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

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Department of Electronics and Communication Engineering

"LEMON NEWSLETTER"

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Message from Head of the Department

I expect the students to participate in National and International level symposiums and conferences.

I look forward for the students to work hard for their success in the upcoming semesters.

I expect from the faculties of ECE department for their sincere efforts to be taken for the growth of the students.

Dr.CHITRAVALAVAN

HOD/ECE

"GREAT SAYINGS"

"If you cannot do great things, do small things in a great way."

– Napoleon Hill

"You may encounter defeats, but you must not be defeated."

- Maya Angelou

"No need to hurry, no need to sparkle, no need to be anybody but oneself."

- Virginia Woolf

Faculty Corner:

➢ ***Dr.K.R.Vinothini,AP/ECE***

FUTURE CARS

Auto Trader has worked alongside a futurologist to reveal its predictions for what the 2050 car will look like, predicting the technological developments and social functions of cars in the future.

Auto Trader's Cars of the Future design and full report predicts that by 2050 cars will be fully autonomous and electric, with advanced customisation technologies.

Key points:

- The 2050 car is a driverless vehicle in the shape of a smooth pod that can change colour with the tap of an app
- By 2050, cars will be fully autonomous and electric, with advanced customisation technologies
- Auto Trader's Car of the Future design and full report, including a timeline of the evolution of the car can be accessed here

The UK's largest digital marketplace for new and used cars, Auto Trader, has released concept designs for what it forecasts vehicles will look like 30 years from now

Auto Trader's 2050 concept car is a fully electric and autonomous vehicle which provides passengers with a spacious interior that's geared up for leisure activities, as well as offering a range of technologies that allow passengers to customise their 'driving' experience.

Featuring 'digital paint', the car allows passengers to change the colour and style of the car from the tap of an app, depending on their mood, with advances in technology meaning this feature could be widely available as early as the year 2040.

Catering to the 10% of drivers who want cars to be fully voice operated in future, the car welcomes passengers with a friendly AI that helps them set their preferred driving speed and style, whether out for a leisurely Sunday drive or dashing home for dinner.

The 2050 car is fitted with windows that extend right over the roof in one large bubble, offering more head room to allow passengers to freely move around during transit.

It also features 360 degree panoramic views for those wanting to sit back, relax and enjoy an autonomous ride, plus black-out functionality on the windows, which can be activated with a quick tap.

Auto Trader's Rory Reid comments: "The government's recent announcement on bringing forward the ban on sales of petrol and diesel cars to 2035 is already influencing.

"The concept of digital paint and the implications this may have for those looking to buy new cars is in keeping with consumer trends and our growing desire for personalisation. People are increasingly using technology to express themselves and this tech would remove the need to wait for a colour of car to come into stock or fork out extra to have a car spray painted a certain colour."

➢

Student Corner:

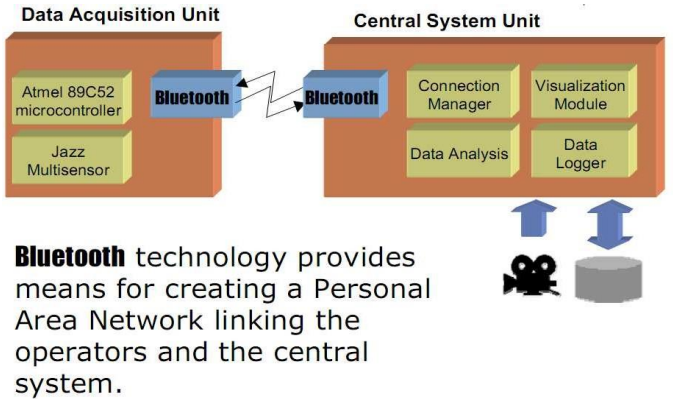
BLUE EYES TECHNOLOGY

- *M.Dharani, IV ECE*

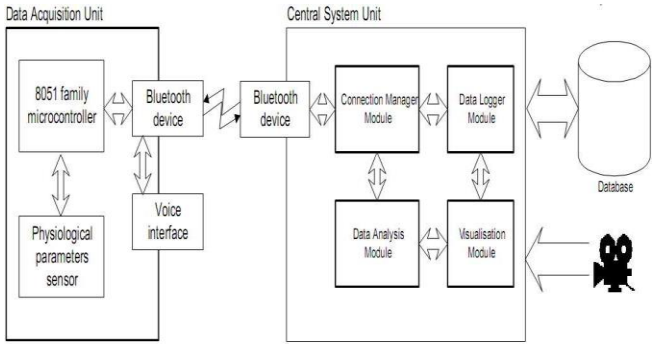
Blue eyes system monitors the status of the operator's visual attention through measurement of saccadic activity. The system checks parameters like heart beat rate and blood oxygenation against abnormal and triggers user defined alarms.

