

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION

EXPLORE, DREAM, DISCOVER

ISSUE 59

MONTHLY NEWSLETTER

JANUARY 2023

# GENESIS

IGNITING THOUGHTS

## Contents

Departmental Activities-	01
Awards and recognitions-	03
Tech Talk -	07
Achievements -	14
Upcoming events-	15





## Vision

- To be recognized at the national and international level for excellence in education and research in Electronics and Communication Engineering.

## Mission

- Inculcating leadership qualities, adaptability, and ethical values
- Imparting quality education in the field of electronics, communication, and related areas to meet the challenges in the industry, academia, and research
- Nurture the growth of each individual by providing a dynamic and conducive learning environment.



# DEPARTMENTAL ACTIVITIES

## FACULTY DEVELOPMENT PROGRAMME ON ML AND DL APPLICATIONS IN COMPUTER VISION

Department of Electronics and Communication Engineering, Adi Shankara Institute of Engineering and Technology, Kalady is organizing a KTU-sponsored FDP on "ML and DL applications in Computer Vision" in offline mode. This highly enriching programme commenced on 30th January, 2023 and will conclude on 3rd February, 2023.

The ongoing 5-day program is set to benefit the faculty members for both academic and research activities in the field of Deep Learning and Computer Vision.



GPS Map Camera

Kalady, Kerala, India

Entrance way to ASIET, Mattoor, Kalady, Kerala

683574, India

Lat 10.178276°

Long 76.430126°

30/01/23 09:53 AM GMT +05:30

google

**Adi Shankara**  
INSTITUTE OF ENGINEERING AND TECHNOLOGY

**KTU**  
Kerala Technological University

**NBA**  
NATIONAL BOARD  
OF ACCREDITATION  
Accredited Programmes  
CSE, ECE, EEE & ME (2022-25)

**KTU Sponsored**  
Faculty Development Program on

**ML and DL Applications in  
Computer Vision**

**Organised by**  
**DEPARTMENT OF**  
**ELECTRONICS & COMMUNICATION ENGINEERING**  
(NBA ACCREDITED B.TECH PROGRAMME)

**30<sup>th</sup> Jan - 3<sup>rd</sup> Feb 2023**

[www.adishankara.ac.in](http://www.adishankara.ac.in)

## IEDC EXECUTIVE COMMITTEE

The following students from ECE Department have been selected for various positions in the Executive Committee of the Innovation and Entrepreneurship Development Cell, Adi Shankara Institute of Engineering and Technology for the year 2023.

- J Jithendra Gopal, S7 ECE - Chief Executive Officer (IEDC Lead)
- Nikhil R Bhat, S7 ECE - Chief Technical Officer (Technology Lead)
- Rahul V R, S7 ECE - Chief Marketing Officer ( Marketing Lead)
- Seethal Benny, S7 ECE - Community Co-lead
- Arjun Mani, S7 ECE - Finance Co-Lead

Congratulations and best wishes to the new office bearers.





# AWARDS AND RECOGNITIONS

**Appreciation for achieving IEEE Regional Exemplary Student Branch Award consecutively for three years.**

The fervent efforts, ceaseless dedication and passion radiating from every member of IEEE SB ASIET has been recognized yet again.

Another feather added to the crown as IEEE SB ASIET has been entitled with the prestigious IEEE Region 10 Exemplary Student Branch Award 2022.



## Funding from Kerala Start-up mission

Hearty congratulations to our students who received funding for their projects, from Kerala Start-up mission as a part of Idea Grant, Feb 2022.

- J Jithendra Gopal of S7, ECE received a grant amount of One lakh rupees for his project titled 'Tutti Quit'.
- Manikandan A R of S7, ECE received a grant amount of Fifty thousand rupees for his project titled 'Reracle waste management solution'.



J Jithendra Gopal, S7 ECE



Manikandan A R, S7 ECE





# CONGRATULATIONS

Congratulations to our new Head of Department, Dr. Ajay Kumar,  
Associate Professor, Dept of ECE.



