A.V.C COLLEGE OF ENGINEERING, MANNAMPANDAL, MAYILADUTHURAI

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Department of Electronics and Communication Engineering
(Accredited by NBA)

"LEMON NEWSLETTER"

Message from Head of the Department

I appreciate the students who have participated and won prizes in National and International level symposiums and conferences.

I wish students to strive hard for their success in University Exams and aim for the University ranks.

I presume from the faculties of ECE department for their active participation in Faculty development programmes and workshops.

Dr. CHITRAVALAVAN
HOD/ECE

Positive Quotes of All Times

❖ *You must be the change you wish to see in the world.*

❖ *Spread love everywhere you go*

❖ *The only thing we have to fear is fear itself.*

❖ *Darkness cannot drive out darkness: only light can do that.*

❖ *Do one thing every day that scares you.*

❖ *Well done is better than well said*

Faculty Corner:

Impact of Speech and Voice Recognition Technology in the Healthcare System

- **Dr.C.Jayasri, AP/ECE**

A software program and a hardware device that is capable of decoding a human voice is known as **Voice recognition technology** or **Voice search technology.** Voice search technology converts a spoken word into a command or text entry.

Voice search is not just limited to recognizing the spoken word, it includes identification of emotions in speech, assessment of language skills, and speaker identification. It can also be used to convert speech into text for use in applications such as search engines. Voice search technology enables computers to recognize human voices and learn what they mean.

Technology has been revolutionizing the way we interact with computers, allowing us to command computers with relative ease when used. A next-generation and exciting technology – Voice search, has the potential to assist in the healthcare field in a number of ways. For e.g., healthcare providers, nurses, and doctors can dictate their notes on the computers without having to take time out from patient care. Similarly, the **voice search** is now a widely used healthcare technology tool, providing an opportunity for patients to receive care from home.

Importance of Speech and Voice Recognition in the Healthcare Setting

The importance and the application of **voice-enabled virtual assistant systems, voice-activated systems,** and **voice-enabled devices** are growing in different sectors. It is one of the most influential emerging technology trends set to revolutionize the way users and providers interact with each other. Sectors such as banking, hospitality, e-commerce, automobile, and retails, among others are widely using these speech recognition devices in their system over the previous decade. Similarly, the healthcare industry is also adopting voice & speech recognition.

In speech recognition, the computer program identifies different words and converts them into a rather machine-readable format, which can be used immediately or later for a wide range of purposes. These Speech and Voice Recognition devices are easy to use with hands-free components. These devices help to get the work done efficiently and increase productivity. Worldwide, several healthcare institutions and healthcare service providers are currently using these systems in their day-to-day operations.

Benefits of Speech and Voice Recognition in the Healthcare Domain

➢ Increases the Productivity of the Healthcare Professionals
➢ Fewer Errors
➢ Improved Mobility
➢ Better Decision Making
➢ Voice Data Has Become Reusable

How Speech and Voice Recognition Technology Can be Implemented in the Healthcare

➢ The healthcare journey of a patient consists of several stages. The inquiry about the illness or symptoms is one of the first steps where the patient uses the voice search. Similarly, the patient's

interaction with the doctor for consultation is the next step.

➢ At this stage, the doctor and the patient can use Speech and Voice Recognition to exchange and store the information. Healthcare providers instead of typing their notes, reports, and other medical records, can use the speech-to-text options. The software can understand most of the medical terminology and can also integrate seamlessly with the EHR.

➢ The Speech and Voice Recognition system can be more productive for activities such as seeing patients and increasing the cash flow. Currently, several startups are using speech technology as a virtual scribe to conduct health checkups and data entry via voice through devices.

➢ Similarly, some AI-based systems are available that can translate the voices into a rich, detailed clinical description and can learn from previous records to make certain suggestions.

➢ The technology is in the initial stages of development; in the coming years, this software and the process will have a wide role in other healthcare segments as well, such as radiology, pathology, research treatment, nutrition information, emergency medicine, and others.

➢ Apart from patient-doctor interaction, Speech and Voice Recognition can be implemented in verticals such as health plan enrollment, handling customer queries, healthcare insurance, patient management, buying medications, and appointment scheduling.

