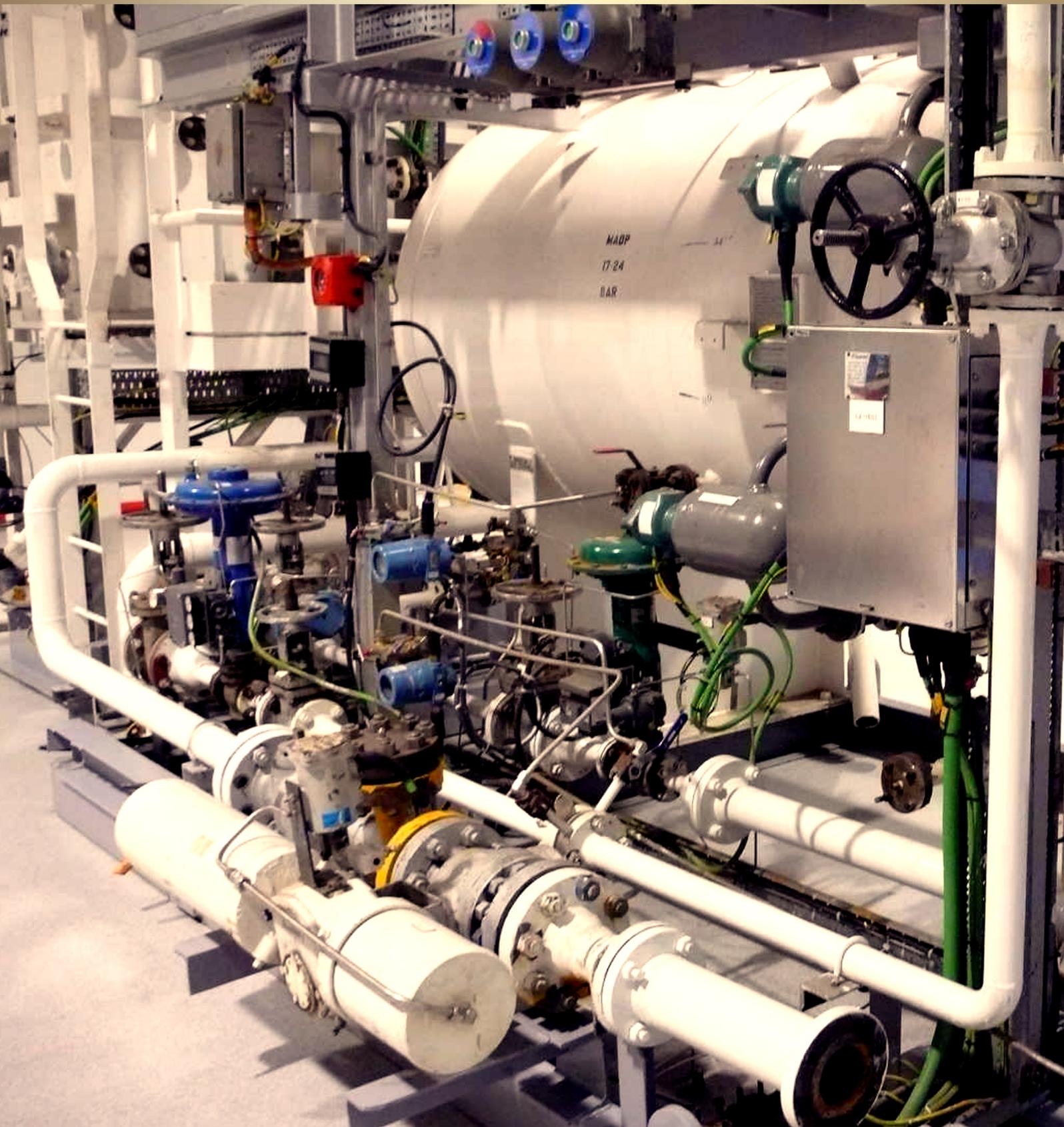




**RSET**  
RAJAGIRI SCHOOL OF  
ENGINEERING & TECHNOLOGY

# APPTRONICS review

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DEPARTMENT OF APPLIED ELECTRONICS & INSTRUMENTATION  
RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY  
RAJAGIRI VALLEY | KOCHI | KERALA | INDIA