Congratulations to Dr. Bobby Mathews C for getting promoted as Dean  
(Research and publications ,Dept of ECE)



## Publication

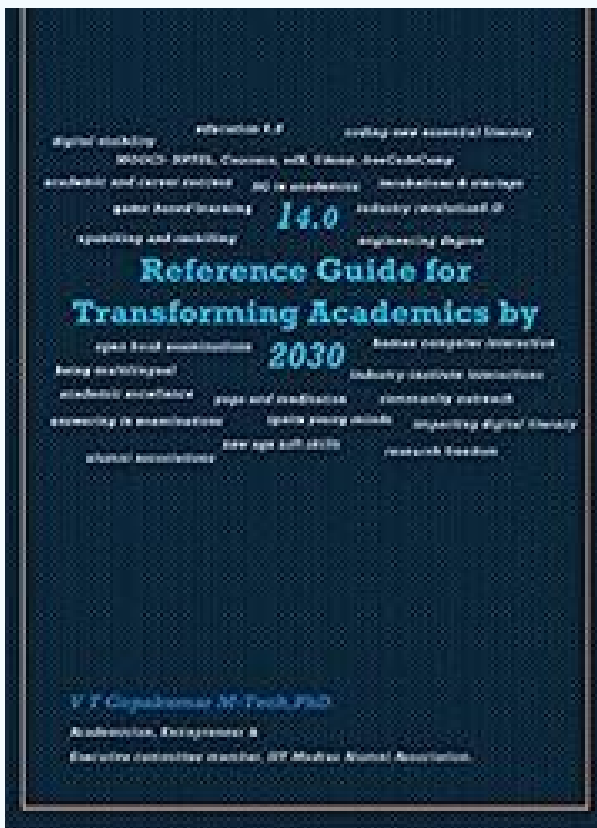
Dr. V T Gopakumar, Professor Dept. of ECE wrote and published the book titled: "14.0 Reference Guide for Transforming Academics by 2030". Copies are available on Amazon.

This book is a collection of 14 articles written over the course of three to four years providing suitable guidance for students, teachers, and parents alike to achieve excellence in education while keeping up with the changing technology and pedagogy. Reference links are added at the end of each article including that of reputed educational institutes, agencies, national and international government institutions, UN agencies, and multinational companies in India and abroad.

The 14 articles are comprehensive recommendations and opinions on the curriculum and mentoring for 2030 in light of exponentially advancing technology.

Here is the link to purchase a copy and for more details :

<https://www.amazon.in/dp/B0BTBTG1PB?asin=B0BTBTG1PB&revisionId=d524ad49&format=1&depth=1&fbclid=IwAR3wg7A0xkO8RQJnQ12JHj5qOYJF24xgg3ehwy3dRuVIA36Uibz3lpLPNr4>



Dr.V T Gopakumar, Professor,  
Department of ECE



## STAFF ZONE



## Performance improvement by Using Hybrid Lifi and Wifi Networks(HLWNets)

Prashanth P Menon , Assistant Professor  
ECE DEPT.

### What is QUIC protocol used for?

Consumption of wireless data increases by 60 percent every year. Because of this, the radio frequency spectrum becomes congested leading to a phenomenon called spectrum crunch. Spectrum crunch is defined as a phenomenon in which there is a lack of sufficient radio spectrum required to support the growing demands of wireless data by public and private sector organizations. This will have a negative impact on the speed of wireless data and internet speed reduces. Thus WiFi will not be able to keep up with the growing demand for wireless data.

In order to tackle the rapidly growing number of mobile devices and their expanding demands for Internet services, network convergence is envisaged to integrate different technology domains. For indoor wireless communications, one promising approach is to coordinate light fidelity (LiFi) and wireless fidelity (WiFi), namely hybrid LiFi and WiFi networks (HLWNets). This hybrid network combines the high-speed data transmission of LiFi and the ubiquitous coverage of WiFi.

Combining the high-speed data transmission of LiFi and the ubiquitous coverage of WiFi, the concept of a hybrid LiFi and WiFi network (HLWNet) was proven to achieve a better network performance than a stand-alone LiFi or RF system.

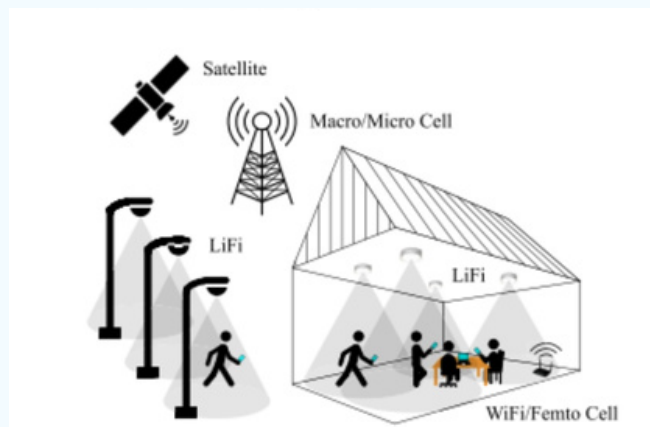


Fig:-convergence of LiFi with wifi.

