

# 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 look forward from the faculties of ECE department to involve and participate themselves in conducting sponsored Faculty development programme and workshops.

I wish the faculty members and students to be safe during this tough situation and be safe and follow the instructions to overcome the pandemic situations.

I wish the students to work hard for the University Exams and aim for the University ranks.

**Dr.S.SIVANESSKUMAR**  
**HOD/ECE**

### *Thinking Positive*

*"You're braver than you believe, and stronger than you seem, and smarter than you think."*

*"It always seems impossible until it is done."*

*"In every day, there are 1,440 minutes. That means we have 1,440 daily opportunities to make a positive impact."*

## Faculty Corner:

### RASPBERRY PI

- Mrs.R.Ramya, AP/ECE

Raspberry Pi, developed by Raspberry Pi Foundation in association with Broadcom, is a series of small single-board computers and perhaps the most inspiring computer available today.

From the moment you see the shiny green circuit board of Raspberry Pi, it invites you to tinker with it, play with it, start programming, and create your own software with it. Earlier, the Raspberry Pi was used to teach basic computer science in schools but later, because of its low cost and open design, the model became far more popular than anticipated.

It is widely used to make gaming devices, fitness gadgets, weather stations, and much more. But apart from that, it is used by thousands of people of all ages who want to take their first step in computer science.

It is one of the best-selling British computers and most of the boards are made in the Sony factory in Pencoed, Wales.

#### Generations and Models

In 2012, the company launched the Raspberry Pi and the current generations of regular Raspberry Pi boards are Zero, 1, 2, 3, and 4.

Generation 1 Raspberry Pi had the following four options –

Model A

Model A +

Model B

Model B +

Among these models, the Raspberry Pi B models are the original credit-card sized format.

On the other hand, the Raspberry Pi A models have a smaller and more compact footprint and hence, these models have the reduced connectivity options.

Raspberry Pi Zero models, which come with or without GPIO (general-purpose input output) headers installed, are the most compact of all the Raspberry Pi boards types.

Raspberry Pi Version	Release Date
Raspberry Pi 4 Model B	2019-2020
Raspberry Pi 3 Model B+	2018
Raspberry Pi 3 Model B	2016
Raspberry Pi 3 Model A+	2018
Raspberry Pi Zero Wireless with Headers	2017
Raspberry Pi Zero Wireless	2016
Raspberry Pi Zero	2015
Raspberry Pi 2 Model B	2015
Raspberry Pi 1 Model B +	2014
Raspberry Pi 1 Model B	2012
Raspberry Pi 1 Model A+	2014
Raspberry Pi 1 Model A	2013

### External Hard Drive

If you want to share your collection of music and movies, you need to use an external hard drive with your Raspberry Pi model. You can connect the same by using a powered USB cable.

### Raspberry Pi Camera Module

The Raspberry Pi camera module originated at Raspberry Pi foundation. It is an 8MP (megapixel) fixed focus camera that can be used to shoot high-definition video and take still photos. For wildlife photography at night, it provides another version without an infrared filter.

### Speakers

The Raspberry Pi has a standard audio out socket. This socket is compatible with headphones and speakers that use a 3.5mm audio jack. We can plug headphones directly to it.

### Power supply

For power supply, it uses a Micro USB connector. Hence theoretically, it is compatible with a mobile phone and tablet charger.

### Cables

Following are some of the cables, which you need for the connections to the Raspberry Pi computer –

- HDMI cable
- HDMI-to-DVI adapter, if you are using a Digital Visual Interface (DVI) monitor.
- RCA cable, if you want to connect to an older television.
- Audio cable
- Ethernet cable

Software developer Eben Upton and Software Engineers Pete Lomas and David Braden formed the Raspberry Pi foundation in 2006. The main aim of this foundation was to devise a computer to inspire children. Hence, in order to reduce the cost, the early

prototypes of the Raspberry Pi were based on the 8-bit Atmel ATmega microcontroller.

On February 29th, 2012, the team started taking the orders for Model B and in the same year, they started its production run which consisted of around 10,000 units. These models were manufactured by the founders in China and Taiwan.

On February 4th, 2013, they started taking the orders for lower cost Model A. Similarly, on November 10th, 2014, the team launched for even more low-cost Model A+. The cheapest Raspberry Pi Zero was launched on November 26th, 2015.

