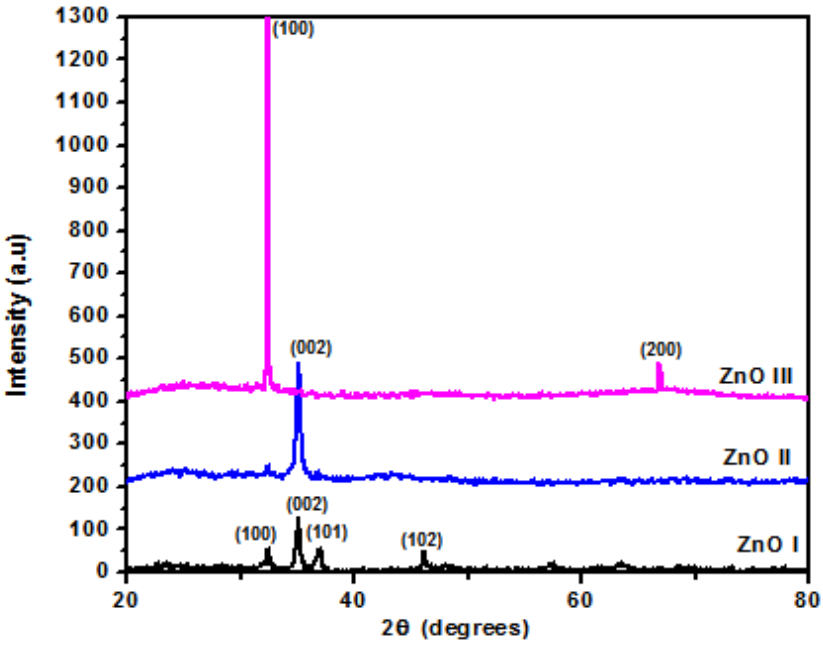


Figure .1 XRD pattern of the ZnO films

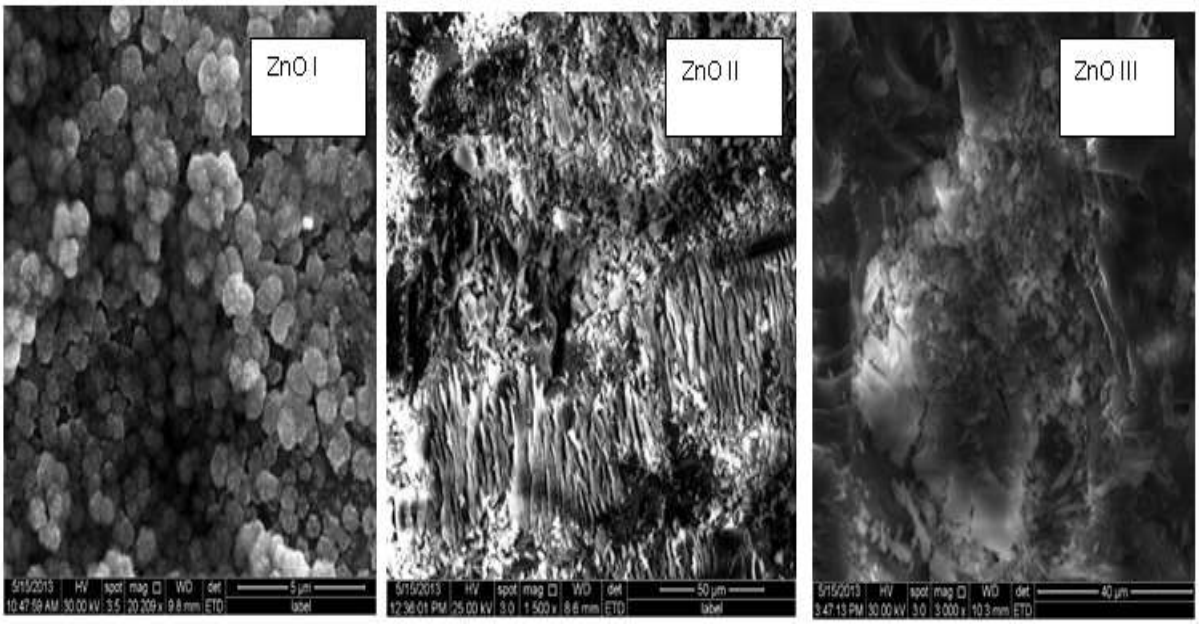
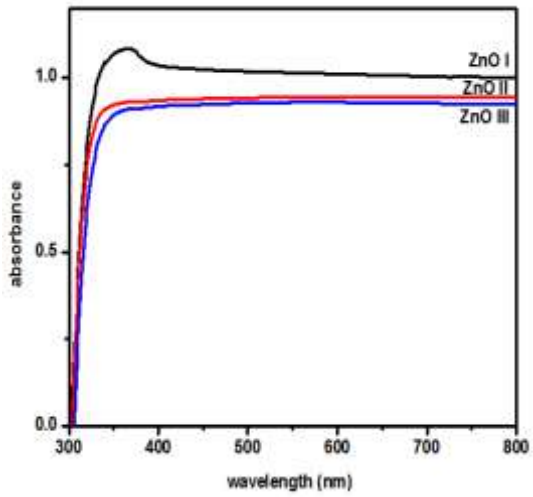


Figure.2 FE-SEM images of the ZnO films



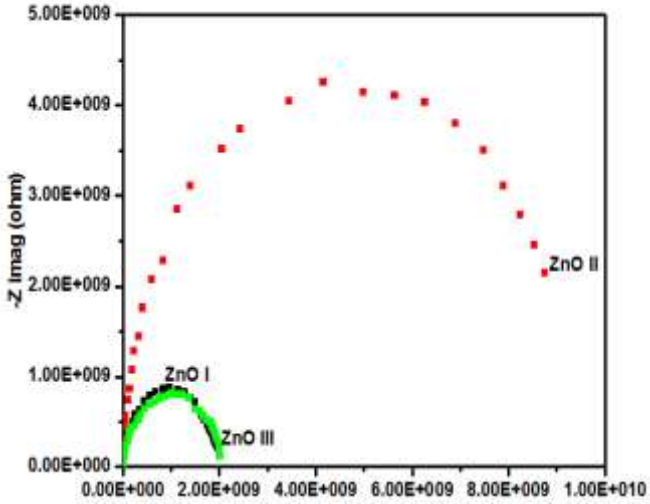


Figure. 3 Absorption spectra of the ZnO films Figure.4 Impedance spectra of the ZnO films

