



# RISE-MAGAZINE

## Recent Innovations In Sophisticated Electronics

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## Vision and Mission of the Department

### Vision and Mission of the Department:

The department of Electronics and Communication Engineering is established in the year 2007. After consulting with the administrative board, departmental boards and industrial experts and professionals, the department of ECE defines the vision and mission as follows: these two is not tough to break and consumer must use encrypted data.

### Department Vision:

To be a focal centre for academic excellence in competing global standards and dynamics in the field of Electronics and Communication Engineering with research and services focusing on effective communication skills, entrepreneurial, ethical and social concern.

### Department Mission:

To impart quality technical education in Electronics and Communication Engineering with well established infrastructure, state-of-the art laboratories, core instructions and cognizant faculty.

To prepare the young and dynamic Electronics and Communication Engineers professionally deft and intellectually adept with knowledge, behavior and information competency.

To prepare the learners for dynamic requirements in the field of Electronics and Communication Engineering with a focus on career guidance, placements and higher education by MOUs with premier industries and institutes.

### Programme Educational Objectives Statements(PEOs)

**PEO-1:** Graduate should be cognizant in basic sciences, fundamental engineering stream along with contemporary problem solving, critical analytical skills in Electronics

and Communication Engineering and the allied fields.

**PEO-2:** Graduate should understand the issues related design and developments and should update the knowledge, skills and behavior through continuous learning in the field of Electronics and Communication Engineering.

**PEO-3:** Graduate should demonstrate their technical, communication and research aptitudes along with leadership skills in professional environment to empower employability, higher education and entrepreneurs successfully.

**PEO-4:** Graduate should be motivated with high ethical, human values and team work towards development of the society.

### Programme Outcome Statements (POs)

**PO1**  
Engineering Knowledge: An ability to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems as appropriate to the field of electronics & communication engineering practice.

**PO2**  
Problem analysis: Ability to Identify, formulates, review research literature, and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3**  
Design/development of solutions: ability to Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4**  
Conduct investigations of complex problems: Apply research-based knowledge and research methods including design of experiments, analysis

and interpretation of data pertaining to Electronics & Communication Engineering problems and arrive valid conclusions.

**PO5**  
Modern tool usage: An ability to use the techniques, resources and modern engineering tools necessary for modeling the complex system design in Electronics and Communication Engineering

**PO6**  
The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7**  
Environment and sustainability: An Ability to Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of need for sustainable development.

### Programme Specific Outcome Statements(PSOs)

**PSO1**  
An ability to get an employment in Electronics and Communication Engineering field and related industries and to participate & succeed in competitive examinations like GRE, GATE, TOEFL, PSUs, etc.

**PSO2**  
Should be able to design and test various electronic systems that perform analog and digital processing functions.

## 5G TECHNOLOGY

1. 5G is a completed wireless communication with almost no limitation; somehow people called it REAL wireless world
2. Additional features such as Multimedia Newspapers, also to watch T.V programs with the clarity as to that of an HD T.V.
3. We can send Data much faster than that of the previous generations.
4. 5G will bring almost perfect real world wireless or called "WWW: World Wide Wireless Web
5. Real wireless world with no more limitation to access and zone issues.
6. Wearable devices with AI capabilities.
7. Internet protocol version 6 (IPv6), where a visiting care-of mobile IP address is assigned according to location and the connected network.[23]
8. One unified global standard.
9. Pervasive networks providing ubiquitous computing: The user can simultaneously be connected to several wireless access technologies and seamlessly move between them (See Media independent handover or vertical handover, IEEE 802.21, also expected to be provided by future 4G releases). These access technologies can be a 2.5G, 3G, 4G or 5G mobile networks, Wi-Fi, PAN or any other future access technology. [9] In 5G, the concept may be further developed into multiple concurrent data transfer paths.
10. Cognitive radio technology, also known as smartradio: allowing different radio technologies to share the same spectrum efficiently by adaptively finding unused spectrum and adapting the transmission scheme to the requirements of the technologies currently sharing the spectrum. This dynamic radio resource management is achieved in a distributed fashion, and relies on software defined radio. See also the IEEE 802.22 standard for Wireless Regional Area Networks.
11. High altitude stratospheric platform station (HAPS) systems.