Key Factors Driving the Speech and Voice Recognition Market

➢ Many healthcare professionals spend a large amount of time composing notes and reports and maintaining each patient's medical records because documenting every minute detail is critical in healthcare. However, these responsibilities divert time away from more productive tasks like treating and connecting with patients. As a result, doctors and physicians prefer natural language processing (NLP) algorithm-based voice recognition software solutions.

➢ Voice recognition technology is generally utilized in the healthcare sector to report health exams, data entry, and when the doctor or attendant/nurse is unavailable. Such voice recognition software solutions allow healthcare personnel to enter notes into the electronic health record (EHR) system or their PCs without interrupting patient care and remain productive throughout the day.

➢ This eliminates the need for healthcare providers to work late to complete paperwork, allowing them to see more patients during the day. The easy-to-use and hands-free capabilities of an automated speech recognition system in medical applications allow clinicians to complete their tasks more efficiently, fueling the expansion of the speech and voice recognition market.

Student Corner:

Underwater Robots
- *Harini.G, III ECE*

Marine scientists would like to use underwater robot systems to improve their understanding of the underwater world. However, current underwater robot systems are limited to open waters where few obstacles exist and there is little need for real-time feedback and control.

One reason for this limitation is that cluttered and dynamic environments prevent the use of a tether between the underwater robot and the user. Reefs, rocks, and other items will quickly tangle the tether, hindering and possibly damaging the vehicle or the environment.

Our goal is to develop a system that allows real-time, high-bandwidth communication with an underwater robot system to enable operation in cluttered and dynamic waters such as in coral reef environments.

On land, radio communication usually allows systems to operate wirelessly. Unfortunately, radio does not work underwater because water absorbs most electromagnetic radiation. Acoustic modems are the most commonly used underwater communication system with ranges of several km.

Acoustic communications, however, is extremely slow (only hundreds of bits per second) with high latency due to reflections and the relatively slow speed of sound underwater.

Thus, it is not possible to dynamically control underwater vehicles remotely using acoustic communication in real-time. Instead of using a tether or an acoustic modem, we developed a wireless underwater optical modem. In this paper, we present the design and experimental results of a system to control our underwater robot (Autonomous Modular Optical Underwater Robot or AMOUR) in real-time using our optical modem link.

Our optical modem achieves high bandwidth (megabits per second) and low latency while maintaining good coverage of the area of operation of the robot.

Figure 1 shows a picture of AMOUR and our optical communications system. Our optical modem allows a land-based user to remotely operate the robot using our human input device (HID) in real-time. The system achieves real-time control due to the high speed and low latency optical link. We analyze the performance of our system in a pool. In nearly all positions and orientations over a 100 square meter area, our robot successfully receives optical commands from a single stationary transmitter.
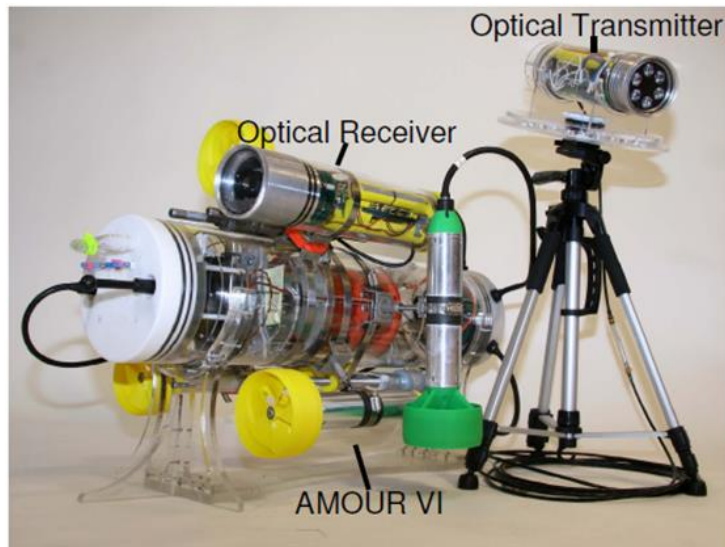
Figure. 1-The optical transmitter mounted to a tripod (right) together with the optical receiver mounted to AMOUR.