The name Raspberry Pi was chosen with “Raspberry” as an ode to tradition of naming early computer companies after fruit. Here, "Pi" is for Python Programming Language.

### Uses

Like a desktop computer, you can do almost anything with the Raspberry Pi. You can start and manage programs with its graphical windows desktop. It also has the shell for accepting text commands.

The Raspberry Pi computer is used for the following –

- Playing games
- Browsing the internet
- Word processing
- Spreadsheets
- Editing photos
- Paying bills online
- Managing your accounts.

For power supply, it uses a Micro USB connector. Hence theoretically, it is compatible with a mobile phone and tablet charger.

### Student Corner:

### 3D Television

- *T.Gayathiri, IV ECE*

Three-dimensional TV is expected to be the next revolution in the TV history. They implemented a 3D TV prototype system with real-time acquisition transmission, & 3D display of dynamic scenes. They developed a distributed scalable architecture to manage the high computation & bandwidth demands. 3D display shows high-resolution stereoscopic color images for multiple viewpoints without special glasses. This is first real time end-to-end 3D TV system with enough views & resolution to provide a truly immersive 3D experience. Japan plans to make this futuristic television a commercial reality by 2020 as part of abroad national project that will bring together researchers from the government, technology companies and academia. The targeted "virtual reality" television would allow people to view high definition images in 3D from any angle, in addition to being able to touch and smell the objects being projected upwards from a screen to the floor.

The evolution of visual media such as cinema and television is one of the major hallmarks of our modern civilization. In many ways, these visual media now define our modern life style. Many of us are curious: what is our life style going to be in a few years? What kind of films and television are we going to see? Although cinema and television both evolved over decades, there were stages, which, in fact, were once seen as revolutions:

- 1) at first, films were silent, then sound was added;
- 2) cinema and television were initially black-and-white, then color was introduced;
- 3) computer imaging and digital special effects have been the latest major novelty.

### **BASICS OF 3D TV**

Human gains three-dimensional information from variety of cues. Two of the most important ones are binocular parallax & motion parallax.

#### **A. Binocular Parallax**

It means for any point you fixate the images on the two eyes must be slightly different. But the two different image so allow us to perceive a stable visual world. Binocular parallax defers to the ability of the eyes to see a solid object and a continuous surface behind that object even though the eyes see two different views.

#### **B. Motion Parallax**

It means information at the retina caused by relative movement of objects as the observer moves to the side (or his head moves sideways). Motion parallax varies depending on the distance of the observer from objects. The observer's movement also causes occlusion (covering of one object by another), and as movement changes so too does occlusion. This can give a powerful cue to the distance of objects from the observer.

#### **C. Depth perception**

It is the visual ability to perceive the world in three dimensions. It is a trait common to many higher animals. Depth perception allows the beholder to accurately gauge the distance to an object. The small distance between our eyes gives us stereoscopic depth perception. The brain combines the two slightly different images into one 3D image.

It works most effectively for distances up to 18 feet. For objects at a greater distance, our brain uses relative size and motion. As shown in the figure, each eye captures its own view and the two separate images are sent on to the brain for processing. When the two images arrive simultaneously in the back of the brain, they are united

into one picture. The mind combines the two images by matching up the similarities and adding in the small differences. The small differences between the two images add up to a big difference in the final picture ! The combined image is more than the sum of its parts. It is a three-dimensional stereo picture.

### ARCHITECTURE OF 3D TV

The whole system consists mainly three blocks:

- 1 Acquisition
  2. Transmission
  3. Display Unit
- A. Acquisition

The acquisition stage consists of an array of hardware-synchronized cameras. Small clusters of cameras are connected to the producer PCs. The producers capture live, uncompressed video streams & encode them using standard MPEG coding. The compressed video then broadcast on separate channels over a transmission network, which could be digital cable, satellite TV or the Internet. Generally they are using 16 Basler A101fc color cameras with 1300X1030, 8 bits per pixel CCD sensors.