## CONCEPT OF 5G TECHNOLOGY

### Physical/MAC layers

Physical and Medium Access Control layers i.e. OSI layer 1 and OSI layer 2, define the wireless technology and shown in Fig.1. For these two layers the 5G mobile networks is likely to be based on Open Wireless Architecture.

### Network layer

The network layer will be IP (Internet Protocol), because there is no competition today on this level. The IPv4 (version 4) is worldwide spread and it has several problems such as limited address space and has no real possibility for QoS support per flow. These issues are solved in IPv6, but traded with significantly bigger packet header. Then, mobility still remains a problem. There is Mobile IP standard on one side as well as many micro-mobility solutions (e.g., Cellular IP, HAWAII etc.). All mobile networks will use Mobile IP in 5G, and each mobile terminal will be FA (Foreign Agent), keeping the CoA (Care of Address) mapping between its fixed IPv6 address and CoA address for the current wireless network. However, a mobile can be attached to several mobile or wireless networks at the same time.[16] In such case, it will maintain different IP addresses for each of the radio interfaces, While each of these IP addresses will be CoA address for the FA placed in the mobile Phone. The fixed IPv6 will be implemented in the mobile phone by 5G phone manufacturers. The 5G mobile phone shall maintain virtual multi-wireless network environment. For this purpose there should be separation of network layer into two sub-layers in 5G mobiles (Fig. 3) i.e.: Lower network layer (for each interface) and Upper network layer (for the mobile terminal). This is due to the initial design of the Internet, where all the routing is based on IP addresses which should be different in each IP network world wide. The middleware between the Upper and Lower network layers (Fig. 1) shall maintain address translation from Upper network address (IPv6) to different Lower network IP addresses (IPv4 or IPv6), and vice versa.

### Open Transport Protocol (OTA) layer

The mobile and wireless networks differ from wired networks regarding the transport layer. In all TCP versions the assumption is that lost segments are due to network congestion, while in wireless network losses may occur due to higher bit error ratio in the radio interface. Therefore, TCP modifications and adaptation are proposed for the mobile and wireless networks, which retransmit the lost or damaged TCP segments over the wireless link only. For 5G mobile terminals will be suitable to have transport layer that is possible to be downloaded and installed. Such mobiles shall have the possibility to download (e.g., TCP, RTP etc. Or new transport protocol) version which is targeted to a specific wireless technology installed at the base stations. This is called here Open Transport Protocol - OTP.

### Application layer

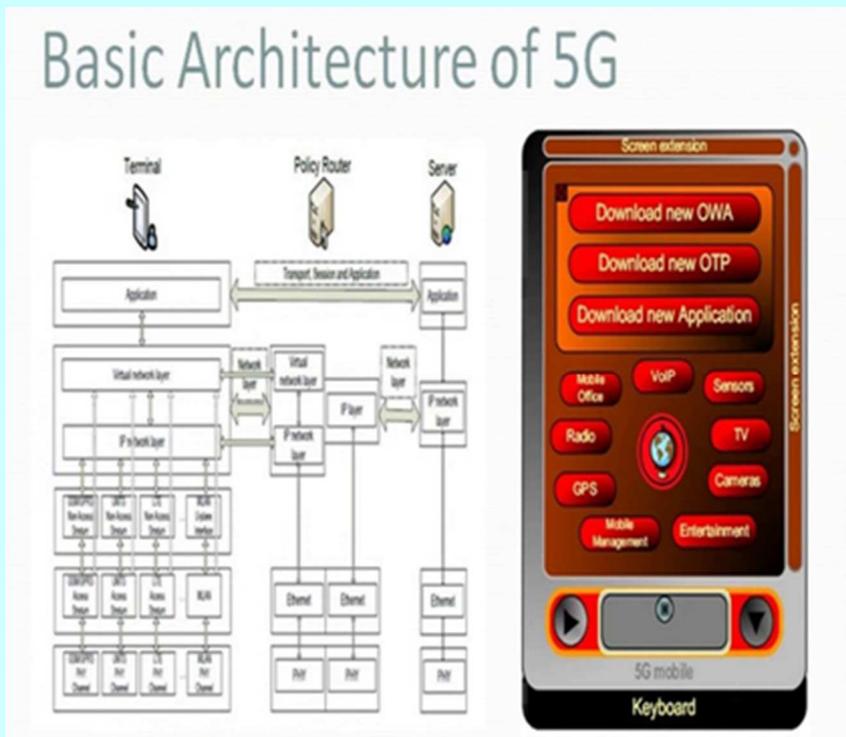
Regarding the applications, the ultimate request from the 5G mobile terminal is to provide intelligent QoS management over a variety of networks. Today, in mobile phones the users manually select the wireless interface for particular Internet service without having the possibility to use QoS history to select the best wireless connection for a given service. The 5G phone shall provide a possibility for service quality testing and storage of measurement information in information databases in the mobile terminal