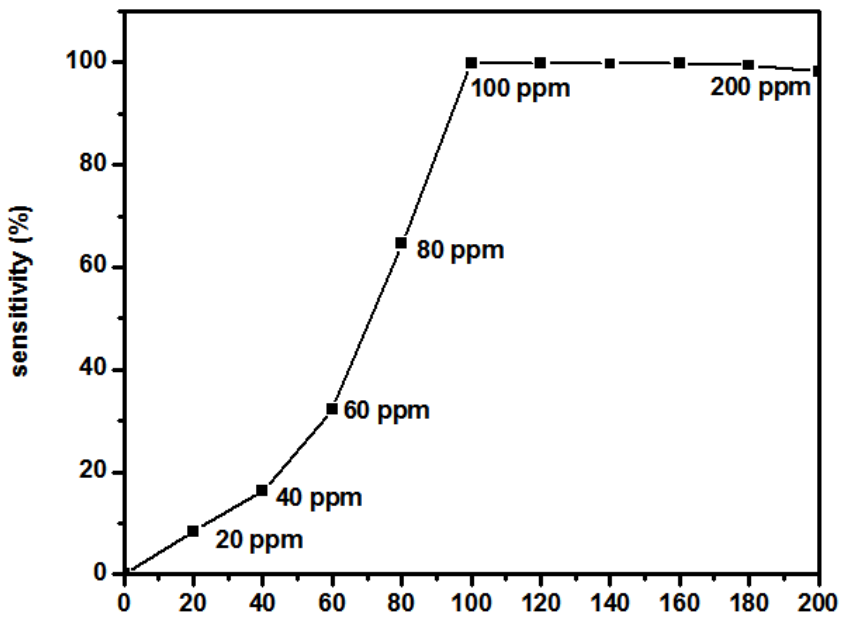


Figure.5 Sensitivity of ZnO II film when exposed to acetone

IV CONCLUSION

The effect of precursor on the ZnO thin films were characterized by XRD and SEM. The uniformly grown ZnO nanorods (ZnO II) along the c-axis plane is tested towards the sensing of acetone and it is found that, the film is active between 20 and 100 ppm.

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A SURVEY PAPER ON ENSURING SECURITY IN CLOUD COMPUTING

Yogita gangboir[1], Praveen Shende[2], Tushar Kumar Vaidya[3]

[1,3]Department of Computer Science and Engineering, CSIT, Durg, (India)

[2]Assoistant Professor in Computer Science and Engg. Department, CSIT, Durg, (India)

ABSTRACT

Cloud computing means store the new technology around the world. It is the next generation of computer industry which plays a vital role in corporate business. Any type of users who want to do secure transmission of data or storage of data in any network. Cloud computing stores the data and share distributed resources in open environment thus it suffers from security problems. The objective of this paper is to ensure security on software as a service model for uploading and downloading data by end user in cloud computing.

Keywords: Cloud Computing, Infrastructure As A Service, Platform As A Service, Software As A Service, Security.

I. INTRODUCTION

Cloud computing is the new technology which provide different services and resources to users. In cloud computing users doesn't know how computation is done and storage is managed. There are three types of services – (Infrastructure as a service (IaaS), platform as a service (PaaS), software as a service(SaaS). The cloud service provider is responsible to manages a cloud and provide data storage services to different users. Cloud computing gives assurance to reduce all the operational and capital cost of the organizations and just focus on strategy of organization.

II. ABOUT CLOUD COMPUTING

For providing a secure cloud computing services, a major decision is to decide which type of cloud going to be implemented. There are four types of cloud deployment model – public, private, community and hybrid cloud.

2.1 Public Cloud

In public cloud model, it allows all users' access to the cloud via interfaces by using mainstream web browsers. It's work on pay-per-use model,. disadvantage of this model , it is less secure than other cloud models because This ensure to cloud users that all the applications and data accessed on the public cloud are not subjected to attackers. Therefore for trust and privacy concern it will not be good deal with Public clouds. Public cloud employs different techniques for resource optimization; since these services are transparent for end users and represent a potential threat to the security of the system. If a cloud provider runs several data centers, for instance, resources can be assigned in such a way that the load is uniformly distributed between all centers. Example of public cloud is Amazon web service (AWS), it is simple storage service which is form of IaaS type of cloud, and

it offering the Google App Engine with provides a PaaS to its customers. The customer relationship management (CRM) solution Salesforce.com is the example of SaaS cloud service.

2.2 Private Cloud

In private cloud model, all the cloud services, applications and resources are managed by the organization itself. It is quite similar to intranet . private cloud model is secure than public cloud because of its specified internal exposure. The advantage of private cloud is that, the enterprise retains full control over data, security mechanism, and performance of the system.

2.3 Community Cloud

In community cloud model, is work on specific community of cloud consumer, it is similar to public cloud. Community Clouds are owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises. The cloud infrastructure is provisioned for exclusive use of a specific community of consumers from organizations that have shared concerns.

2.4 Hybrid Cloud

In hybrid cloud model, it is the combination of power of the private and public models. Most of the organizations deploy their own cloud with their limited infrastructure to host their sensitive applications. When need for a big infrastructure and non-critical applications so it can be moved into the public cloud and critical applications could stay in their own internal cloud. It introduces the complexity of determining how to distribute applications across both a public and private cloud.

2.5 Architecture of Cloud Computing

Cloud computing is a traditional computing model, it is very important to understand the cloud's architecture. Because there is different definitions and architecture of cloud, all the enterprises is using different architecture. NIST (National Institute of Standards and Technology) summarizes the architecture of the cloud computing [4]. In this architecture there are five essentials characteristics, three service models and four deployment models.
Five essentials characteristics are:

- On-demand self-service- A consumer can unilaterally provision computing capabilities.
- Broad network access- Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms.
- Resource pooling- The provider's computing resources are pooled to serve multiple consumers, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.
- Rapid elasticity- Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in.

- Measured service- Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service.

Figure 1: Architecture of Cloud Computing

Different services models are- Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).

- Software as a Service- In this service model consumer is only use to application provided by the cloud service provider running on the cloud infrastructure. In this Applications and computing resources as a web base application it act as an interface between application host and customer.
- Platform as a Service (PaaS) this model is consumer-created or acquired applications created by using different languages and supported by cloud provider. cloud infrastructure are does not control by the consumer, it has control with possible configured settings for application-hosting (e.g. Java runtime environment) and enables users to deploy their own applications within it.
- Infrastructure as a Service (IaaS) The consumer does not control or manage cloud infrastructure but has control over operating systems, storage, and deployed applications, and networking components (e.g., host firewalls). It is only cloud layer where the Cloud computing resources are only shared with contracted clients at a pay-per-use fee.

III. SECURITY CHALLENGES AND POLICY IN CLOUD COMPUTING

Cloud computing is a new computing model, regardless of the system's architecture or service's deployment is different from the traditional computing model[3].

3.1 Security Challenges In Cloud Computing Environment

- In the traditional model, it can be protect device user by dividing physical and logical security zones. It is difficult to clearly define the boundaries to protect the user devices.

- Security service challenge. Cloud service provider controlled all data, different services, networks and resources. So when security is something wrong, how to provide assurance that the service continues to be used, as well as the confidentiality of user data is particularly important.
- Protection. This is challenge to protect user data. It includes location of data stored, way of data storage, recovery of data, encryption and data integrity protection.
- In cloud computing model, many users dynamically changes and also services. So lead of user can not classify.
- The user's rights may be difficult to ensure because in cloud model, cloud service provider has many rights. So it becomes a problem that, how to balance the rights between the users and cloud service providers.
- Complexity of cloud computing. It is an important issue that how to ensure communications among the various subjects are security and integrity.
- Security benefits. There are definitely plenty of concerns regarding the inability to trust cloud computing due to its security issues. However, cloud computing comes with several benefits that address data security [9].