The figure above presents a vision of integrating the mainstream wireless networks and LiFi in 5G and beyond environments. In outdoor scenarios, mobile users can be served by satellites, macro/microcells, or LiFi-enabled street lamps. When moving indoors, they are shifted to an HLWNet for a higher quality of service.

What is LiFi?

LiFi or Light Fidelity is a type of visible light communication (VLC) that uses light-emitting diodes or LEDs to transfer data. Since it uses visible light to transfer data, this technology is able to exploit a large part of the optical spectrum which is nearly 300THz. Integration of LiFi access points (APs) with the existing lighting infrastructure, which is the LED, serves the purpose of providing illumination as well as data transfer. The cell size for LiFi communication can be reduced further compared to mm-wave communication. This introduces the concept of LiFi attocell. This standard is currently being revised to add LiFi. LiFi on the other hand describes a complete wireless networking system. This includes bidirectional multi-user communication. LiFi relies on electromagnetic radiation for information transmission. So, many modulation schemes used for RF communication could be used for LiFi as well. Modulation schemes that could be used for LiFi could be categorized as 1) Single carrier modulation and 2) Multi-carrier. Single carrier modulation schemes include OnOff Keying(OOK), Pulse Position Modulation(PPM), Optical Spatial Modulation(OSM), and Carrier-less Amplitude Phase modulation(CAP). Multi-carrier modulation schemes include Direct Current Optical OFDM(DCO-OFDM), Asymmetrically Clipped Optical OFDM(ACO-OFDM), Reverse Polarity Optical OFDM (RPO-OFDM), etc.

LiFi is relatively advantageous than its RF counterpart:-

1. LiFi is a type of wireless communication that can be up to 100 times faster than WiFi.
2. Since LiFi uses light to transfer data, it can be used in areas where RF waves cannot be used like in hospitals and aircraft cabins.
3. And, finally it uses license-free optical spectrum.

Also, LiFi has a few limitations:-

1. Covers short ranges, like a few metres using a single AP.
2. It loses connectivity when there is an opaque object in its path.



Hence LiFi cannot be considered as a replacement but a complementary technology to WiFi. The application of LiFi mainly is for indoor scenarios.

When the fast data rates of LiFi and the wider coverage of WiFi are combined, a new hybrid network called Hybrid LiFi and WiFi Networks (HLWNets) was proposed. This type of hybrid network is proven to achieve better performance results compared to that of standalone LiFi and RF systems. Such networks need a network hypervisor such that flexible resource allocation and link management could be done. For indoor scenarios, a 2-dimensional (2D) grid-based cell deployment can be considered which provides a general form of coverage.

The Hybrid system model is designed such that there is an RF antenna and a LED light source at the transmitter. At the receiver, there is another RF antenna and a photodetector. Here both the links are used simultaneously such that the SNR as well as other parameters like throughput and BER are improved compared to a standalone LiFi system.

# STUDENT ZONE



## AMBIENT INTELLIGENCE

Anjali Nair

S1 EC A

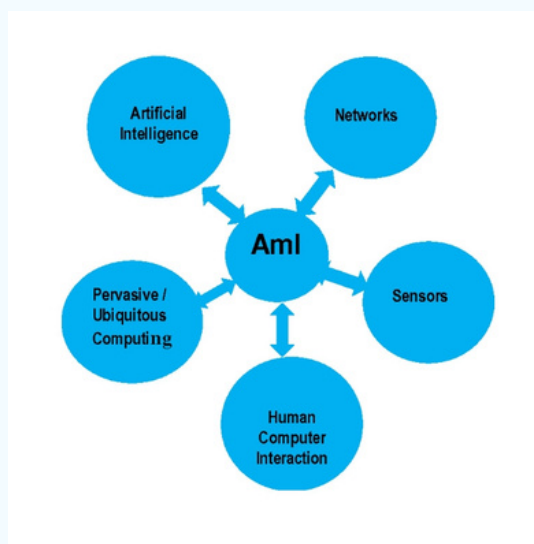
Intelligence refers to the ability to learn and apply knowledge in new situations. Artificial is something made by human beings and ambience is something that surrounds us. We also tend to consider ambient intelligence (Aml) to be something artificial; the phenomena in natural Aml are the subjects of biology and sociology. The scope of this subject is in human-centric technologies, which require a close alignment of both humans and artificial intelligence (AI) interacting with the environment. Many AI technologies generated by computers originate from the idea of emulating neurological functions and human intelligence