## HoD speaks ...

Ms. Liza Annie Joseph, HoD, AEI

*Can you imagine a world without instruments?*

*We see, and in fact use, instruments every day, at home, at our workplaces and even while travelling.*

*Instruments, of one form or another, for one function or another, have become part and parcel of every one's life. Thanks to the all-important field of instrumentation and the great instrumentation engineers, instruments keep adding value to life. Instruments keep improving all processes related to life and livelihood.*

*Touching every walk of life and every facet of industries, instrumentation engineering is really an interesting field. It's not simply an engineering branch, it's in fact an art; it's the art and science of measurement and control of processes. It's a multidisciplinary stream which covers subjects ranging from electronics, electrical, mechanical, chemical, computers, and what not! This major feature of instrumentation has an important significance in terms of employability of graduates: Graduates from this stream can fit in any industry. Learn it well; getting employed is never an issue.*

*And, is it difficult to learn?*

*Any engineer is expected to have good aptitude for mathematics and physics. That's true with instrumentation too. Have good score in high school level, have an attitude to achieve; that's it, you are through!*

*The growth in avionics, aeronautical and space science sectors has increased the scope of instrumentation engineers. Biomedical instrumentation is another fast growing area that also has the requirement of instrumentation professionals.*

*Instrumentation engineers are responsible for integrating sensors with recorders, transmitters, displays or control systems. They are capable of designing the installation, wiring and signal conditioning. They can also take charge of calibration, testing and maintenance of the system.*

*And thus the scope for instrumentation engineers is ever growing.*

*They may also prove their expertise in R&D and can manage both software and hardware sectors.*

*To sum up, an appropriate degree in instrumentation with good communication skills to translate project needs into design and development can equip a person to be an instrumentation engineer.*

*Interesting, is it not?*

*You can be a good instrumentation engineer, and earn a great opportunity to serve the society and mankind.*



## Which branch to be selected for engineering studies?

*by Prof. P. R. Madhava Panicker*

It's a common experience that most of the students and parents look for admission in Electronics and Communication, Mechanical Engineering or Computer Science, and recently Civil Engineering too, as the first choice for engineering studies. Streams like Information Technology (IT) or Applied Electronics and Instrumentation (AEI) do not even form the third choice for many. Discuss with them on how they go for a choice. You will find that in majority of cases, they don't have any specific reasons in terms of job opportunities, scope for higher studies or in regard to the capability of the students to learn. Their choice could be because in the neighborhood of their residence there is one student doing ECE, CS or ME, or some distant relative (an uncle!) might have given advice to do so. In fact what the parents really look for is a decent job for their wards. As everyone knows, majority of students are selected, after the engineering course, for IT jobs. [Even if they want to join core industries,

the fact remains that there is no chance for so many graduates being hired by the core industries.] The IT industry does not look for thorough understanding of the topics in these 'most preferred' areas; it does not matter if the students studied EC or IT. Many aspirants of admission to engineering courses forget that the institution where they learn engineering is more important than the subject with respect to both learning and getting placed; subjects are prescribed, in fact, to make the students acquire the skill of learning. They don't realize that it is in a reputed institution like RSET, the students get groomed well with respect to the attributes which the employers are looking for. They seem to be unaware of the terrifying statistics being published about the employability of the engineering graduates. They don't seem to check the statistics on placement from different engineering colleges. What other reason can you point out for a parent to let his ward join EC, ME or CS in a much less rated institution than



RSET, just because his ward could get admission in RSET in a stream like AEI or IT! We have so many cases to be cited as examples of students (engineering graduates!) remaining unemployed after completing courses in ECE, ME, CS or CE; remember they had their UG courses run by such useful-for-nothing institutions.

You may argue against the above view. You may argue as follows.

Check the available statistics on placement. You would find that students from these most preferred branches are selected first and they do receive maximum number of offers. Also many of them get higher initial positions. If records stand in favour of the current trend, why should we say that the students and parents are ill advised with regard to the choice of the branch for study! Yes you are not wrong; it happens in the case of reputed institutions. Can you not see why it is so? Students who should have preferred to join courses like IT or AEI in a reputed institution went ahead to join their better preferred (!) courses elsewhere

causing two things to happen: (i). They do not undergo a good course/coaching and cannot fetch a decent job and (ii). The seats in the reputed institutions for the less preferred (!) courses got allotted to a set of students with much lower capability to learn. Please be reminded that statistics could very much lead to highly biased conclusions if the inputs are not properly chosen. Calibre and attitude of students to learn are important parameters to be considered. Those in higher levels of these attributes are currently joining the streams from which (you find) now more placement offers are got. Things will automatically change, and in fact show drastic improvement, if this priority listing of streams for admission is changed (even forcefully!).