3.2 Policy in Cloud Computing

There are some security policy points [3]:

- Divided into multiple security domains in the cloud computing environment, different security domain operation must be mutual authentication, each security domain internal should have main map between global and local.
- Ensure that the user's connection and communications security with the SSL, VPN, PPTP, etc. Using license and allowing there are multiple authorizations among user, service owner and agents, to ensure user access to data securely.
- User data security assurance: according to the different user's requirements, different data storage protection should be provided. At the same time, the efficiency of data storage should be improving.
- Using a series of measure to solve the user dynamic requirements, including a complete single sign-on authentication, proxy, collaborative certification, and certification between security domains.
- Establishment of third-party monitoring mechanism to ensure that operation of cloud computing environment is safe and stable.
- The computing requested by service requestor, should carry out the safety tests, it can check whether they contain malicious requests to undermine the security rules.

IV. SECURITY REQUIREMENTS IN CLOUD COMPUTING

Cloud computing security should be guided in this manner to become an effective and secure technology solution. In Figure 2, cloud computing security requirements, is coupled with different cloud delivery model and deployment model. Here "X" denotes the mandatory requirements and an asterisk (*) denotes the optional requirements [9].

Different security requirements are:

- Authentication and Identification- It depending upon the type of cloud as well as the cloud delivery model. The specified users must be established first.
- Authorization –It ensures that referential integrity is maintained. It follows on in exerting control and privileges over process flows within Cloud computing. Authorization is maintained by the system administrator in a Private cloud.

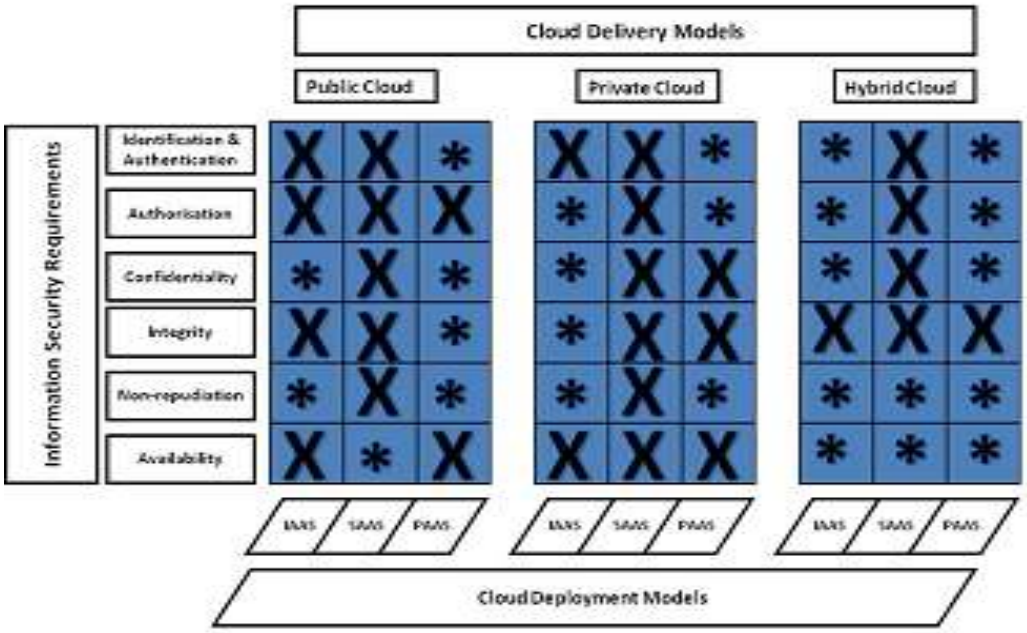

Figure 2: Cloud Computing Security Requirements

- Confidentiality- confidentiality plays an important role especially to maintain control over organizations' data situated across multiple distributed databases. It is a must when employing a Public cloud due to public clouds accessibility nature. Provide confidentiality of users' profiles and protecting their data, that is virtually accessed, allows for information security protocols to be enforced at various different layers of cloud applications.
- Integrity - The integrity is required when cloud domain mainly accessing the data. Therefore ACID (atomicity, consistency, isolation and durability) properties of the cloud's data should be robustly imposed across all Cloud deliver models.
- Non-repudiation - Non-repudiation can be obtained by applying the traditional e-commerce security protocols. Tokens are provisioning to data transmission within cloud applications.
- Availability – It is one of the most critical security requirements in Cloud model because it is a key decision factor when deciding among private, public or hybrid cloud vendors as well as in the delivery models.

V. RESULT

S. No.	Security Area	Current / possible solution
1	Authentication and Authorization	Open Authorization [8]
2	Availability	Data Dispersion

3	Data confidentiality	Attribute based Proxy Re-Encryption [6]
4	Virtual Machine Security	Reconfigurable distributed virtual machine[12]
5	Information Security	Risk Management Framework [16]
6	Network Security	Network Security for virtual machines [15]
7	Cloud standards	IEEE Cloud Computing Standard Study Group
8	Web application Security	Web Application Scanners
9	Backup	Agent less Method for data Backup and Recovery [1]

Table1 1: Current Solutions Available For Security Saas Service

VI. CONCLUSION

Cloud Computing is a new and growing paradigm where computing is considered as on-demand service. In this paper survey of cloud computing, we mainly described the different characteristics, service model and different security requirements. We also discussed about the security challenges & policies and some results in which some security area has different possible solutions.

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Biographical Notes

Miss. Yogita Gangboir is presently pursuing M.Tech final year in Computer Science & Engineering Department from CSIT, Durg ,Chhattisgarh, India.

Mr. Praveen Shende working as Assistant Professor in Computer Science & Engineering Department, CSIT, Durg, Chhattisgarh, India.

Mr. Tushar Kumar Vaidya is presently pursuing M. Tech final year in Computer Science & Engineering Department from CSIT, Durg, Chhattisgarh, India.

PHYTOCHEMICAL PREPARATION, CHARACTERIZATION AND PHOTOCATALYTIC APPLICATION OF Ag - SiO_2 NANOCATALYST

N. Neelakandeswari[1], N. Rajasekaran[2], K. Uthayarani[3]

[1,2] Department of Chemistry, [3]Department of Physics

Sri Ramakrishna Engineerning College, Coimbatore- 22 (India)

ABSTRACT

Silver nanoparticles (Ag NPs) were synthesized using Aloe vera extract as a reducing agent. Formation of Ag NPs were confirmed from their surface Plasmon resonance bands. Prepared nanoparticles were stabilized using a porous silica support (SiO_2) and characterized by various physio chemical techniques like UV-visible spectroscopy, Fourier-Transform Infra red spectroscopy (FTIR), powder X-ray diffraction (XRD), scanning electron microscopy (SEM) and atomic absorption spectroscopy (AAS). Catalytic efficiency of the prepared catalyst towards the degradation of crystal violet dye was tested through UV light irradiation. Effect of various parameters like pH of the medium, quantity of the catalyst etc., on the degradation efficiency were also studied and compiled in this paper.