Ambient intelligence is the future of MIS implementation, services, and applications which require technology to be an integral part of human interaction. Properties such as usability, technical feasibility, positive socio-economic impacts, and trustworthiness make its application possible for various MIS applications.

### Benefits

1. Smart Home: The Aml specification may include the meaningful environment in the house, including the backyard and a portion of the front door as these areas also have sensors. Objects are plants, furniture, and so on.
2. Hospital room: where a patient is monitored for health and security reasons. Objects in the environment are furniture, medical equipment, specific elements of the room like a toilet and a window
3. Underground station: equipped with location sensors to track the location of each unit in real time. Based on the time needed to connect two locations with sensors, the system can also predict the speed of each unit. Examples of objects in this environment are tracks and stations. Actuators will be signals coordinating the flow of trains and messages that can be delivered to each unit in order to regulate their speed and the time they have to spend at a stop. Contexts of interest can be delays or stopped trains.
4. School: where students are monitored on balancing their learning experience. The objects within a classroom or playground are tables and other available elements. The sensors will identify who is using what scientific kit and that in turn will allow monitoring of how long students are involved with a particular experiment. Contexts of interest can be a student who has been with a single experimentation kit for too long or a student who has not engaged in active experimentation.

5. Fire Brigade: must act then the environment. Streets can be equipped with sensors to measure the passage of traffic within the areas through which the fire brigade truck might go through to reach the place where the emergency is located. Objects here will be streets and street junctions. Interactors will be cars. Actuators can be traffic lights as they can help speed the fire brigade through. A context will be a fire occurring at peak time with several alternative streets to be used. An interaction rule can be if all streets are busy, use traffic lights to hold traffic back from the vital passage to be used.
6. Production Line: Sensors can track the flow of items at critical bottlenecks in the system and the system can compare the current flow with a desired benchmark. Decision makers can then take decisions on how to proceed and how to react to the arrival of new materials and to upcoming demands. Different parts of the plant can be de/activated accordingly. Similarly, sensors can provide useful information on places where there has been a problem and the section has stopped production, requiring a deviation in flow. Objects here are transportation belts and elements being manufactured whilst actuators are the different mechanisms dis/allowing the flow of elements at particular places.
7. Public Surveillance: Sensors are enriched CCTV cameras on street or on transport, monitored by security guards. Integrators are law-abiding citizens and potential muggers. A context can be if a person is attacked, provide an alarm, issue a verbal warning in situ to detect the attacker, and activate a rescue from the nearest police station or security guard. Bidirectional voice channels can be used. Of course, Aml requires that the sensing, decision-making, and actuator are automated. In the future, this can be achieved with image and sound processing, the reasoning for the identification of an emergency, and text-to-speech warnings delivered to the offender.



## Disadvantages

- several major challenges are present in ambient intelligence for massive communication in mobile information systems. One big challenge is the limited performance of ambient intelligence, and so intelligent algorithms must be developed to reveal how many communications can be supported by ambient intelligence in MIS.



- Another challenge is assessing how ambient intelligence will impact conventional communication schemes, such as multiple-input and multiple-output (MIMO), orthogonal frequency-division multiplexing (OFDM), caching, physical-layer security, and edge computing. It is therefore essential to develop deep learning-based algorithms in this field.
- The next major disadvantage is the complicated resource management of ambient intelligence for MIS, where deep reinforcement learning-based schemes should be developed to fully exploit the system communication and computing resources



## Applications for future uses

### Education

The relationship between teachers and students has changed significantly as a result of the development of technology. This engagement no longer occurs face-to-face and may instead rely on communication tools, which are never effective replacements for our complex communication processes.

Face-to-face conversations between teachers and students have mostly been replaced by online forums and text-based debates, which drastically worsens communication.

### Robotics

The vision of artificial intelligence has always included robots. Each person would purportedly have a robotic companion shortly, most likely in humanoid form, who would serve as a multifaceted personal assistant and take care of all of our needs. The direction of research and technological development seems to be changing.