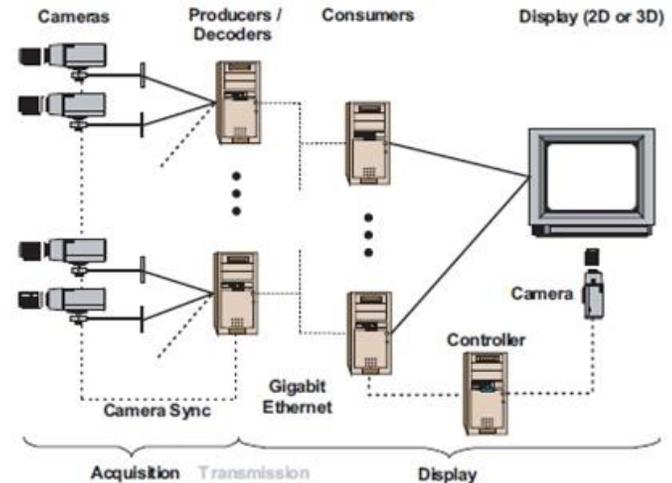
- 1) CCD Image Sensors: Charge coupled devices are electronic devices that are capable of transforming a light pattern (image) into an electric charge pattern (an electronic image).
- 2) MPEG-2 Encoding: MPEG-2 is an extension of the MPEG-1 international standard for digital compression of audio and video signals. MPEG-2 is directed at broadcast formats at higher data rates; it provides extra algorithmic 'tools' for efficiently coding interlaced video, supports a wide range of bit rates and provides for multichannel surround sound coding. MPEG- 2 aims to be a generic video coding system supporting a diverse range of applications. They have built a PCI card with custom programmable logic device

(CPLD) that generates the synchronization signal for all the cameras. So, what is PCI card?

### 3) PCI Card:

There's one element the bus. Essentially, a bus is a channel or path between the components in a computer. We will concentrate on the bus known as the Peripheral Component Interconnect (PCI). We'll talk about what PCI is, how it operates and how it is used, and we'll look into the future of bus technology.

All 16 cameras are individually connected to the card, which is plugged into the one of the producer PCs. Although it is possible to use software synchronization, they consider precise hardware synchronization essential for dynamic scenes. Note that the price of the acquisition cameras can be high, since they will be mostly used in TV studios. They arranged the 16 cameras in regularly spaced linear array



### 3D DISPLAY

This is a brief explanation that we hope sorts out some of the confusion about the many 3D display options that are available today. We'll tell you how they work, and what the relative tradeoffs of each technique are. Those of you that are just interested in comparing different Liquid Crystal Shutter glasses techniques can skip to the section at the end.

They use 16 NEC LT-170 projectors with 1024'768 native output resolution. This is less than the resolution of acquired & transmitted video, which has 1300'1030 pixels. However, HDTV projectors are much more expensive than commodity projectors. Commodity projector is a compact form factor. Out of eight consumer PCs one is dedicated as the controller. The consumers are identical to the producers except for a dual-output graphics card that is connected to two projectors. The graphic card is used only as an output device. For real-projection system as shown in the figure, two lenticular sheets are mounted back-to-back with optical diffuser material in the center. The front projection system uses only one lenticular sheet with a retro reflective front projection screen material from flexible fabric mounted on the back. Photographs show the rear and front projection.

### **Questions on Image Processing**

**- B.Brundha,IV ECE**

1. What is Digital Image Processing?
  - a) It's an application that alters digital videos
  - b) It's a software that allows altering digital pictures
  - c) It's a system that manipulates digital medias
  - d) It's a machine that allows altering digital images
2. Which of the following process helps in Image enhancement?
  - a) Digital Image Processing
  - b) Analog Image Processing
  - c) Both a and b
  - d) None of the above
3. Among the following, functions that can be performed by digital image processing is?
  - a) Fast image storage and retrieval
  - b) Controlled viewing
  - c) Image reformatting
  - d) All of the above
4. Which of the following is an example of Digital Image Processing?
  - a) Computer Graphics
  - b) Pixels
  - c) Camera Mechanism
  - d) All of the mentioned
5. What are the categories of digital image processing?
  - a) Image Enhancement
  - b) Image Classification and Analysis
  - c) Image Transformation
  - d) All of the mentioned
6. How does picture formation in the eye vary from image formation in a camera?
  - a) Fixed focal length
  - b) Varying distance between lens and imaging plane
  - c) No difference
  - d) Variable focal length
7. What are the names of the various colour image processing categories?
  - a) Pseudo-color and Multi-color processing
  - b) Half-color and pseudo-color processing
  - c) Full-color and pseudo-color processing
  - d) Half-color and full-color processing