Keywords: Photocatalysis, Phytochemical Synthesis, Silver Nanoparticles

I INTRODUCTION

Manifestation of size of a material to nano scale causes appreciable change in its properties, which can be used in practice for development of novel materials and technologies. Passion in the preparation of metal nanoparticles increases dramatically with the increase in number of publications for the past few years. However, the properties of NPs purely depend on their size as well as structure, shape and environment. Thus, control over the size and size distribution is an important task. Generally, specific control of shape, and size is often achieved by varying the synthesis methods, reducing agents and stabilizers [1]. Among the well known synthetic processes, use of hazardous reducing agents like borohydride salts, thiols etc.,[2] mounts a bias for the expected eco friendly approach. Hence a green chemical approach for the nanoparticle synthesis was adopted by various research groups [3-6] some of them include the use of microbes, plant extracts and so on. Among the plasmonic metal nanoparticles, silver nanoparticles (Ag NPs) have attracted much attention for various applications like catalysis, optoelectronics, bactericides, sensing probes for biological systems, information technology etc.,[7]. Despite the above mentioned applications, NPs find their own limitations when they are used as catalysts i.e., the difficulty in recovery and reusability. These colloidal NPs tend to aggregate or dissolve

due to their low temperature stability during the course of reaction that leads to the difficulty in reuse. Hence it is necessary to prevent the NPs from aggregation by using a suitable stabilizing agent. Herein we report the preparation of a Ag NPs using an aqueous extract of Aloe vera, stabilization of the prepared NPs using an inorganic support (SiO_2) and the preliminary photocatalytic behaviour of the stabilized catalyst towards the degradation of an organic pollutant crystal violet.

II EXPERIMENTAL DETAILS

Silver nitrate, Silica and Crystal violet were purchased from Rankem and were used as such without any further purification. Aloe vera is collected from the neighbouring irrigation field. Aqueous extract of Aloe vera was obtained by refluxing 20g of Aloe vera in 100mL of double distilled water. To an aqueous solution of $AgNO_3$ (0.1M), calculated quantity of extract was added and stirred under dark at room temperature and frequently monitored by UV-Visible spectroscopy for the formation of NPs. To load the Ag NPs on SiO_2 two different approaches were made. In the first approach calculated quantity of SiO_2 was dispersed in 0.1M $AgNO_3$ solution under dark. Then it was filtered, washed with distilled water and the Ag^+ loaded SiO_2 was redispersed with distilled water, reduced by adding optimised quantity of extract and stirred at room temperature for 6 hrs. In the second approach SiO_2 was added to the already prepared AgNps and stirred at RT. Finally the samples were filtered, washed with double distilled water, dried and named as Ag-SiO_2 I and Ag-SiO_2 II respectively.

Above prepared Ag NPs and the Ag-SiO_2 composites were characterised by the following state of the art techniques. UV- visible absorption spectrum was recorded at room temperature with JASCO- UV VIS spectrophotometer. The powder X- ray diffraction patterns were recorded using PANALYTICAL X – Ray diffractometer (Cu- Kα radiation, λ= 1.54Å) in 2θ range from 20- 80°. The SEM images of the samples were recorded on JEOL JSM- 6490L A scanning electron microscope. Concentration of silver in the composites was estimated using PERKINELMER atomic absorption spectrophotometer. Particle size of the materials were determined from the HORIBA particle size analyser.

III RESULTS AND DISCUSSION

Figure -1a shows the UV- Visible spectrum of mixture of 100 mL aqueous 0.1M $AgNO_3$ and 1mL or 2mL of extract at different reaction time. When the reaction was performed with 1mL extract, formation of Ag NPs was not observed even after 6 h but for the reaction with 2mL extract possesses a broad surface Plasmon resonance absorption between 410 nm and 590 nm after 4 hrs of the reaction and intensifies after 6 hrs, which confirms the formation of Ag NPs [6,8]. Powder XRD pattern of Ag NPs loaded on SiO_2 is given in figure – 1b. In both the methods adopted for loading of NPs on the support, the diffraction peak is originated at $2\theta = 23.4^\circ$ corresponds to the support (SiO_2). No peaks for the elemental silver (predominant one at $2\theta = 38.1^\circ$) is appeared in the difractogram, probably due to detection limit of the instrument [9]. But the presence of Ag in the composite was quantified by AAS and it was found to be 12% and 9.6% correspondingly for Ag-SiO_2 I and Ag-SiO_2 II.

Fig – 2 (a & b) is the SEM images of Ag-SiO_2 I and Ag-SiO_2 II respectively. Patches of Ag NPs formed were dispersed on the rock like porous SiO_2 support is clearly identified. Images of the dispersed Ag NPs were given

as inset. Since the particle size of the composites was not identified from the SEM, but was obtained from the particle size analyser and the results are given in TABLE – 1. From the results, the average particle size of the composite is greater than the prepared Ag NPs as well as SiO_2, which clearly indicates the loading of Ag on SiO_2 resulting in the formation of a composite (Ag-SiO_2).

3.1. Photocatalytic activity

Among the prepared composites, amount of Ag loaded was found to be maximum in the case of Ag-SiO_2 I and hence the photocatalytic efficiency of the prepared composite was tested with crystal violet dye (1 X 10^{-4}M) under UV irradiation and the efficiency of the degradation was calculated as per the literature [10]. Effect of catalyst concentration on the degradation was studied. Reaction did not proceed at all in the absence of the catalyst. But upon increasing the catalyst quantity from 5mg to 10mg, the degradation efficiency increases from 59% to 92% and further increase upto 20mg didnot show any appreciable change (only 95%). Hence, the optimum catalyst quantity for the heterogeneous photodegradation of crystal violet was found to be 10mg. Lower catalyst concentration suffer lack of reactive sites but higher concentration lead to the backscattering of radiation rather than the interaction with the dye. Effect of pH of the reaction medium on the degradation efficiency was also tested and it was found that pH-9 is the optimum one for the effective degradation.