Who will bell the cat? How can we let the public become aware of employment opportunities through completion of applied streams like IT and AEI? How can we let them understand the importance of these modern streams of engineering? What can we do towards that? Please spare a few minutes to think over it.

### **About the Author**

Prof. P. R. Madhava Panicker, with 34 years of active service at Vikram Sarabhai Space Centre, ISRO and having served in many review and staff selection forums of various organizations, is being consulted by many parents and students on choosing the right branch of engineering studies. His knowledge and skill in this area is being put to use by RSET also during the process of admission

## Department News & Events

### Courses, Training Programs and workshops

- **Five-day training on DCS & PLC by YOKOGAWA, India Ltd.**, for the students of S8 AEI from 17/03/16 to 21/03/16. The faculty members Ms. Sukanya R Warier and Mr. Krishna Kumar K P, and technical staff members Mr. Radhakrishnan K V and Mr. Binil Joseph M also attended the training programme.



### Conferences, Seminars and Talks

- Talk on **Signal and Image Processing** by Prof. Dominic Mathew for B.Tech students, Kumaraguru Engineering College on 31<sup>st</sup> October 2015



- Research presentation on **Introduction to Beaglebone Black** by Mr. Balu Raveendran for Faculty and Technical staff AEI on 14<sup>th</sup> December, 2015.
- Talk on **Recent Trends & Techniques in Digital Image Processing** by Mr. Hari C. V. for faculty, College of Engineering Vadakara, on 3<sup>rd</sup> December 2015
- Talk on **Essentials of Research & Trends in Image Processing** by Mr. Hari C. V. for faculty, Adi Shankara Institute of Engineering & Technology, Kalady on 16<sup>th</sup> December 2015

### Events

#### ➤ 2015

- Invited talk on “Needs & issues of calibration in measuring instruments” by **Prof. Jaganath Bhat, Director, STIC**, for faculty and S4, S6 and S8 students of AEI, on 26<sup>th</sup> March 2015.



#### ➤ 2016

- **Quiz competition & Idea presentation:** The Department of Applied Electronics & Instrumentation in association with ISOI Kochi students' chapter conducted the contest, on March 9th 2016
  - Co ordinators: Ms. Shanmuga Priya M and Ms. Mary Hexy.
  - **Prize winners**
    - **IDEA PRESENTATION**
      - First: Neha Paul M (S8 AEI)
      - Second: Stephy Caroline Stanley (S8 AEI)
    - **QUIZ COMPETITION**



- First: Vivek A.S (S8 AEI) , Diya Simon (S6 AEI) & Razi Abdul Rahman (S4 AEI)
- Second: Sachin Suresh (S8 AEI), Varun Nair (S6 AEI) & Alen Antony (S4 AEI)



### **In house Research:**

- A discussion on the formation of Bio Design Instruments and Research Development Society(BIRDS)at Rajagiri Hospital - a research forum for a collaborative effort by doctors & Engineers was held on 8<sup>th</sup> December 2015, coordinated by Prof. P. R. Madhava Panicker and Ms. Liza Annie Joseph. Dr. Binu Joy and Dr. Ajith Toms of Rajagiri hospital, Dr. Deepthi Das Krishna, Ms. Harsha A and Ms. Rithu James of DEC RSET also attended the discussion.
- More activities were planned in the next meeting held on 27<sup>th</sup> February 2015 under birds attended by members from Rajagiri Hospital and RSET.