The optical link will also enable reception of high fidelity images and videos from the robots. Already, the optical modem has sufficient bandwidth available to allow the real-time operation of tens of robots in parallel with spare bandwidth for relay of images or video. The current system is uni-directional; however, we can easily add a transmitter on the robot to enable a bi-directional link allowing, for instance, the transmission of live video from the robot.

System Design And Hardware

Our system allows control of an underwater robot via an optical link. The system consists of three high level components:

(1) The base station, which provides an interface for the user to control the robot,

(2) The optical modem, which forms the wireless communication link between the base station and the robot, and

(3) Our underwater robot, AMOUR, which is capable of motions in 6 degrees of freedom.

The Base Station is further divided into 2 parts:

(1) A laptop computer running a specially designed user interface (UI)

(2) And a human input device (HID) which allows the user to directly control the robots attitude.

Figure 2 presents an overview of the system.
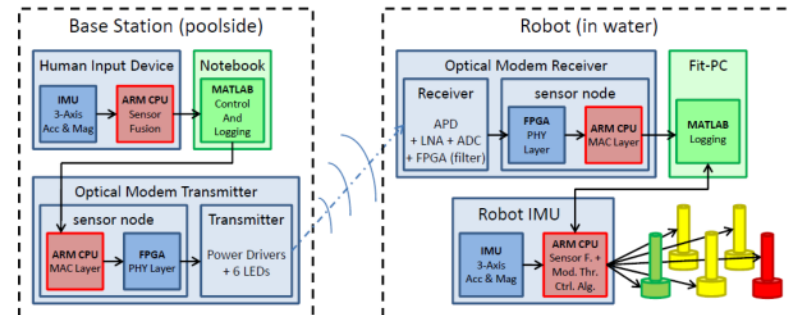
Figure .2 - Communication System between The User and Robot

System overview showing the data path through all modules. The optional HID forwards data to a notebook computer. The computer runs a user interface for desired robot attitude, depth, and speed control and forwards this data

to the optical modem transmitter. The transmitter encodes the signal using DPIM and transmits it optically.

The optical modem receiver decodes the received pulse train into the desired robot state and forwards this information to the Fit-PC located inside the robot. The Fit-PC forwards this information to the robots IMU.

It also logs both the data from the optical modem as well as the robots current position which it receives from the IMU. Finally, the IMU uses the Modular Thrusters Control Algorithm to compute thrusters updates.

Objective Type questions on Wireless Communication

- _**Gowrisri .R, IV ECE**_

1. What is Mobile communication?
   a) Allows to communicate from different locations without the use of physical medium
   b) Allows to communicate from different locations with the use of physical medium
   c) Allows to communicate from same locations without the use of physical medium
   d) Allows to communicate from same locations with the use of physical medium
2. What is wireless communication?
   a) Sending data from one location to with the use of physical medium
   b) Sending data from one location to another without the use of physical medium
   c) Sending data from one location to another without the use of virtual medium
   d) None of the mentioned

3. Which of the following is a type of wireless communication?
   a) LAN
   b) WAN
   c) PAN
   d) All of the mentioned
4. Which of the following is not an example of wireless communication?
   a) Wi-Fi
   b) Mobiles
   c) Landline
   d) Wireless Computer Parts
5. Why wireless communication is used?
   a) It enables billions of people to connect to the Internet
   b) Lowers the cost of network infrastructure
   c) Makes services more inexpensive
   d) All of the mentioned
6. . _____ is a transmission method used in MIMO wireless communications to transmit encoded data signals independently.
   a) MU-MIMO
   b) STTD
   c) SM
   d) Collaborative Uplink MIMO
7. Space diversity s also known as _____
   a) Frequency diversity
   b) Antenna diversity
   c) Polarization diversity
   d) Time diversity
8. MIMO was initially developed in the year
   _____
   a) 1970

b) 1990
c) 1960
d) 1985

9. MIMO is a smart antenna technology.
   a) False
   b) True

10. Which type of transmission technique is employed by paging system?
    a) Multicasting
    b) Unicasting
    c) Hybrid
    d) Simulcasting

Answers:

1. a) Allows to communicate from different locations without the use of physical medium

2. b) Sending data from one location to another without the use of physical medium

3. d) All of the mentioned

4. c) Landline

5. d) All of the mentioned

6. c) SM

7.b) Antenna diversity

8.b) 1990

9.b) True

10.d) Simulcasting

EINSTEIN PUZZLES
. . . .