FIGURES

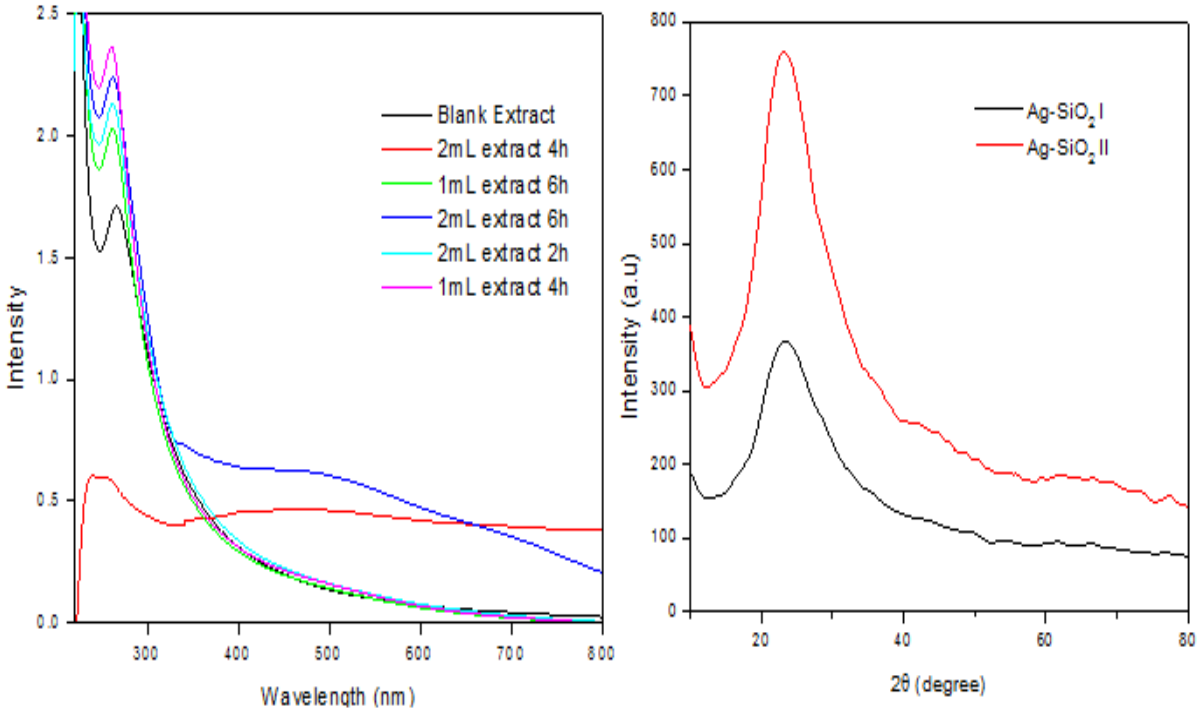

Figure – 1: a) UV-Visible spectrum of Ag NPs, b) Powder XRD pattern of composite

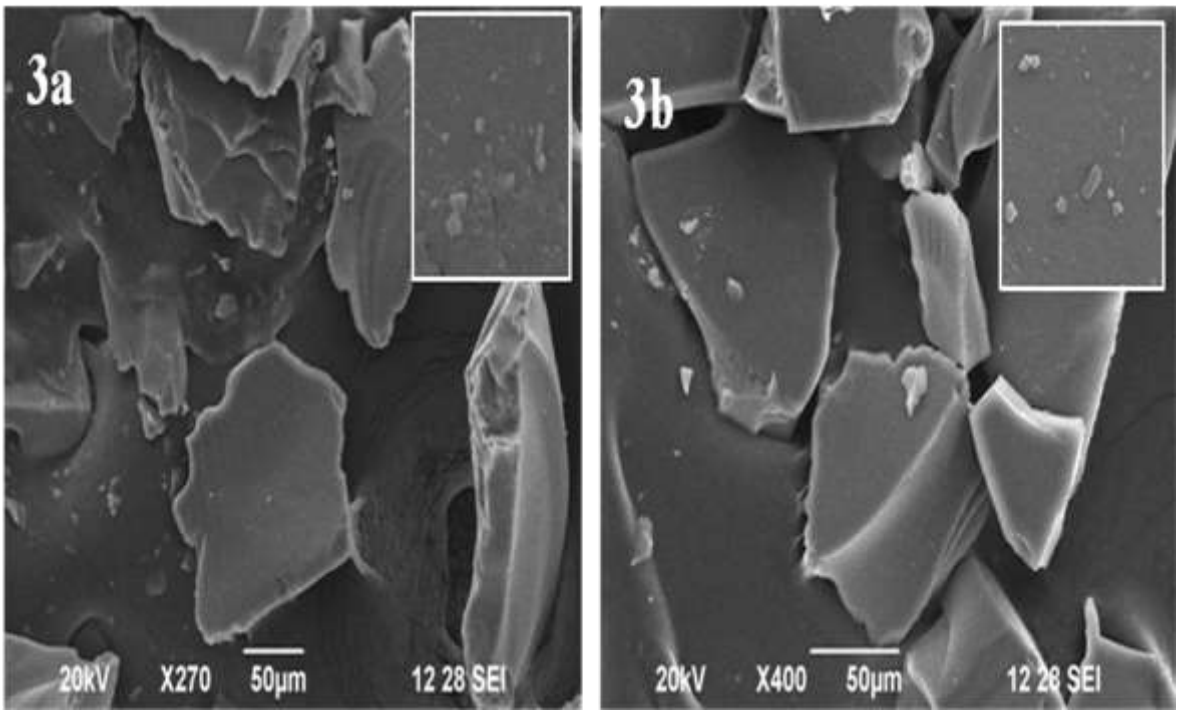

Figure – 2: SEM images of a) Ag-SiO_2 I and b) Ag- SiO_2 II

TABLES

Table 1: Particle size data

S. No	Sample	Particle Size (nm)
1	Ag NP	104
2	SiO_2	205
3	Ag-SiO_2 I	321
4	Ag-SiO_2 II	396

IV CONCLUSION

Ag NPs were prepared by a simple eco-friendly approach using Aloe vera extract and loaded on SiO_2 support. The composite was characterized and tested for its activity towards heterogeneous photodegradation of a model substrate crystal violet dye. Since the composite is efficient in catalyzing a photochemical degradation, it can be further extended for its photocatalytic activity towards various important chemical reactions.

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CLOUD BASE DATABASE SYSTEM FOR CLOUD COMPUTING

Jyoti [1], Dr. Deepti sharma[2]

[1]*Computer Science, Student, JJT University, Jhunjhunu, Rajasthan,(India)*

[2]*Research guide, JJT University, Jhunjhunu, Rajasthan, (India)*

ABSTRACT

Cloud computing is basically a technology which uses internet and central database server to maintain data and applications effectively. It is independent of location,with the help of cloud computing customer do not need to buy all resources from any vendor . Customer can use resources if they are free or pay basis, by this customer can save money and time. Example of cloud is ymail, gmail, hotmail etc. Cloud is for all customers not only for some big companies or enterprises. In cloud computing environment all the data, resources, applications programs are distributed over network and can be access on demand. In this paper we describe the database system of cloud storage. We describe the master slave architecture and paxos architecture of cloud database storage system.

I INTRODUCTION

Cloud computing provide a way to share distributed resources and services over the network. Cloud computing share resources and services in open environment so there are many security problems related to its security. If we are working in our computer we have full control over our data but on the other hand if we are working in cloud computing environment services, data maintances are providing by another party and user are not unaware of where all processes are running and where all his data are store in the network[1]. The vendor has to provide some security architecture for securing these data in the network or over the internet. Vendors use many schemes to secure distributed information to maintain scalability and reliability for accessing the data in the cloud. But there are so many issues related to security of data.

Cloud computing is used for covalently on demand access of shared resources. Cloud computing merges technology, platform for hosting and storage service over internet. The main aim of the cloud computing is to provide scalability and reliability. cloud computing provide inexpensive and on demand resource sharing.

1.1 Principles of Cloud Computing

The principle behind cloud computing that make it more cost effective, flexible and easy for user are:

Resource pooling: in cloud computing many servers and data storage devices are used economically. Vendors computing resources are pooled for various users. They are assigned and released according to user demand.

Virtualization: user need not worry about physical state of their hardware.

Elasticity: addition of more space and data replication can be done if user wants.

Resource Deployment: the user of cloud can set configuration and specification of resource and provider set them automatically.

Metered billing: users charged according to use.

1.2 Types of cloud computing providers

The cloud service provider provide their services to user by SPI model. SPI refers to software as a service(SaaS), plat form as a service(PaaS) and infrastructure as a service(IaaS)[2].

II ROLE OF SERVERS IN CLOUD

Servers play a very important role in the cloud computing. They act as backbone of cloud computing. The cloud computing servers offered some knowledge of configuration that are same across all service providers.

III CLOUD STORAGE

Cloud storage companies follow a three layer architecture, front end, storage logical layer and back end.

Front end: The front end is for communication between user and servers. Cloud storage service can be used by application programming interface(API) or application that support API such as cloud storage gateway. A cloud storage gateway is a server which is present on client side and translate cloud storage API . they enhance the cloud storage, lower monthly charges and diminish data security[3].

Storage logic layer: it control all cloud storage activities. It have features like administrative procedures regarding reliability and availability.

Back end: it works on actual implementation of storage of data with protocols. It works on cost effectiveness and increasing storage capacity.