### **Industry-Institute Interaction:**

- Industrial visit to HNL, by S4 AEI students on 28th March 2015. Faculty members accompanied were Ms. Shanmugha Priya M., Mr. Balu Raveendran, Ms. Sukanya R. Warier.
- Industrial visit to Mitradam, by S1 AEI students on 19th September 2015. Faculty members accompanied were Prof. P. R. Madhava Panicker, Ms. Liza Annie Joseph & Mr. Hari C. V.
- Industrial visit to FACT, by selected 10 students from S4 AEI students on 18th September 2015. Faculty member accompanied was Mr. Krishna Kumar K. P
- Industrial visit to NEST, Kakkanad, students of S7 AEI students on 17th October 2015. Faculty member accompanied was Ms. Sukanya R. Warier



- Hospital visit to Rajagiri Hospital, by students of S7 AEI students on 20th October 2015. Faculty members accompanied were Ms. Aparna George and Ms. Mary Hexy.

### **Accomplishments-Faculty**

Prof. Dominic Mathew got fellowship award from ISOI at Kumaraguru Engineering College on 30th October 2015. He also participated in the national symposium on instrumentation.



### **Accomplishments-Students**

Mr. Albin Manjaly, S6 AEI and Mr. Cybil Jose, S3 AEI were members of RSET chess team which won the Mahatma Gandhi University inter Zone Chess Championship held at NSS college , Rajakumari on 29<sup>th</sup> & 30<sup>th</sup> September 2015.



### **Publications**

1. Anjitha Mekkayil Anand, Balu Raveendran, Shoukath Cherukat, "Real-time Application in Linux using PRUSS", International Journal of Engineering Research & Technology, Volume 4, Issue 5, May 2015, e-ISSN: 2278-0181.
2. Anjitha Mekkayil Anand, Balu Raveendran, Shoukath Cherukat, Shiyas Shahab, "Using PRUSS for Real-Time Applications on Beaglebone Black", Proceedings of the Third International Symposium on Women in Computing and Informatics, August 10 – 13, 2015.



**Campus Placements:**

Thirty-three students of AEI, 2012-16 batch placed in various reputed companies through the campus placements

**GATE 2016**

**Congratulations !!!**



Aneta Mary Augustine



Innovation is the market introduction of a technical or organisational novelty, not just its invention.

— Joseph A. Schumpeter —

AZ QUOTES



# LiFi (Light Fidelity)

ADITHYA SUNDARLAL | MANU RAJAN

S6 AEI

## INTRODUCTION

LiFi is transmission of data through illumination by taking the fiber out of fiber optics by sending data through a LED light bulb that varies in intensity faster than the human eye can follow. Very simply, if the LED is on, you transmit a digital 1, if it's off you transmit a 0, They can be switched on and off very quickly, which gives nice opportunities for transmitted data. "It is possible to encode data in the light by varying the rate at which the LEDs flicker on and off to give different strings of 1s and 0s.

## WORKING TECHNOLOGY

What we require at all are some LEDs and a controller that code data into those LEDs. We

have to just vary the rate at which the LED's flicker depending upon the data we want to encode. Further enhancements can be made in this method, like using an array of LEDs for parallel data transmission, or using mixtures of red, green and blue LEDs to alter the light's frequency with each frequency encoding a different data channel. Such advancements promise a theoretical speed of 10 Gbps. Radio waves are replaced by light waves in a new method of data transmission which is being called Li-Fi. Light-emitting diodes can be switched on and off faster than the human eye can detect causing the light source to appear to be on continuously. A data rate of greater than 100 Mbps is possible by using high speed LEDs with appropriate multiplexing techniques

## COMPARISON BETWEEN LIFI AND WIFI

LiFi vs WiFi			
S. No.	Parameters	Wireless Technologies	
		Light Fidelity	Wireless Fidelity
1.	Speed for data transfer	Faster transfer speed (>1 Gbps)	Data Transfer speed (150 Mbps)
2.	Medium through which data transfers occurs	Used Light as a carrier	Used Radio spectrum
3.	Spectrum Range	Visible light spectrum has 10,000 time broad spectrum in comparison to radio frequency	Radio frequency spectrum range is less than visible light spectrum.
4.	Cost	Cheaper than Wi-Fi because free band doesn't need license and it uses light.	Expensive in comparison to Li-Fi because its uses radio spectrum.
5.	Network topology	Point to point	Point to point
6.	Operating frequency	Hundreds of Tera Hz	2.4 GHz



## **HOW IS IT DIFFERENT?**

Li-Fi technology is based on LEDs for the transfer of data. The transfer of the data can be with the help of all kinds of light, no matter the part of the spectrum that they belong. That is, the light can belong to the invisible, ultraviolet or the visible