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- *Mahalakshmi. A, IV ECE*

Five friends have their gardens next to one another, where they grow three kinds of crops: fruits (apple, pear, nut, cherry), vegetables (carrot, parsley, gourd, onion) and flowers (aster, rose, tulip, lily).

1. They grow 12 different varieties.
2. Everybody grows exactly 4 different varieties
3. Each variety is at least in one garden.
4. Only one variety is in 4 gardens.
5. Only in one garden are all 3 kinds of crops.
6. Only in one garden are all 4 varieties of one kind of crops.
7. Pear is only in the two border gardens.
8. Paul's garden is in the middle with no lily.
9. Aster grower doesn't grow vegetables.
10. Rose growers don't grow parsley.
11. Nuts grower has also gourd and parsley.
12. In the first garden are apples and cherries.
13. Only in two gardens are cherries.
14. Sam has onions and cherries.
15. Luke grows exactly two kinds of fruit.
16. Tulip is only in two gardens.
17. Apple is in a single garden.
18. Only in one garden next to Zick's is parsley.
19. Sam's garden is not on the border.
20. Hank grows neither vegetables nor asters.
21. Paul has exactly three kinds of vegetable.

Who has which garden and what is grown where?

Solution:

Hank:	pear	apple cherry	rose
Sam:	cherry	onion rose	tulip
Paul:	carrot	gourd onion	rose

Zick: aster   rose   tulip   lily

Luke: pear   nut   gourd   parsley

NUMBER PUZZLES
****

Find a 10-digit number where the first digit is how many zeros in the number, the second digit is how many 1s in the number etc. until the tenth digit which is how many 9s in the number.

Answer:
6210001000

CARD PUZZLES
****

A blind-folded man is handed a deck of 52 cards and told that exactly 10 of these cards are facing up.

He is asked to divide those cards into two piles, each with the same number of cards facing up.

He can't peek, get help, or damage the cards, but may use any strategy that occurs to him to do so.

How can he do it?

Solution :

The blind-folded man divides the cards into two piles with 10 and 42 cards each.

He then flips all cards in the smaller pile.

Done!

Editor's Desk:

Benefits of Healthy Eating for Adults

➢ May help you live longer.

➢ Keeps skin, teeth, and eyes healthy.

➢ Supports muscles.

➢ Boosts immunity.

➢ Strengthens bones.

➢ Lowers risk of heart disease, type 2 diabetes, and some cancers.

➢ Supports healthy pregnancies and breastfeeding.

➢ Helps the digestive system function.

Send your suggestions to:

Dr.K.R.Vinothini, AP/ECE –Editor / *LEMON NEWSLETTER*
lemonece2013@gmail.com

Student Editors :

1. M.Yogeshwaran, IV ECE
2. S.Ashika, IV ECE
3. B.Arooran, III ECE
4. S.Abirami, III ECE

Department Vision

To create globally competent engineers in Electronics and Communication Engineering to meet the industrial progress for betterment of the society

Department Mission

➢ To create an academic ambience for quality education in the field of Electronics and Communication Engineering

➢ To make the best use of modern tools and software for teaching and research activities

➢ To promote industry-institution interaction for skill-based learning of students from rural society

➢ To inculcate moral and ethical values with a sense of professionalism.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO's):

1. To provide the students with a strong foundation in the required sciences in order to pursue studies in Electronics and Communication Engineering.

2. To gain adequate knowledge to become good professional in electronic and communication engineering associated industries, higher education and research.

3. To develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolve

4. To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

5. To inculcate in the students a professional and ethical attitude and an ability to visualize the engineering issues in a broader social context.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** 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.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **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.

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

8. **Ethics:** Apply ethical principles and commit to professional

ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

➢ PSO1: Design, develop and analyze electronic systems through application of relevant electronics, mathematics and engineering principles

➢ PSO2: Design, develop and analyze communication systems through application of fundamentals from communication principles, signal processing, and RF System Design & Electromagnetics.

➢ PSO3: Adapt to emerging electronics and communication technologies and develop innovative solutions for existing and newer problems