### Health

Currently, one of the sectors with the most advanced technology in healthcare. As a result, it is not surprising that this category includes a wide range of initiatives. The provision of healthcare services at home and the support of healthcare in hospitals are two significant trends to be aware of.

## Transportation

Transport is another industry where the adoption of ambient intelligence may have various advantages given that we spend a lot of our lives traveling back and forth.

Buses and other vehicles may be fitted with technology that can provide crucial insight into how the system is operating and identify potential adjustments by more effectively utilizing the system, which can enhance people's experiences

## Workplace

Accidents at work, including on construction sites, might be drastically reduced with the help of ambient intelligence. Failure to adhere to safety regulations is the root of many accidents.

Human monitors can't be on duty continuously. AMI, on the other hand, always has a bird's-eye view of the environment and the people in it. If a safety rule is broken, it can quickly notify management or the employee.

# ACHIEVEMENTS

## STAFF ACHIEVEMENTS

Dr. Bobby Mathews C

Attended a webinar on Stress & Time Management on 27/01/23 organized by the Tarush foundation.

Aswathy N

Obtained an appreciation for receiving IEEE Regional Exemplary Student Branch Award for three consecutive years.

## STUDENTS ACHIEVEMENTS

Student Batch	Name	Title of course attended	Conducted by	Date
2021-25	Afthab T S	Cyber Security and Ethical Hacking	Dyuthi 2022	11/2/2022
2021-25	Albin Paul	Weberoux	IEEE Student Branch	11/1/2022



# UPCOMING EVENTS



IEEE Kerala Section



## ACCESS '23

3<sup>rd</sup> International Conference on

ADVANCES IN COMPUTING, COMMUNICATION, EMBEDDED  
AND SECURE SYSTEMS

Organized by

Department of Electronics and Communication Engineering  
Adi Shankara Institute of Engineering and Technology, Kalady, Kerala, India

Technically sponsored by  
IEEE Kerala Section

Virtual Mode



### CALL FOR PAPERS

ACCESS '23 encourages full paper article submission in futuristic next generation technologies related to, but not limited to the topics listed. All accepted papers shall be submitted to IEEE for publication in IEEE Xplore.

#### Topics include:

Cyber Physical Systems and IoT  
Computer Science and Big data  
Artificial Intelligence  
Machine Learning  
Block Chain  
Data Analytics  
Computing (Cloud, Cluster, Grid, Soft, Edge, Fog, Quantum etc)  
Reconfigurable systems, MEMS/NEMS  
Networking Protocols and communication (mm Wave technologies, Cognitive Radio, Spectrum Management, WBAN, Multi Carrier, M2M communication, etc)  
Signal and Image Processing  
Data Security/Information Assurance

Publication: **IEEE Xplore**

Important dates:

Submission of full paper:  
**January 25, 2023**

Notification of acceptance:  
**March 01, 2023**

Registration due date:  
**April 01, 2023**

Camera-ready submission:  
**April 18, 2023**

Conference dates:  
**May 18 - 20, 2023**

Submit the full paper here:

[easychair.org/conferences/?conf=access23](https://easychair.org/conferences/?conf=access23)

Visit us at: [www.access23.in](http://www.access23.in)

Contact: **Dr. Bipin P R (+919656128850)**  
Email: [access22@adishankara.ac.in](mailto:access22@adishankara.ac.in)

# EDITORIAL BOARD



**Dr. AJAY KYMAR**

HEAD OF DEPARTMENT(HOD).  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING



**Ms ANJANA S**

ASSISTANT PROFESSOR  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING

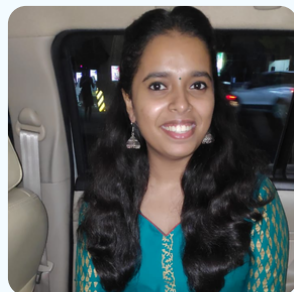


**Ms NEETHA K**

ASSISTANT PROFESSOR  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING



**Mr Samuel Sabu  
Thomas**  
S7 ECB



**Ms Reshmi R**  
S7 ECB



**Ms Titya  
Ramchandran**  
S5 ECB



**Ms Sreen Sabu**  
S5 ECB



**Ms Anit Sunil**  
S3 ECA



**Mr Jeffin Paul**  
S3 ECB