Blue Eyes system consists of a mobile measuring device and a central analytical system. The mobile device is integrated with Bluetooth module providing wireless interface between sensors worn by the operator and the central unit. ID cards assigned to each of the operators and adequate user profiles on the central unit side provide necessary data personalization so the system consists of

- Mobile measuring device (DAU)
- Central System Unit (CSU)



The overall System diagram is as follows:-



THE HARDWARE

Data Acquisition Unit

Data Acquisition Unit is a mobile part of the Blue eyes system. Its main task is to fetch the physiological data from

the sensor and to send it to the central system to be processed. To accomplish the task the device must manage wireless Bluetooth connections (connection establishment, authentication and termination). Personal ID cards and PIN codes provide operator's authorization. Communication with the operator is carried on using a simple 5-key keyboard, a small LCD display and a beeper. When an exceptional situation is detected the device uses them to notify the operator. Voice data is transferred using a small headset, interfaced to the DAU with standard mini-jack plugs.

The Data Acquisition Unit comprises several hardware

- modules Atmel 89C52 microcontroller -
- system core Bluetooth module (based on
- ROK101008) HD44780 - small LCD display
- 24C16 - I2C EEPROM (on a removable ID card)

- MC145483 – 13bit PCM codec

Central System Unit

Central System Unit hardware is the second peer of the wireless connection. The box contains a Bluetooth module (based on ROK101008) and a PCM codec for voice data transmission. The module is interfaced to a PC using a parallel, serial and USB cable. The audio data is accessible through standard mini-jack sockets To program operator's personal ID cards we developed a simple programming device. The programmer is interfaced to a PC using serial and PS/2 (power source) ports. Inside, there is Atmel 89C2051 microcontroller, which handles UART transmission and I2C EEPROM (ID card) programming.

THE SOFTWARE:

Blue Eyes software's main task is to look after working operators' physiological condition. To assure instant reaction on the operators' condition change the software performs real time buffering of the incoming data, real-time physiological data analysis and alarm triggering.

The Blue Eyes software comprises several functional modules System core facilitates the transfers flow between other system modules (e.g. transfers raw data from the Connection Manager to data analyzers, processed data from the data analyzers to GUI controls, other data analyzers, data logger etc.). The System Core fundamental are single-producer-multi-consumer thread safe queues. Any number of consumers can register to receive the data supplied by a producer. Every single

consumer can register at any number of producers, receiving therefore different types of data. Naturally, every consumer may be a producer for other consumers. This approach enables high system scalability – new data processing modules (i.e. filters, data analyzers and loggers) can be easily added by simply registering as a costumer. **Connection Manager** is responsible for managing the wireless communication between the mobile Data Acquisition Units and the central system. The Connection Manager handles:

- communication with the CSU hardware
- searching for new devices in the covered range
- establishing Bluetooth connections
- connection authentication
- incoming data buffering
- sending alerts

Data Analysis module performs the analysis of the raw sensor data in order to obtain information about the operator's physiological condition. The separately running Data Analysis module supervises each of the working operators.

The module consists of a number of smaller analyzers extracting different types of information. Each of the analyzers registers at the appropriate Operator Manager or another analyzer as a data consumer and, acting as a producer, provides the results of the analysis. The most important analyzers are:

- Saccade detector - monitors eye movements in order to determine the level of operator's visual attention
- Pulse rate analyzer - uses blood oxygenation signal to compute operator's pulse rate
- Custom analyzers - recognize other behaviors than those which are built-in the system. The new modules are created using C4.5 decision tree induction algorithm

Visualization module provides a user interface for the supervisors. It enables them to watch each of the working operator's physiological condition along with a preview of selected video source and related sound stream. All the incoming alarm messages are instantly signaled to the supervisor. The Visualization module can be set in an off-line mode, where all the data is fetched from the database. Watching all the recorded physiological parameters, alarms, video and audio data the

supervisor is able to reconstruct the course of the selected operator's duty. The physiological data is presented using a set of custom-built GUI controls.