FEATURES

1. 5G technology offers high resolution for crazy cell phone user and bi- directional large bandwidth shaping.
2. The advanced billing interfaces of 5G technology make it more attractive and effective.
3. 5G technology also providing subscriber supervision tools for fast action.
4. The high quality services of 5G technology based on Policy to avoid error.
- 5.

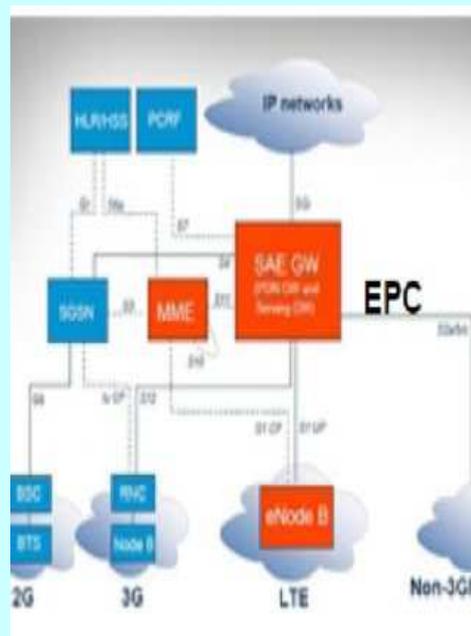
13. The uploading and downloading speed of 5G technology touching the peak.

In this paper we have surveyed 5G technology for mobile communication. The 5G technology is designed as an open platform on different layers, from the physical layer up to the application. Presently, the current work is in the modules that shall offer the best Operating System and lowest cost for a specified service using one or more than one wireless technology at the same time from the 5G mobile. A new revolution of 5G technology is about to begin because 5G technology going to give tough completion to normal computer and laptops whose marketplace value will be affected. There are lots of improvements from 1G, 2G, 3G, and 4G to 5G in the world of mobile communication. The new coming 5G technology is available in the market at inexpensive rates, high peak expectations and much reliability than its foregoing technologies. 5G network technology will release a novel age in mobile communication. The 5G mobiles will have access to different wireless technologies at the identical time and the terminal should be able to merge different flows from different technologies. 5G technology offers high resolution for passionate mobile phone consumer. We can watch an HD TV channel in our mobile phones without any disturbance. The 5G mobile phones will be a tablet PC. Many mobile embedded technologies will develop.



5G technology is providing large broadcasting of data in Gigabit which supporting almost 65,000 connections.[19]

6. 5G technology offers a transporter class gateway with unparalleled consistency.
7. The traffic statistics by 5G technology makes it more accurate.
8. Through remote management offered by 5G technology a user can get a better and faster solution.
9. The remote diagnostics also a great feature of 5G technology.
10. The 5G technology is providing up to 25 Mbps connectivity speed.
11. The 5G technology also supports virtual private network.
12. The new 5G technology will take all delivery services out of business prospect



By

C CHANDANARAI

15BF1A0442

CONCLUSION AND FUTURE SCOPES/PERSPECTIVES

# Ground Penetrating Radar (GPR)

AS we know landmines are very harmful for us. Landmines and unexploded ordnance (UXO) are a legacy of war, civil disobedience and guerilla activity. If all mines were cased or had substantial metallic content, all that would be required for detection are metal detectors. The widespread use of plastic landmines necessitates development and deployment of additional detection technologies. Because there is no such thing as a plastic detector, other sensors attempt to exploit ancillary disturbances in the background, such as thermal, chemical, or dielectric.