## **APPLICATION OF LI-FI**

### ***Airlines***

Airline Wi-Fi. Nothing says captive audience like having to pay for the "service" of dial-up speed

### ***Smarter Power Plants***

Wi-Fi and many other radiation types are bad for sensitive areas. Like those surrounding power plants. But power plants need fast, inter-connected data systems to monitor things like demand, grid integrity and (in nuclear plants) core temperature. The savings from proper monitoring at a single power plant can add up to hundreds of thousands of dollars. Li-Fi could offer safe, abundant connectivity for all areas of these sensitive locations. Not only would this save money related to currently implemented solutions, but the draw on a power plant's own reserves could be lessened.

part of the spectrum. Also, the speed of the internet is incredibly high and you can download movies, games, music etc in just a few minutes with the help of this technology. Also, the technology removes limitations that have been put on the user by the Wi-Fi.

Wi-Fi on the plane. passengers will "soon" be offered a "high-speed like" connection on some airlines. United is planning on speeds as high as **9.8 Mbps** per plane.

## **USES**

LiFi can be used in the places where it is difficult to lay the optical fiber like hospitals. In operation theatre LiFi can be used for modern medical instruments. In traffic signals LiFi can be used which will communicate with the LED lights of the cars and accident numbers can be decreased. Thousand and millions of street lamps can be transferred to LiFi lamps to transfer data. In aircraft LiFi can be used for data transmission. It can be used in petroleum or chemical plants where other transmission or frequencies could be hazardous.



# VIRTUAL USER INTERFACE

STEPHY CAROLINE STANLEY

S8 AEI

VUI is to bring an awareness on building a low cost virtual interface for interactive environments. This can be used to have an advanced educational experience, improve the quality and effectiveness of education by using computer. It develops a low cost virtual interface using hardware devices namely, a Raspberry pi with an IR camera and an IR pointing device such as light pen. The concept of VUI aims to be a major step towards the development of smart classroom and interactive conference halls. The ease of presentation and user interaction will make a significant change in the field of education, finance and other day to day activities. The main goal is to develop a low cost virtual interface, based on usually accessible hardware in our daily lives, i.e., a video projector, a Raspberry-Pi with an IR-cam and an Infra-Red(IR)pointing device. The electronic white board is implemented using a layered approach. Primarily a base layer for the board is created with suitable background color. Each stroke on the board is represented by a layer class. Further each stroke in the board is stacked as different layers with properties like color, brush size etc. The functions intended to be provided by the application are Virtual touch interface in which the users can perform operations such as left click, right click on the projected surface from the projector. Freehand drawing by using the pointing device. Different brush sizes and colors will be provided to the user. Learning process can be made much better by importing images and figures into the canvas. Notes and drawings can be recorded and later be distributed or used for future sessions.VUI aims to improve the traditional techniques and redefine the current scenario of presentation aiding tools. The notes and slides recording is one of the main advantage of VUI as it allows teacher and student to reuse or distribute later. While working as presentation aid, VUI enables the user to control the host computer as if the host computer screen is made to be a virtual touch screen.



# SWARM ROBOTICS

MABLE GEORGE | SHRUTHI UNNIKRISHNAN

S6 AEI

Swarm Robotics is a developing area of robotics where many simple and reconfigurable robots are made to work in a cooperative and decentralized method to perform tasks. It has many advantages like simplicity, ease of maintenance and repair, cost effectiveness when compared to a huge complex robot. The idea of Swarm Robots was first coined by Gerardo Beni, a professor in the University Of California and Jing Wang in 1989. They are used in applications and tasks of high difficulty and time consumption as these swarm robots solves the tasks with ease. Communication is the most important factor concerning the efficiency of swarm robots. Communication depends on environment, communication area, size of robot etc. The method of communication and identification of these swarm robots is by the usage of Tags. Tags acts as their address and they interact individually through tags. Usually binary digits or codes are used as tags. Communication

in these swarm robots are also classified into implicit and explicit where implicit focuses on communication by changing the environment and explicit communication focuses on direct communication by means of IR or RF techniques. Characteristics of swarm robots include decentralization, self organization and parallel distribution. As there is no leader robot, each robot can make decisions individually and even if one robot in the swarm fails, the other robots take up its duty. Self organisation gives emergent intelligence and parallel distribution enhances functional capability of swarm robots. Applications of swarm robotics are in the field of medicine, agriculture, satellite maintenance, pipe inspection, telecommunication etc.