In cloud storage model data is stored in digital form, this data is stored in logical pools. Physical storage includes multiple storage on many locations[4]. These are called servers, which are owned by hosting companies. These are also called providers, they are responsible for data security, accessibility, availability. Users can buy these applications, can lease storage capacity, and use on pay basis.

Cloud storage is composed of virtualized infrastructure. cloud computing can be accessed from off premises or on premises. Cloud database provider have multiple database architecture having different level of consistency ,costs and latency[5]. According to needs customer can choose from these database. Two different architectures which are used by service providers are – Master/Slave architecture and architecture based on Paxos algorithm.

In the master/slave architecture when a user send write delete request to the server, database server acts as master and request goes to master database server. Then master server check its database and update it and asynchronously

update in other slaves database servers also. Master/slave architecture have small write/delete cpu time, lower write/delete latency and strong query consistency.

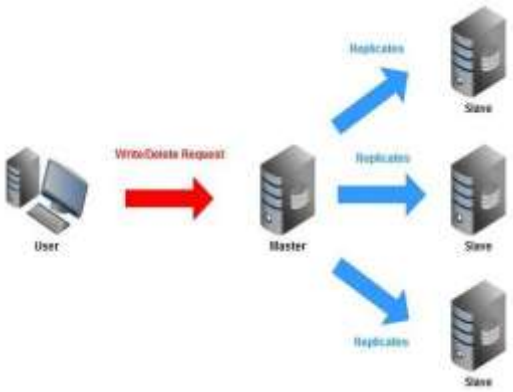

Figure: 1

Figure: 2

In paxos architecture, when a user send a request, it is accepted by network of several data base servers. Then all these databases check their own database and communicate with each other about users request. Paxos architecture purpose better reliability and availability.

There are some consideration which we have take in mind when choosing a cloud base database. Such as

Portability: when client use cloud they transfer their data into cloud. The organizations who use their data inform of relational database portability is must[6].

Reliability and availability: database which uses replication high reliability and availability is important.

Scalability: because of scalability many companies uses cloud based database because cloud base db provide more scalable than traditional db.

Programming environment: we have to keep in mind which architecture have to choose, what database use to built upon and programming environment use for database. There are different database for different languages.

IV SECURITY RISKS

There are many security risks also in using cloud computing. Some of features of cloud computing have risk assessment such as privacy of user data, recovery of data, data integrity.

Data protection: data protection refers to protection of data from encryption, access methods. Because of unsecure models many unauthorized user can access data store in cloud.

Data isolation: cloud storage system does not uses separate storage and different resources for different clients. the mechanism use for resource isolation is also not secure.

Data sanitization: the removal of data from device when it is not in use. Such as when a device failure occur and we throw away device without sanitization.When a user left a cloud the data store in\cloud is not deleted. This can make a problem because of data isolation mechanism[7]. Other clients can assess this data after your termination.

Data loss and recovery : cloud provider shoud care of data and store data at more than more server. If data is lost data restoring process should be fault proof.

V CONCLUSION

The overview of two architectures gives us a better understanding that why some database use by cloud providers are more costly than other or why some database are more consistent than other.

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A REVIEW ON ENCODING AND DECODING FOR FRACTAL IMAGE COMPRESSION

S. C. Shrivastav[1], A. Mansana[2]

[1]*Department of Applied Mathematics, Rungta College of Engineering and Technology, Bhilai (C.G.), (India)*

[2]*Department of Applied Mathematics, Chhatrapati Shivaji Institute of Technology, Durg (C.G.), (India)*

ABSTRACT

Image compression is a process of reducing or eliminating all redundant or irrelevant data. The new compression technique called Fractal image compression. This scheme works by partitioning an image into blocks and using contractive mapping to map each range blocks to its matched domains. In present study we review the work on encoding and decoding to compress the image by fractal image compression with IFS.

Keywords: Affine Transformation, Contractive Mapping. Fractal Encoding And Decoding, IFS, Self-Similarity.

I INTRODUCTION

Day by Day, the demands for higher and faster technologies are rapidly increasing for everyone. Now a days before purchasing computers, customers are concerned about two things (1) the speed of the CPU and (2) the storage and memory capacity. Image compression helps to reduce the memory capacity and to have faster transmission rate [1].

There are two types of image compression is present. They are lossy and loss-less method.

(1) In lossy method:- The reconstructed image contains degradation relative to the original and lossy technique image quality degradation in each compression step. Lossy compression technique lead to loss of data with higher com-pression ratio. (2) Lossless method:- The reconstructed image after compression is numerically identical to the original image. Lossless compression gives good quality of compressed images [2].

Compression is important both for speed of transmission and efficiency of storage.

II FRACTAL IN IMAGE COMPRESSION

Lossy image coding by partitioned iterated function system (PIFS), popularly known as Fractal Image Compression, has recently become an active area of research. Fractal theories are totally different from the others [1].

The idea fractal image compression is to find subspaces (or sub images) of the original image space, which can be regenerated using IFS. Where possible, if on IFS can be used in place of several IFS's which reproduced similar sub images, it is more efficient in terms of storage space to use that one IFS. It is more likely that an

image will require more than one IFS to reproduce a compressed image, which closely resembles the original [3].

Fractal image compression is also called as fractal image encoding because compressed image is represented by contractive transforms and mathematical functions (iterated functions) required for reconstruction of original image[4], [5]. A. E. Jacquin suggested to have the range and domain blocks to be always in the shape of a square and the domain size to be twice the size of the range [1].

In fractal compression system the first image is partitioned to form of range blocks then domain blocks are selected. This choice depend on the type of partitioned scheme used then set of transformation are selected which are applied on domain blocks to range blocks and determines the convergence properties of decoding [1].

2.1 Fractal Image compression has the following features [1]:

- Compression has high complexity.
- Fast image decoding.
- High compression ratio can be achieved.`
- It is resolution independent.

2.2 Fractal Image Compression has three basic steps [1] :

- Partition the image.
- Encoding.
- Decoding.

III FRACTAL IMAGE COMPRESSION ALGORITHM

3.1 Encoding

The image should be used in this compression are of the square size. The image is partitioned into non-overlapping square blocks R_n (range blocks) of size $B * B$ and large over lapping square blocks D_n(domain blocks) of size $2B * 2B$. That means, the pixels in the domain are average in group of four so that the domain is reduced to the size of range [2]. For a range block R_n, we would find the best domain block D_n with the corresponding mapping T_n . Apply IFS transformation from domain block to range block. To use IFS to reproduce images by partitioning an image into blocks, typically $8 * 8$ or $16 * 16$ pixels, it becomes possible to map small portions of an image to large portions. The smaller portions are reproduced by using affine transformations. These transformation effectively map squares to parallelograms through translation , scaling, skewing, rotation etc [6]. The affine transformation of the pixel values is found that minimizes the rms difference between the transformed domain pixel values and range pixel value. Select best domain with best transformation (compare each range block with whole domain blocks to find the best match). In this way an image can be stored as a collection of affine transformations that can be used to reproduce a near copy of original image [2]. Once the best matching domain block is obtained, the reconstruction error is estimated. If it is small than the threshold, a fractal code is generated, otherwise the range block is split into four sub blocks of size $B/2 * B/2$. Pixels to be considered in the next level of the quadtree decomposition. The partitioning process finishes when a minimum block size is reached [7].

3.2 Decoding

The decoding in fractal compression is much faster compressed with the encoding, here the time depends on the number of iterations, however, we will see that only a few iterations are required to reach the fixed point or attractor [1].