## OVERVIEW OF THE SYSTEM

Because of the difficulty detecting the tiny amounts of metal in a plastic landmine with a metal detector, technology development has been funded in other areas. Ground penetrating radar (GPR) has been used for nearly 70 years for a variety of geophysical subsurface imaging applications including utility mapping and hazardous waste container location and has been actively applied to the problem of landmine detection for nearly 20 years. When parameters such as frequency range, antenna size, antenna separation and system timing are optimized for detection of mine sized objects in the near subsurface,

width of roughly 1 to 4GHz is effective for detection of landmines. Ultimately GPR images the dielectric properties of the soils and any discontinuities appear as a signal. If soil were perfectly homogeneous, a discontinuity caused by a landmine would stand out as an anomaly against the background. Unfortunately, even under near-ideal test track condi-

puter and in laboratory analysis.

## A SCAN

A scan is a method for detecting the presence and absence of surrogate mine in clay soil. The electromagnetic field is scattered by the GPR. Scattering pulses are detected by the graph. This graph is Amplitude Vs Time. This graph is helpful to find the landmine and is used for visual inspection.

## B SCAN

B scan is a graph which is Time delay Vs Distance. So B scan helps to calculate the penetration length. This graph helps to calculate the distance from ground to the mine.

## ADVANTAGES

- GPR locates even small targets.
- GPR operates by detecting the dielectric soils which allows it to locate even non-metallic mines.
- Biological sensors can only operate for limited periods but in GPR has no such limits.

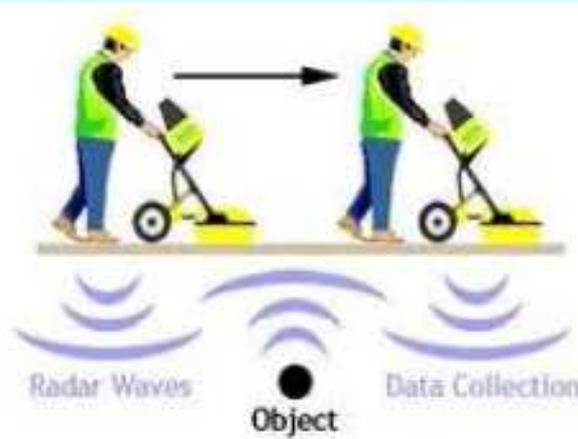
## DISADVANTAGES

- The sensor such as GPR is larger and heavier.

By

**B VISHAL**

**15BF1A0424**



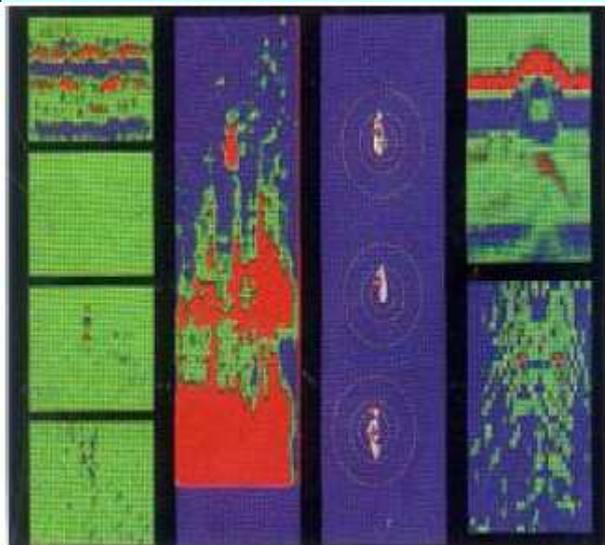
tions, soil itself is a remarkably inhomogeneous medium and false alarms are easily generated from the background itself. Because of this, automatic target recognition (ATR) algorithms employed by impulse-based GPR systems typically calculate and remove background and try to detect the hyperbolic signatures that are characteristic in size and shape of landmine targets in GEO-CENTERS 400 Series energy in focusing ground penetrating radar (EFGPR), we employ a fuzzy logic-based algorithm that uses prototypes, or feature sets, for landmines and prototypes than to clutter.

## HOW IT WORKS?

An FR-127-MSCB impulse ground penetrating radar (ImGPR) system developed by the Commonwealth Scientific and Industrial Research

Organization (CSIRO), Australia, has been used for these measurements. The system collects 127 returns or surroundings, per second each composed of 512 samples with 12 bit accuracy. The sounding range may vary from 4 ns to 32ns. The GPR system uses bistatic bow-tie antennas which transmit wideband ultra-short duration pulses.