Keywords: Swarm Robotics, Simplicity, Tags, Implicit, Explicit, Decentralisation, Self Organisation, Parallel distribution

# 'SMART CONTACT LENSES' USING NANODEVICES

SHREYAS S.

S8, AEI

Nanoscale devices are one of the highly researched topics in nanotechnology. Researchers are presently researching the nanoscale devices which can manipulate light. This can lead to the discovery of the 'Smart Contact Lens'.

With nanoscale devices, light can be manipulated such that it can be filtered while still being transparent. With this technology, high tech lenses could filter harmful optical radiation without interfering with vision, transmits data and gather live vital information.

As mentioned earlier, light manipulation involves creating tiny artificial crystals known as 'dielectric resonators', having a fraction of wavelength of light, 100-200 nm or 500 times thinner than human hair.

By controlling properties of surfaces, light filtering properties can be easily controlled, thus

enabling to create devices for high data rate communication/smart contact lenses.

The current drawback is that dielectric resonators work only for specific colors, however, with flexible surface, operation range can be adjusted by stretching it. The device is made using rubber like material used for contact lenses. Crystals of titanium oxide found in sunscreens were used/embedded.

Both proved to be bio-compatible forming an ideal platform for wearable optical devices. By changing/varying shape of these materials, a device that changes properties when stretched can be created.

This can modify the way light interacts with and travels through device. This will pave way for making smart contact lenses and stretchable color changing surfaces in the near future.



## PHOENIX SYSTEM

SAM VERGHESE AEI S4

An assistance is what u always need while driving a person who can give u wise judgments while driving keeping u safe. A monitoring system is what a police control room needs to keep the driver and pedestrians safe, **phoenix** systems is a one-word solution.

This is an automotive system which enhances the driving experience and makes easier judgement during accidents, reduces the chances of accident by effectively using the fear factor.

The system consists of multiple sensors always arranged at different parts of the body, assigned to do different operations. It uses ultrasound for obstacle detection, laser guided system for distance and relative velocity measurement, colour sensor array, proximity sensor and a server based **AI** system.

The system records all the data including the speed of the automotive position, real time and uploads to the server's real time monitored in a control room. **AI** judges the rule break committed by the driver and gives warning to the driver and reports to the control room. During an accident, this system judges, by whose mistakes the accident had occurred.

The different sensors placed at different parts of the body gives data to the **AI** which enhances the driving experience by providing up-to-date information about the obstacle or about the current speed etc. The **AI** also acts as an advanced personal assistance to the driver as the **AI** is fully aware of the user and his surroundings with help of multiple sensors placed in and around the automobile.

This system gives the feeling of security over the automotive, the fear of being monitored reduces the chances of the driver to make rule breaks by giving warnings and real time advanced information about the automotive position and surroundings. This increases the safety of the automotive just like a black box in flights. The automotive will have a data base which stores all this information for future analysis.

**Phoenix** system is a practical application of swam robotics concept in collaboration with government and different automobile manufacturers for the safety of drivers and pedestrians. Let us make this **World an Accident Free Zone**.



# THE SMART CASE

ARJUN SETHUNATH | DAVID GEORGE

S4 AEI

## **The Present Day Problem!**

Smart phones are a necessity, even though critics say that it degrades the thinking capabilities of the youth. A phone with an OS is how you simply define a smart phone, most of them come with touch screens, a camera, different sensors and the list goes on...

But what we face today is that these phones run out of fuel at a very quick rate!!!. As a teenager when you use your phone mostly for WhatsApp, play store or to watch HD videos your phone quickly runs out of battery and when a time comes to make an important phone call, you are left with around 4% battery charge and your phone shuts down. Most of the big names in the industry like Samsung, Micromax, Sony make smartphones having around 20-28 hours of battery life, which is actually not enough. This 30 hour time frame is provided only if you use your phone in power saving mode, i.e you reduce the screen brightness, get rid of animations and stuff like that. So if you use your phone neglecting the above conditions, you'd probably get maximum of up to 10 hours. Thus you always need to carry a charger around or a power bank wherever you go to ensure that your phone doesn't go out in the time of need. And always carrying around a carry bag for the

charger or the power bank is not practical especially for the modern day youth, who are the targeted demographic by the smart phone manufacturers. So this is a problem to which we need to find a solution!