8. Which characteristics are taken together in chromaticity?
  - a) Hue and Saturation
  - b) Hue and Brightness
  - c) Saturation, Hue, and Brightness
  - d) Saturation and Brightness
9. Which of the following statement describe the term pixel depth?
  - a) It is the number of units used to represent each pixel in RGB space
  - b) It is the number of mm used to represent each pixel in RGB space
  - c) It is the number of bytes used to represent each pixel in RGB space
  - d) It is the number of bits used to represent each pixel in RGB space
10. The aliasing effect on an image can be reduced using which of the following methods?
  - a) By reducing the high-frequency components of image by clarifying the image
  - b) By increasing the high-frequency components of image by clarifying the image
  - c) By increasing the high-frequency components of image by blurring the image
  - d) By reducing the high-frequency components of image by blurring the image

Answers .:

1. b) It's a software that allows altering digital pictures
2. c) Both a and b
3. d) All of the above
4. d) All of the mentioned
5. d) All of the mentioned

6. d) Variable focal length
7. c) Full-color and pseudo-color processing
8. a) Hue and Saturation
9. d) It is the number of bits used to represent each pixel in RGB space
10. d) By reducing the high-frequency components of image by blurring the image

### **HARD LOGIC PUZZLES**

*- Ragavi.R ,III ECE*

**1. Logic Puzzle:** There are three crates, one with apples, one with oranges, and one with both apples and oranges mixed. Each crate is closed and labeled with one of three labels: Apples, Oranges, or Apples and Oranges. The label maker broke and labeled all of the crates incorrectly. How could you pick just one fruit from one crate to figure out what's in each crate?

**Answer:** Pick a fruit from the crate marked Apples and Oranges. If that fruit is an apple, you know that the crate should be labeled Apples because all of the labels are incorrect as they are. Therefore, you know the crate marked Apples must be Oranges (if it were labeled Apples and Oranges, the Oranges crate would be labeled correctly, and we know it isn't), and the one marked Oranges is Apples and Oranges. Alternately, if you picked an orange from the crate marked Apples and Oranges, you know that crate should be marked Oranges, the one marked Oranges must be Apples, and the one marked Apples must be Apples and Oranges.

**2. Logic Puzzle:** A teacher writes six words on a board: "cat dog has max dim tag." She gives three students, Albert, Bernard and Cheryl each a piece of paper with one letter from one of the words. Then she asks, "Albert, do you know the word?" Albert immediately replies yes. She asks, "Bernard, do you know the word?" He thinks for a

moment and replies yes. Then she asks Cheryl the same question. She thinks and then replies yes. What is the word?

**Answer:** Dog. Albert knows right away because he has one of the unique letters that only appear once in all the words: c o h s x i. So, we know the word is not “tag.” All of these unique letters appear in different words, except for “h” and “s” in “has,” and Bernard can figure out what the word is from the unique letters that are left: t, g, h, s. This eliminates “max” and “dim.” Cheryl can then narrow it down the same way. Because there is only one unique letter left, the letter “d,” the word must be “dog.” (For more on this answer, watch the video below.)

**3. Logic Puzzle:** Three men are lined up behind each other. The tallest man is in the back and can see the heads of the two in front of him; the middle man can see the one man in front of him; the man in front can't see anyone. They are blindfolded and hats are placed on their heads, picked from three black hats and two white hats. The extra two hats are hidden and the blindfolds removed. The tallest man is asked if he knows what color hat he's wearing; he doesn't. The middle man is asked if he knows; he doesn't. But the man in front, who can't see anyone, says he knows. How does he know, and what color hat is he wearing?

**Answer:** Black. The man in front knew he and the middle man aren't both wearing white hats or the man in the back would have known he had a black hat (since there are only two white hats). The man in front also knows the middle man didn't see him with a white hat because if he did, based on the tallest man's answer, the middle man would have known he himself was wearing a black hat. So, the man in front knows his hat must be black.

### Editors Desk

#### Top 15 Health Benefits of Eating Organic Food

- Better overall health
- Antioxidant content
- Improved Heart condition
- Antibiotic resistance
- Better taste
- Pesticide cutback
- Stronger immune system
- Organic products are poison-free
- Consumption of highly nutritious food products
- Organic foods are not genetically modified
- Environmental safety
- You have the certainty you are consuming fresh food
- Lessened chances of food-borne illness
- Consumption of higher quality meat and milk
- Lower levels of toxic metals

#### Send your suggestions to:

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4. *Azeem Ahamed .B, III ECE*

### **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.