The measurements form a two dimensional matrix referred to as a radar gram or B scan and A scan are used for visual inspection of data on the acquisition com-



GPR is quite effective in detecting both metal and plastic landmines in a variety of soils.

The depth of penetration is a function of both the frequency range produced and the soil attenuation. Lower frequency components penetrate further but it is a higher frequency component that is necessary to image and resolve smaller targets. Both impulse-based and swept frequency GPR systems have been employed in Army-sponsored research programs. Generally a system with a band-

# Artificial Eye

In the current scenario, where over millions of people are affected by visual anomalies, it was with a challenge that this project came into being. It aims at restoring vision to the blind.

Today, high-tech resources in microelectronics, Optoelectronic, computer science, biomedical engineering and also in vitreo retinal surgery are working together to realize a device for the electrical stimulation of the visual system.

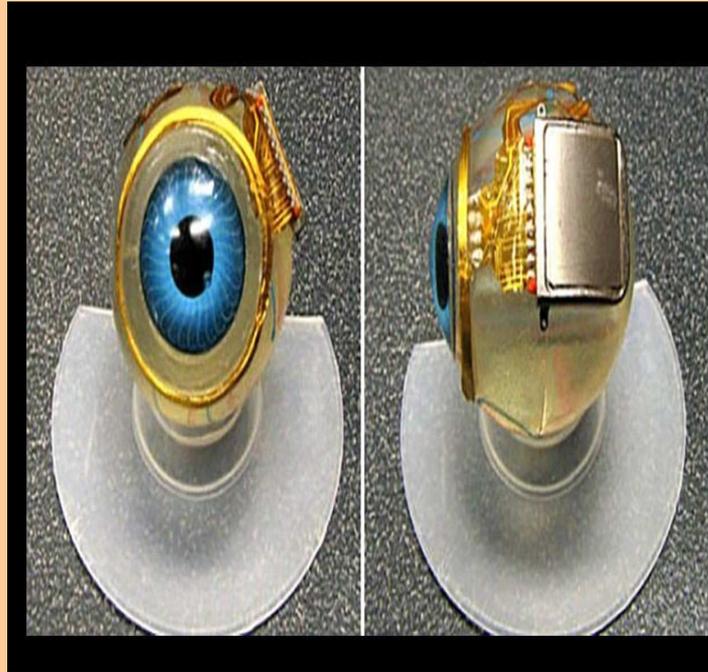
Artificial Eye, which works through retinal implants, could restore sight to millions of people around the world who suffer from degenerative eye diseases. This technology is still in its infancy, but has progressed to human trials. This report aims to present a brief overview about the basic aspects of this technology and where it's headed.

Electronic eye describes the design and implementation of Door image capture using Microcontroller based security system for home and offices. It provides the user with efficient and reliable security system for Door image capture for home, offices and industries that supports the use of an sensor at the door to send the signals to control unit of electronic eye with buzzer alarm for security purpose with image capture as soon as the door opens with image capture at the output of laptop or PC with VB application.

## Introduction

Security is primary concern with day to day life and properties in our environment. This paper describes effective security alarm system that can monitor image capture system with the help of VB application. As soon as door opens sensor gets activated with image captured with help of Web camera in PC captured image gets saved within VB application. It also serves function of sensing and detecting false intrusion (using input sensory device and gives early warning devices alarm and remotely controlled security system).

The term false intrusion here is used to mean any form of attempt to gain entry without proper pre design protocols. Robbery has become common in our day to day life. Countering it, Security systems with Web cameras are commercially available. These systems are powered entire time and they capture videos, images throughout the day and hence consuming large amount of electricity. In most the places remote surveillance is needed. These system captured image as door opens alarm gets on with transferring data through microcontroller control unit with image can be seen on PC or Laptop with VB application software.



Security system has been concern of worldwide. As technology is emerging every second, abundant home based or office based or industries based security systems have been developed and implemented to keep welfare security safe. Home security system is an essential mean of protecting homes from illegal invasion and false intrusion. A general home security system consists of CCTV, Web cameras, Buzzer alarm. Web camera or CCTV capture image in 24 hours to identify what goes around the house and in the house around the door which holds evidences if there is false intrusion in house breaking around the door of captured areas. The power consumption is also considerably large as camera is always on to keep recording nonstop and for capturing images. The power consumption is considered as concern of installing a security system.