Questions on Electronic Devices

- *Lavanya P, III ECE*

1. Which of the following is not an electronic device?
   a) A mobile
   b) A computer
   c) A magnifying glass
   d) A keyboard

2. Which of the following is not a physical component of an electronic circuit?
   a) Capacitor
   b) Inductor
   c) Diode
   d) Temperature

3. Which of the following is not a property of semiconductors used in electronic devices?
   a) They excite electrons
   b) They don't emit light
   c) They have high thermal conductivity
   d) They have variable electrical conductivity

4. Which of the following is the correct relationship between temperature (T) and mobility (u) of electrons in electronic circuits?
   a) $u \propto T^{-3/2}$
   b) $u \propto T^{-1/2}$
   c) $u \propto T$
   d) $u \propto T^{-1}$

5. What is the effect of temperature on the recombination rate of electrons in electronic circuits?
   a) Recombination rate increases with increase in the temperature
   b) Recombination rate decreases with increase in the temperature
   c) Recombination rate is independent of temperature
   c) Recombination of electrons doesn't occur in semiconductors

6. Which of the following is correct about semiconductors in electronic devices?
   a) Elemental semiconductors have direct band gap
   b) Compound semiconductors have indirect band gap
   c) Extrinsic semiconductors are injected with impurities
   d) Doping is done in Intrinsic semiconductors

7. Which of the following technique can't be used for generating electron-hole pairs in electronic devices?
   a) Thermal excitation
   b) Impact ionization
   c) Photo excitation
   d) Impurity injection

8. Which of the following is not correct about semiconductors in electronic devices?
   a) Electrons are present below Fermi level in a semiconductor
   b) Degenerated semiconductors behave like a conductor
   c) Fermi level is independent of temperature and doping
   d) Pentavalent atoms are used in an n-type extrinsic semiconductor

9. Which of the following is wrong about solar cell electronic devices?
   a) Solar cell responsivity is directly proportional to the wavelength of light
   b) It produces dark current
   c) It is a photovoltaic cell
   d) No external voltage is applied

10. What type of semiconductor is used in LED electronic circuits?
    a) Intrinsic semiconductor
    b) Compound semiconductor
    c) Degenerated semiconductor
    d) Compensated semiconductor

Answers:

1. c) A magnifying glass
2. d) Temperature
3. b) They don't emit light
4. a) $u \propto T^{-3/2}$
5. b) Recombination rate decreases with increase in the temperature
6. c) Extrinsic semiconductors are injected with impurities
7. d) Impurity injection
8. c) Fermi level is independent of temperature and doping
9. b) It produces dark current
10. b) Compound semiconductor

LOGIC PUZZLES

- ***B.Abimanyu,III ECE***

1. **Trial by motorbike :** There are 50 bikes, each with a tank that holds enough gas to go 100 km. Using these 50 bikes, what is the maximum distance that you can go?

   Answer: *350 km*

2. **To break a bulb :** You have two light bulbs in a 100-story building. You want to find out what floor the bulb will break on, using the least number of drops.

   Answer: *16*

3. **Wasting water** : If you had an infinite supply of water and a 5-liter and 3-liter bucket, how would you measure

exactly 4 liters? The buckets do not have any intermediate markings.

Answer : *A lot of wasted water*

4. **Tournament time** : If you had 5,623 participants in a tournament, how many games would need to be played to determine the winner?

   Answer: *1*

5. **Socks, socks everywhere!:** There are 20 different socks, of two types, in a drawer in a completely dark room. What is the minimum number of socks you should grab to ensure you have a matching pair?

   Answer: 11

Editors Desk

Nutrition tips will help a person make healthy food choices.

- Include protein with every meal. Including some protein with every meal can help balance blood sugar.
- Eat oily fish.
- Eat whole grains
- Eat a rainbow.
- Eat your greens.
- Include healthful fats.
- Use extra virgin olive oil.
- Eat nuts.

Send your suggestions to:

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Vision of the Institute

To blossom into a cynosure of technological innovations

Mission of the Institute

To participate in the noble cause of nation building by offering professional education, research and training in engineering and technology especially to the rural based poor Students

Department Vision

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

Department Mission

1. To create an academic ambience for quality education in the field of Electronics and Communication Engineering
2. To make the best use of modern tools and software for teaching and research activities
3. To promote industry-institution interaction for skill-based learning of students from rural society
4. To inculcate moral and ethical values with a sense of professionalism.

PROGRAMME EDUCATIONAL OBJECTIVES:

PEO1: To enable graduates to pursue research, or have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs.

PEO2: To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.

PEO3: 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.

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)

1. To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering.
2. To apply design principles and best practices for developing quality products for scientific and business applications.
3. To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.