## **The Futuristic Solution**

Imagine you are holding your smart phone in your hand, you are using WhatsApp and at the same time you can see that your phone is getting charged!!!We the Second year students at Rajagiri School of Engineering and Technology present to you "**THE SMART CASE**".

The most landscape changing idea of this decade, Just think of a world where you do not need chargers to charge up your phone, think of how much electricity could be saved. The word IMMORTAL can be applied to smartphones. You no longer need to operate your phone in low brightness mode or avoid playing games feeling that your phone battery might go down. All you need to do is to make sure that your body/hand is in contact with your phone at all times. Thus it is safe to say that, as long as you live your smartphone can never die!

## **THE CONCEPTUAL WORKING**

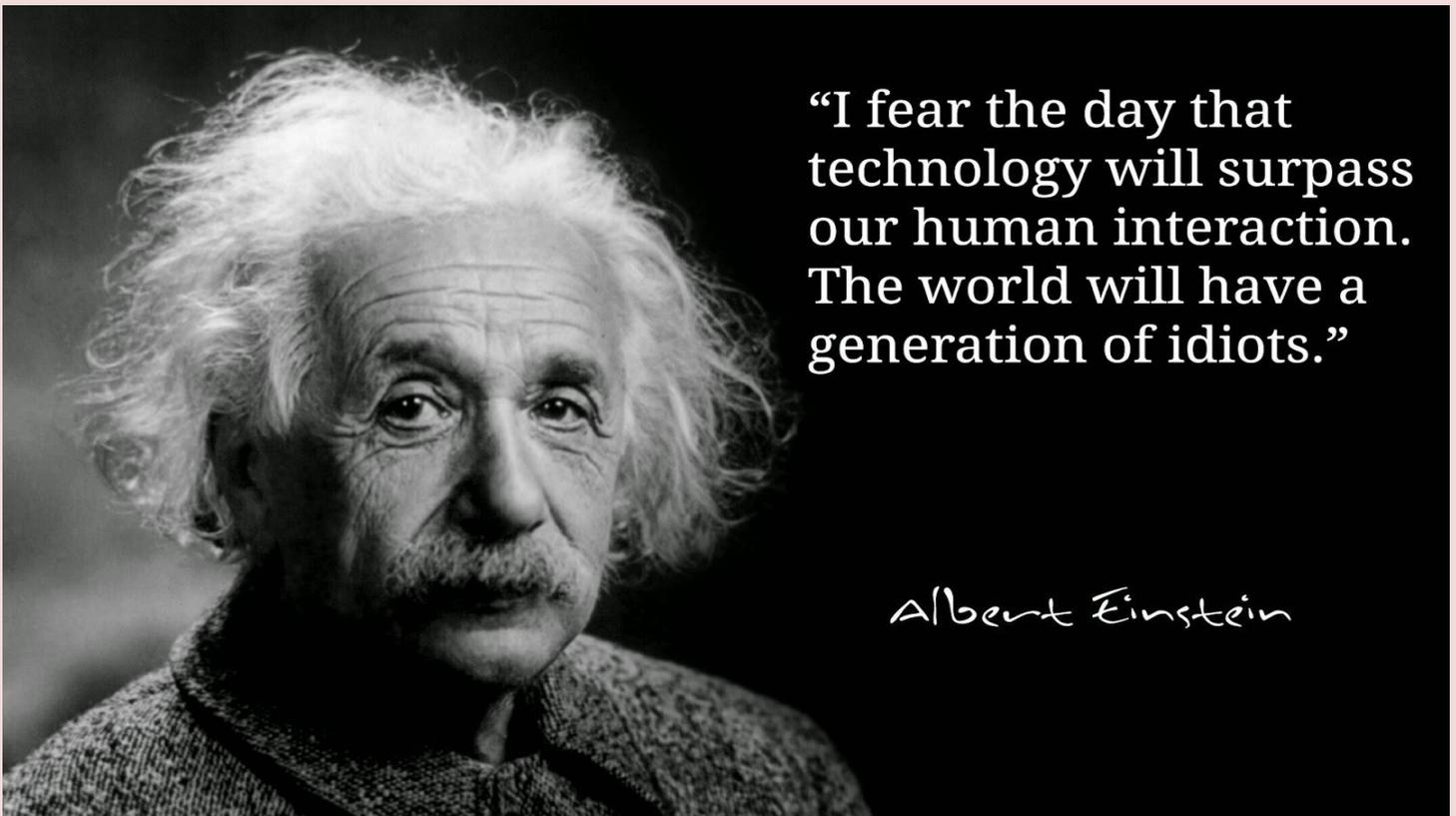


The body temperature of human beings is found to be around 37 degree Celsius. When you hold the phone in your hand this heat produced by your palm, when it comes in contact with our source module, the side in contact becomes hot and the opposite side becomes relatively cool hence flow of electrons occurs, this is known as the Seebeck effect. This output obtained is in the order of millivolt's and mill ampere's which is truly dependent upon the temperature difference created. But so as to facilitate our requirement of output in the order of volts and milli amperes to charge the smartphone, we pass the output through an amplification

process. Thus the smart case is ready to charge your phone.

### **SOCIAL IMPACT**

People will no longer need to be afraid of their battery going dry ever again, No need of chargers ever again. We can get rid of the old power banks and absolute clean, green, free energy conversion is made possible. More than just an innovative idea, we want the smart case to be a symbol to the coming generations that age is not at all a parameter for innovation to be born.





# Eye Controlled Wheelchair using LabVIEW

NEHA PAUL.M

S8 AEI

A powered wheel chair is a mobility-aided device for persons with moderate or severe physical disabilities. In order to take care for different disabilities, various kinds of interfaces have been developed for powered wheelchair control: such as joystick control, head control, etc. Though there are many methods available in recent times to enable their motility, they require efficient and precise control which is most of the times not possible.

Most of the mobility aided device are interfaced with keyboard, mouse, and the other computer input devices. These computers input devices cannot be operated by handicap persons. In this paper, a computer input device by human eyes only is proposed for handicap person. The existing computer input devices can be divided into five categories:

1. Bio-potential based method which utilizes body potential from the user by using special instrument. Instrument such as Electrooculography (EOG), Electromyography (EMG), and Electroencephalograph (EEG), Search coil can be used for measuring bio-potential. The search coil output can be used as sources of computer input for handicap person.
2. Voice Based method, which use user's voice as source input. Voice analyzer is

used to analyze user's voice and convert into digital data. The major defect of this system is that it gets easily affected by noise

3. Motion based method, utilizes other normal movement organs to operate computer input. Head, foot, and etc. can be used to control computer input.

One of the key essentials of the proposed system is detecting and tracking the eye movements. A spectacle mounted camera will track the eye movement and control the wheelchair. The most challenging aspects will lie in finding a good way to differentiate iris and pupil locations, determining the eye's movement, and controlling the wheelchair's wheels in proper movement.

This model is mainly aimed at the quadriplegic patient who is completely paralyzed but have good eye coordination. In this project an IR camera is used to take the image of the eye which is then processed in LabVIEW to track the intended motion of the wheelchair. A commercially available web camera is head-mounted on the user and it will track the eye movement of the user, actuating the wheelchair to go forward, stop, left or right. A computer or laptop mounted on the electric chair processes the captured image data, compare it with the real time image of eye and track the movements of the user's eyes using LabVIEW. An Arduino board is



used to interface LabVIEW to the electric wheelchair. DC motors along with a motor driver is used to apply torque to the individual wheels so that direction control can be ensured. This model helps the completely paralyzed person to have command over the wheelchair and its direction. An ultrasonic sensor and alarm can be incorporated into the powered wheelchair to detect obstacles in the path of the user and warn the user by ringing an alarm. to help the user to

move in environments with ramps and doorways of little space an accelerometer can also be used to determine the inclination. This project enables the disabled patients to move their wheelchair on their own without the help of any other person. However, the only drawback with this project is as the wheel chair requires eye-ball movement as input to the controller for its working, a lot of strain is created to the eyes

### Curiosity Corner

1) Decode the following ASCII message

```
10100111010100101010110001001011001  
01000001001000100000110100101000100
```

2) Remove 4 match sticks and retain a star



3) Using eight eights and addition only, can you make 1000?

### EDITORIAL BOARD

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