## What is artificial eye?

An ocular prosthesis or artificial eye is a type of craniofacial prosthesis that replaces an absent natural eye following an enucleation, evisceration, or orbital exenteration. The prosthesis fits over an orbital implant and under the eyelids.

## How eyes work?

The light coming from an object enters the eye through cornea and pupil. The eye lens converges these light rays to form a real, inverted and diminished image on the retina. The light sensitive cells of the retina get activated with the incidence of light and generate electric signals. These electric signals are sent to the

brain by the optic nerves and the brain interprets the electrical signals in such away that we see an image which is erect and of the same size as the object.

## The eye

the main part in our visual system is the eye. Our ability to see is the result of a process very similar to that of a camera. A camera needs a lens and a film to produce an image. In the same way, the eyeball needs a lens (cornea, crystalline lens, vitreous) to refract, or focus the light and a film (retina) on which to focus the rays. The retina represents the film in our camera. It captures the image and sends it to the brain to be developed.

By

**A BHARATH**

**15BF1A0402**

# Wheel Chair Controller using Eye ball Movement

This seminar topic delivers a new method to guide and control the wheelchair for disabled people based on their eyeball movement. In this method use sensor based eyeball tracking system to control powered wheelchair. Eyeball sensor will generate distinct range of values for each position of eyeball (i.e. left, right, straight). This concept can be used for multiple applications, but this paper focuses the application to mobile and communication aid for paralytic people. The system involves two stages; first eyeball tracking and second sending of control signals to the arduino controlled wheelchair.

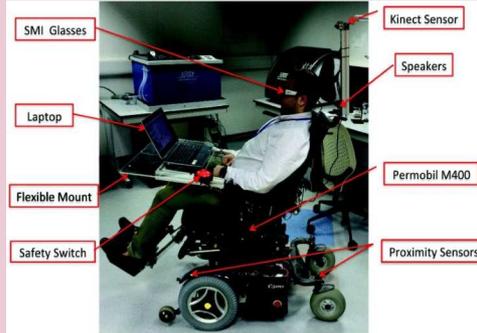
Inside house paralytic people reaching a desired destination is little bit difficult. So, paralytic people can't move freely inside their house they depend on others for their motion. Here with the help of eyeball movement detection system, the new idea of providing a cost effective, less hardware complex embedded system that helps the paralytic people to move freely inside their house.

## DIFFERENT EYE TRACKING MECHANISMS

There are three eye tracking mechanisms to compute the position of pupil.

### Electro-Oculogram (EOG) Method:

The Electro-Oculogram method obtains the gaze direction by sensing the electro-oculographic potential. This is done by measuring the potential using electrodes placed on face where human eye is an electric dipole with a negative pole at the fundus and positive pole at the cornea. One electrode is placed to the side of the left eye and another to the side of the right eye. This pair shall detect horizontal eye movements. One electrode is placed above the left eye and another below the left eye. This pair shall detect vertical eye movements. A fifth electrode is attached by the ear to provide reference voltage. These electrodes send the electrical signals to two EOG circuits of similar design to detect the horizontal and vertical movement of the pupil. This information is sent for computation. The big advantage of this method is the ability to detect eye movements even when they are closed.



## Lens Tracking Systems

In this method a non slipping contact lens fits over corneal bulge. The tracking of the pupil is recorded by affixing a magnetic coil or mirror to the lens. The integrated mirror in the contact lens allows measuring reflected light; alternatively, the integrated coil in the contact lens allows detecting the coil's orientation in magnetic field. The big advantage of this method is high accuracy and nearly unlimited resolution in time. Both methods explained so far are obtrusive and are not suited well for interaction by gaze. The third and preferred method for eye-gaze interaction is using video camera.

## Head Mounted Camera System

The most common mechanical setup involves use of desktop computer with integrated eye tracker camera. The desktop computer is loaded with software package for analyzing the eye gaze data. This setup require head fixation and hence restricts the head movements. An alternative method uses a head mounted eye tracking.

## Proposed System

In this seminar topic proposals importance is to serve all types of paralytic people to move freely to smaller distances inside their residence. This system uses only eyeball detection using eyeball IR sensor. The sensor consists of two parts infrared transmitter and receiver.