Load the saved coefficients. For decoding, an image consists of iteration T from any initial image. In every iteration, for each range R_n , the domain D_n that maps to it shrunk by two in each dimension by averaging non-overlapping groups of pixels and stored the fractal codes information $\{Dxi;\ Dyi;\ si;\ oi;\ Ui\}$ that is location of the domain block in the image space, contrast factor, brightness and type of affine transformation. The shrunk domain pixel values are multiplied by s_i added to and o_i placed in the location in the range determined by the orientation information. This is one decoding iteration

We can define $T_i : F \rightarrow F$ operating on image f(x, y) by

$$T_i(f)(x,y) = s_i\, f\big(T(x,y)\big) + o_i$$

Provided T_i is invertible and $(x,y) \epsilon R$

The decoding step is iterated until the fixed point is approximated [2].

IV CONCLUSION

In this paper, we have described the nature of image compression system based on a fractal theory of iterated contractive image transformations. The advantage of using fractal image compression is that for each range block we have to save only few coefficients, which will give the ability of obtaining a very high compression ratio.

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PRIORITIZATION OF URBAN TRANSPORT SYSTEM FOR MADURAI CITY

G.Sathya[1], Dr.R.Velkennedy[2]

[1]*Department of Civil Engineering, TCE, Madurai, TN (India)*

[2]*Associate Professor, Department of Civil Engineering, TCE, Madurai, TN (India)*

ABSTRACT

India is one of the world's fastest growing economics today, which increased thrust on development of transportation infrastructure in the country to reduce the traffic congestion due to increased traffic demand. Now a day, various mode of transportation is being used for metro cities such as Chennai, Mumbai, Delhi, etc. The Madurai city is under tier 2 city has narrow roads along with densely packed building. This city facing massive traffic congestion and an effective alternative mode of transport is required to compliance with the existing situation. Transportation modes are available in a large number but not one can be decided as the best suitable for every scenario. Numerous factors that are changing according to the place, population, its needs and its growth dominantly influence the selection/Implementation of a particular transportation mode. Hence consideration of the requirement and objectives influence the decision. Prioritization in response to these considerations is vital to reap the maximum benefits. This paper examines these factors and considers available transport options suiting the city's needs and characteristics resulting in a stage where prioritization of these options.

Keywords*: *Urban Transport, Prioritization, Factors Consideration, Site Scenario, Traffic Congestion.

I. INTRODUCTION

Madurai is located in the south west part of Tamil Nadu. Madurai city the district head quarters ofMadurai district. The district is bounded by the Dindigul, Pudukottai, Sivagangai, Virudunagar and Theni districts. Madurai city is about 100 meters above mean sea level. Geographically the city is located on 9°55' north latitude and 78°7'east longitude. Madurai city is well connected by road, rail and air. Figure 1.1 shows the location of the project town. Madurai Municipal Corporation, covering 51.96 sq.kms, comprises of a total population of 928,869 persons, whereas the Madurai Urban Agglomeration comprising the city and surrounding settlements accommodates a population of 11,94,665 persons.

The objectives of the present study are to specifically analyze the existing traffic scenario, the pattern of growth of the town in all its aspects and the traffic and transportation requirements identify the causative factors for the

traffic impediments and to suggest relief and improvement measures, both from technical and traffic management perspective, keeping in view the increase in population and resultant increase in the travel demand considering the environmental, ecological, archaeological and religious issues and green city concepts.

Location details of Madurai

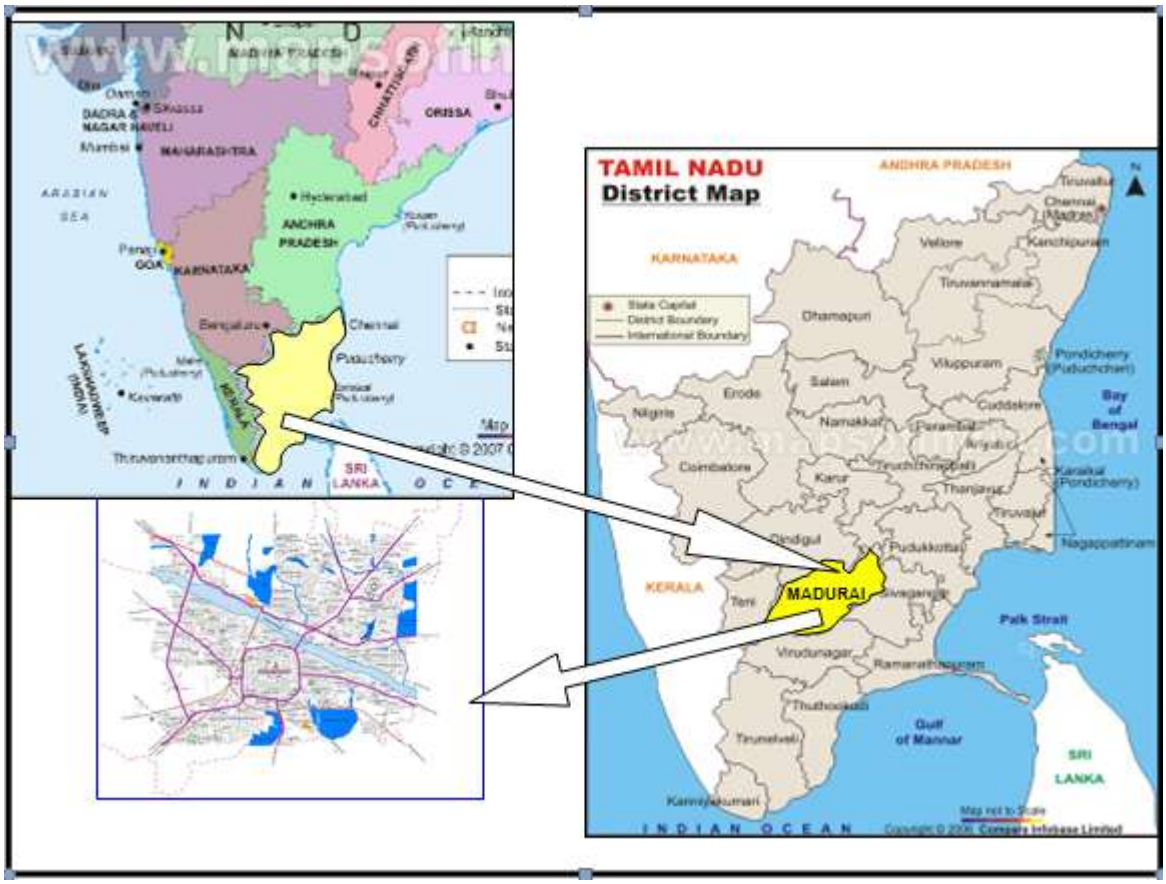

Fig 1

II. ISSUES

Origin and destination survey reveals that about the goods traffic is destined traffic which is a serious issue needs to be addressed immediately on priority basis. Market area inventory reveals that there are about 8 types of whole sale markets and goods transport offices present within the CBD area. These markets are mainly concentrated on the northern side. Presence of such whole sale markets within the CBD area not only attracts goods vehicles in the city but also degrade the environment because of the market waste disposed.

III. ROAD NETWORK

Some of the outstanding problems related to the road network are:

(i) Absence of functional hierarchy of road network as a result of which there is an intermixing of local traffic with long distance through traffic.