Infrared transmitters and receivers are housed into a single unit and fixed in front of the goggles. Necessary wirings are takes through the goggles to the sensor processing. The person should wear the goggles for the sensor to work. Since the sensor is shielded it can be isolated from the external light, thus external light illumination will not affect the sensor output values.

## ADVANTAGES

1. The existing eye tracking methods for locomating the powered wheelchair are based on image processing techniques thus it is tedious to work with images. But our system uses only eyeball sensor which tracks the position of the eye by using a simple components light dependent resistor, comparator, IR led.
2. Calculating the threshold values of position of the image processing techniques are complex but using the eyeball sensor we can easily calculate the threshold values.
3. Using the eyeball sensors instead of the CCD camera will also reduce the cost of the total system dramatically.

## APPLICATION

1. Application to mobile and communication aid for paralytic people.
2. Medical Field.

## CONCLUSION

This system consists of eyeball sensor, microcontroller and wheelchair. The above mentioned hardware along with the software proved to be the great tool which makes the life of the paralytic people independent. This system can also be extended to locomotion of the wheelchair in reverse also. We can also implement obstacle sensors in this system which will be very helpful to the paralytic people in dodging the obstacles. The system can be extended to control the equipments around such fans, lights, etc.

By

A BHAGYARAJ

15BF1A0401

## Cyber and Social Terrorism

Cyber and Social terrorism is a new different type of Technic that makes use of information systems or digital technology, especially the Internet, the internet is now the basic need of each and every people so it is an instrument of target. The Internet becomes more a way of life with us, it is becoming easier for its users to become targets of the cyber terrorists. All we know that cyber crime has been one of the common practices made by the computer experts.

Cyber terrorism is the act of internet terrorism in terrorist activities, including acts of Deliberate , large-scale disruption of computer networks, especially of personal computers attached to the Internet, by the means of tools such as computer viruses. They also hacked social ID , bank account and website also send fake messages for creating fear to others They creat cyber crime, cyber war or ordinary terrorism.

There are some who say that cyber terrorism does not exist and is really a matter of hacking or information warfare They disagree with labelling it terrorism because of the unlikelihood of the creation of fear, significant physical harm, or death in a population using electronic means, considering current attack and protective technologies.

Many believe that cyber terrorism is an extreme threat to countries' economies, and fear an attack could potentially lead to another Great Depression. Several leaders agree that cyber terrorism has the highest percentage of threat over other possible attacks on INDIA territory. They also target civilians, civilian interests and civilian installations. As previously stated cyber terrorists attack persons or property and cause enough harm to generate fear.

We, as the Information Technology people of tomorrow need to study and understand the weaknesses of existing systems, and figure out ways of ensuring the world's safety from cyber and social terrorists. A number of issues here are ethical, in the sense that computing technology is now available to the whole world, but if this gift is used wrongly, the good things could be disastrous. It is important that we understand and mitigate cyber terrorism for the benefit of society, try to curtail its growth, so that we can heal the present, and live the future.

The world is a very large place, but it is getting smaller, thanks to the advent of computers and Information Technology.

However, the progress that we've made in of Internet, a number of new crimes have



these fields also has a dark side, in that a new terrorist tactic, commonly called



Cyber and social terrorism has developed. Cyber and social terrorism is any act of terrorism that uses information systems or digital technology (computers or computer networks) as either an instrument or a target. Cyber and social terrorism can either be "international", "domestic" or "political", according to the nature of the act, but it is always an act involving a combination of the terrorist and the computer.

Cyber and social terrorism involves two primary elements: cyberspace and terrorism, and can be defined as the use of information technology by terrorist groups with intentions of personal gain and widespread damage. Many time some computer exports do whit the help of internet and personal computer .They do this work anywhere and anytime because now the day the technology is very first and they do over internet (help of computer and computer network)

In whatever forms it is, directly or indirectly, always affects the society. In today's world, there is immense increase in the use of Internet in every field of the society and due to this increase in usage

evolved Such crimes where use of computers coupled with the use of internet is involved and broadly termed as cyber and social terrorism.

Cyber & Social terrorism are basically national and non-national group. They attack against information, computer system, computer program, data and official website .They do there crime and terrorism with the help of internet, computer and computer network. They mostly good programmers and computer hackers .They perform illegal activates such as online database hacking, bank account hacking, spreading computer various , online bullying and create Unauthorised electronic fund transfer.