(ii) Narrow road network with restricted capacity, particularly in the CBD results in congestion.

(iii) Intense development along major arterial corridors without adequate provision for its transport demand is affecting the level of service on these corridors. (e.g. Veli streets, Thirupparankundram road, Melur Road etc)

(iv) Absence of access control measures and inconsistent carriageway width along the arterial roads is affecting the speeds.

(v) Poor road geometrics along majority of the roads are making them accident-prone.

From the study, the major key issue associated with Madurai roads is that the available carriageway width is not sufficient to meet the traffic demand. It means that roads having narrow width. Sot the factors should be fixed by considering the existing situation and present need.

IV. CONGESTED ROUTE IDETIFICATION

Congested route in Madurai can be identified by conducting traffic survey along the various routes in Madurai. By using these data, find Traffic to capacity ratio. Which means the ratio of existing traffic to the actual traffic capacity of the road.

If traffic to capacity ratio is less than 1 which means no congestion,

If traffic to capacity ratio is greater than 1which means congested route.

After done the above procedure, the following 3 routes are identified as the most congested route in Madurai.

1. Thirupparankundram- Kalavasal- Yanaikkal- Goripalayam- Mattuthavani- Mellur
2. Mellur- Mattuthavani- Goripalayam-Yannaikkal-East Veli Street-SouthVeli Street-Thirupparankundram
3. Thirupparankundram- periyar-yannaikkal- Goripalayam- Mattuthavani- Mellur

Location details for congested routes in Madurai

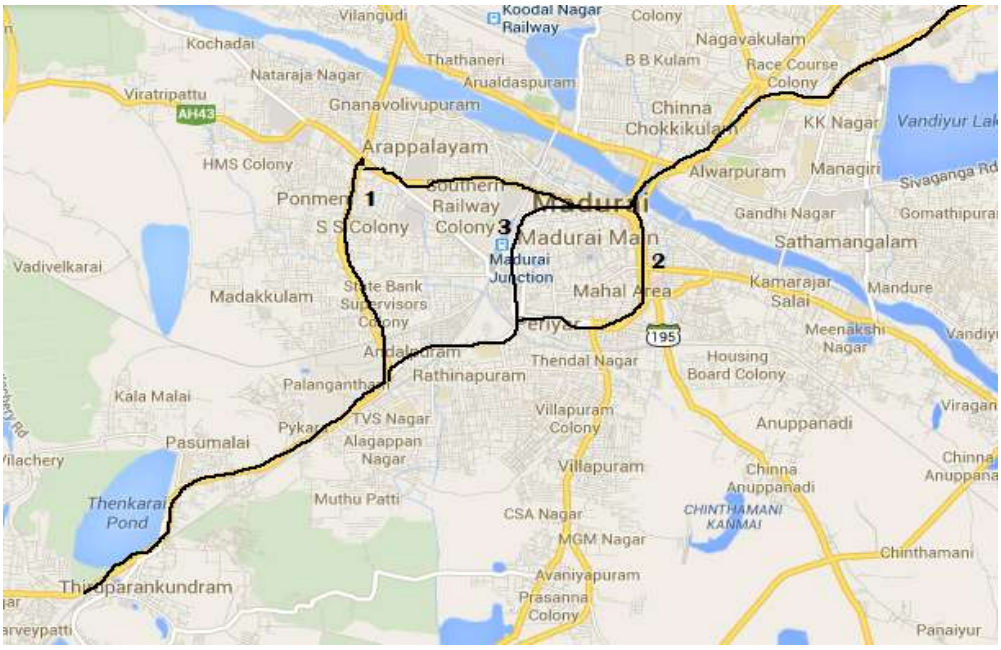

Fig 2

V. PRIORITIZATION

It is the process of finding out the best alternative from the number of available alternative by considering various factors related to the needs that fulfilled by alternative. There are number of prioritization tools are available, from which TOPSIS (Technique of Order Preference by Similarity to Ideal Solution) is the simple and easily understandable tool for prioritization.

TOPSIS (Technique of Order Preference by Similarity to Ideal Solution)

The technique called TOPSIS can be used to evaluate multiple alternatives against the selected factors. In the TOPSIS approach an alternative that is nearest to the Positive Ideal Solution (FPIS) and farthest from the Negative Ideal Solution (FNIS) is chosen as optimal.

Ideal alternative: the one which has the best level for all attributes considered.

Negative ideal alternative: the one which has the worst attribute values.

TOPSIS selects the alternative that is the closest to the ideal solution and farthest from negative ideal alternative.

Steps involved in TOPSIS

TOPSIS assumes that "**m**" alternatives (options) and **"n"** attributes/criteria and have to score of each option with respect to each criterion by expert system

- Attribute weight by expert
- Decision matrix
- Standardized decision matrix
- Weighted standardized decision matrix
- Ideal solution
- Negative ideal solution
- Resul

VI. STUDY METHODOLOGY

First step of this study is to fix the important factors that influence the best transportation system by considering existing situation and need of transportation. After that the various urban transports are set as alternatives for solution. Then experts from transportation field should give weightage value to the each factors for each alternatives. These input values are used in TOPSIS technique for prioritization

6.1 Factors considered according to the need of transport

Following factors are considered to fulfill the basic requirement of transport

- Safety
- Tariff
- Capacity
- Pollution
- Integration

- On time
- Regular
- Speed
- Space occupation
- Cost

6.2 Alternative mode of urban transports

Madurai city has more space constraint (narrow road) that result from study. By taking this as a major issue the following alternative mode of urban transport are considered for this study

- Metro rail
- Mono rail
- Bus transport

6.3 Processing with TOPSIS

a) Normalize the decision matrix.
b) Calculate the weighted normalized decision matrix.
c) Identify the positive ideal solution A* and the negative ideal solution A-
d) Calculate the distance for each alternative to the positive ideal solution and the negative ideal solution, respectively.
e) Calculate the relative closeness for each alternative to the ideal solutions.
f) Rank the alternatives according to the value of Ci*

TOPSIS suggests the best alternative which has the furthest distance from the negative ideal solution (biggest value of Si-) and shortest distance to the positive ideal solution (smallest value of Si*). Thus, the increase of numerator and the decrease of denominator will lead to a bigger value of Ci* in final Equation. In other words, the alternative which maximizes the value of Ci* ranks first.

The final result is obtained from the above analysis is Monorail transport is the best transport system that fulfill the requirement of transport that compliance with the existing situation in Madurai.

VII. CONCLUSION

Urban Transport modes are available in a large number but not one can be decided as the best suitable for every scenario. Numerous factors that are changing according to the place, population, its needs and its growth dominantly influence the selection/Implementation of a particular transportation mode. Hence consideration of the requirement and objectives influence the decision. Prioritization in response to these considerations is vital to reap the maximum benefits. For which TOPSIS tool used to identify the best mode of urban transport system in Madurai.

Madurai has three main route facing traffic congested problems and having narrow roads, it will emerge the implementation of best transportation system. By kept this scenario in this study, there are various factors are set such as space occupation, safety, speed, capacity, etc. then the possible alternative mode of transport system are fixed such as metro rail, Monorail, bus transport, after conducting TOPSIS evaluation technique, the result is

MONORAIL TRANSPORT is the best mode of transport system for Madurai. Because it full fill the requirement of factors that set for the good urban transport system in Madurai.

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