By

C MOUNIKA

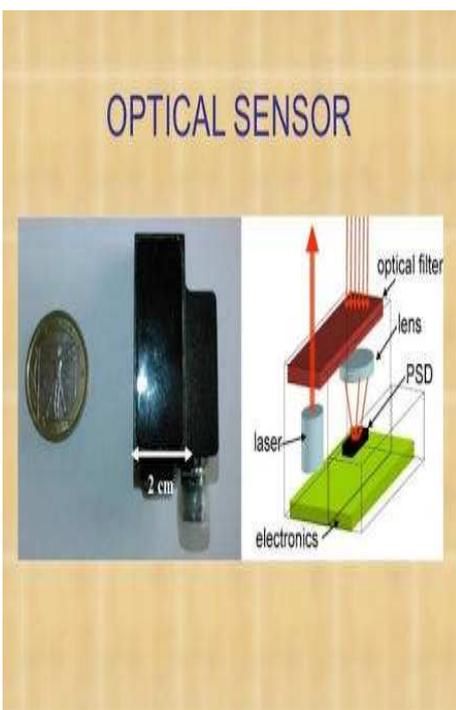
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# Smart Sensors

Smart sensors are an extension of traditional sensors to those with advanced learning and adaptation capabilities. The system must also be re-configurable and perform the necessary data interpretation, fusion of data from multiple sensors and the validation of local and remotely collected data. These sensors therefore contain embedded processing functionality that provides the computational resources to perform complex sensing and actuating tasks along with high level applications. The functions of a smart sensor system can be described in terms of compensation, information processing, communications and integration. The combination of these respective elements allow for the development of these sensors that can operate in a multi-modal fashion as well conducting active autonomous sensing. Compensation is the ability of the system to detect and respond to changes in the network environment through self-diagnostic routines, self-calibration and adaptation.

A smart sensor must be able to evaluate the validity of collected data, compare it with that obtained by other sensors and confirm the accuracy. Information processing encompasses the data related processing that aims to enhance and interpret the collected data and maximize the efficiency of the system, through signal conditioning, data reduction, event detection and decision making.

## What is a Smart Sensor System?



1. Network Capable Application Processor (NCAP) where control and data correction takes place

2. Transducer Interface Module (TIM) (one or more) containing the transducer and dataAcquisition

NCAP (Network Capable Application Processor)

Communications

Interface Control

Message Routing

TIM Discovery and Control

Data Correction Interpretation of TEDS Data

Message Encoding and Decoding

TIM (Transducer Interface Module)

Analog Signal Conditioning

Triggering

Analog to Digital Conversion

Command Processing

TEDS Storage

Data Transfer

Communications

## Minimum Interconnecting Cables

The number of cables and cable lengths dictated by traditional star topologies of interconnecting analog transducers to a central signal processing equipment has a detrimental impact on all aspects of a measurement system. These factors decrease the accuracy and reliability of measurements, decrease system performance, and increase system operating costs.

The multi-drop sensor network architecture of the proposed system allows drastic reduction of interconnecting cables. The Smart Sensor System interconnects all of the transducers through a common digital bus cable. The centralized, bulky electronic boxes typical of traditional measurement systems are replaced with miniature modules strategically distributed throughout the setup.

## High Reliability

Reliability is improved by reducing the total number of interconnecting cables and including Build-in-Test (BIT) features. Self test adds a higher level of con-

fidence that a given measurement channel is alive and working properly.

## High Performance

Large numbers of analog transducers result in difficult-to-manage, large and long bundles of cables carrying analog signals which are susceptible to being corrupted by EMI/RFI noise. Cables carrying digital signals are more immune to these problems and are easier to interface than cables carrying analog signals. Higher measurement accuracy is obtained by digital correction over the operating temperature range of both the transducers' sensitivity and the analog signal conditioning instrumentation.

## Scalable -Flexible System

The new network measurement system accepts different types of transducers, including traditional analog types as well as new smart network sensors. It allows for easy expansion or reduction in the number of measurement channels. This is possible with the use of Intellibus Interface Modules (IBIM).

## Small Rugged Packaging

The proposed measurement system components are small, lightweight and packaged to operate under demanding environmental conditions typical of aerospace applications such as high vibration, high temperature, high pressure, humidity, EMI/RFI, etc.

By

**E BHAVANI**

**15BF1A0454**