MIET
INSTITUTIONS

M.I.E.T. ENGINEERING COLLEGE

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ELECTRONICS AND COMMUNICATION ENGINEERING

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Mr. K JAVID
HOD/ECE

HEAD OF THE DEPARTMENT MESSAGE:

I am writing this message with full of pride and joy watching the talents of our department produce a quality produce like Dhwani. The goal of our magazine is to enhance and enrich the technical talents of our young minds and deploy the great technical knowledge of our faculties. I wish that the magazine provides new developments in Electronics filed and encourages our students to do research and new projects. I congratulate and thank all the students and faculty coordinator who have made untiring efforts to bring out this magazine. I wish them all the very best for releasing more such magazines in future.

EDITORIAL BOARD

MIET ENGINEERING COLLEGE

DHWANI 2019-2020

Volume:9

Er. A MOHAMED YUNUS,B.E, M.Sc., Engg.
Chairman
M.I.E.T. Institutions

CHAIRMAN's MESSAGE:

Being the current world not a hasty track, the responsibility of creating a high-quality educational institution is challenging and embellished with a host of initiatives which validate them over an extended time span. Moreover, in a world where time and space are compacted, there is a massive defy for success which necessitates knowledge, which is current, pertinent and based on real experience. In this situation, the education plays a paramount role in moulding, shaping and preparing youngsters to face the challenges of the future world. The Faculty with an outstanding academic background and sound conceptual knowledge of contemporary engineering studies and practices ably complete the process of converting the budding students into employable technocrats. Moreover, M.I.E.T strives hard to sensitize its students to the needs of the community and inculcate values like truthfulness, fortitude and acceptance of individual differences. That this whole process is completed keeping in mind the College Vision, Mission and Quality policy is an achievement that the Faculty takes pride in.

Dr. A NAVEEN SAIT M.E, Ph.D.
Principal
M.I.E.T. Engineering College

PRINCIPAL's MESSAGE:

As the Principal of our esteemed college, I am immensely proud of all of you. You allhave been inspiring us with your hard work and dedication, and have made us proudwith your many achievements over the years. As we look ahead to the future, I urge you to continue to strive for excellence and tonever give up on your dreams. I am very happy with the progress the college has made by imbibing in its students value based education synergized with modern teaching-learning methods to produce a generation of well informed and emotionally sound generation. I am positive that in times to come we will continue this journey with elevated enthusiasm and persistently provide a platform of holistic learning to the young generation of learners. Our students graduate with the skills, mind sets and qualities that will best equip them for success.

VISION OF THE INSTITUTION

To be a center of excellence in Technical Education through Technical, Ethical and Professional skills for meeting the diverse needs of the Society, in particular Muslim minority community and the Nation.

MISSION OF THE INSTITUTION

- To impart Quality Education, Training and Research in the fields of Engineering and Technology.
- To provide a conducive learning environment that enables the students to achieve professional and personal growth.
- To expose the contemporary issues of society, ethical practices and to create environmental awareness.
- To provide the required infrastructural facilities for developing the professional and innovative skills.

VISION OF THE DEPARTMENT

To be a top-class technical hub in imparting knowledge in cutting edge areas of Electronics and Communication Engineering, providing pleasant learning environment, nurturing scholars of excellent proficiency to meet the global and socio-economic challenges of the country

MISSION OF THE DEPARTMENT

- To provide remarkable teaching and research environment through state-of-the-art facilities.
- To strengthen the soft as well as hard skills of students to achieve technical and academic excellence.
- To raise the students to become responsible citizens with good human values and encourage them to work for the well-being of society.
- To develop the skills of lifelong learning and professional growth of students through utilization of the high-standard infrastructure facilities

DEPARTMENT ACTIVITIES

I. Value Added Course (VAC)

Two value added Courses have been conducted in the department, one in odd semester and another in even semester, with an aim to enhance the hardware knowledge of the students and sharpening the soft skills. An overview of the courses is given below.

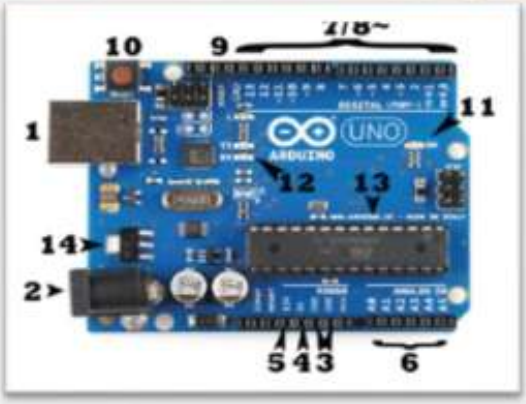
1. Certificate Course in ARDUINO based Embedded System Design

Objective:

The Arduino is an open-source computer hardware/software platform for building digital devices and interactive objects that can sense and control the physical world around them. In this course students will learn how the Arduino platform works in terms of the physical board and libraries and the IDE (Integrated Development Environment). The course also covers programming the Arduino using C code and accessing the pins on the board via the software to control external devices.

Course Instructor

The course was handled by Mrs. G. Kathika, Assistant Professor, Department of ECE.



Details of the course

The course duration was for three months. 15 second year students had enrolled for the course and successfully completed the course.

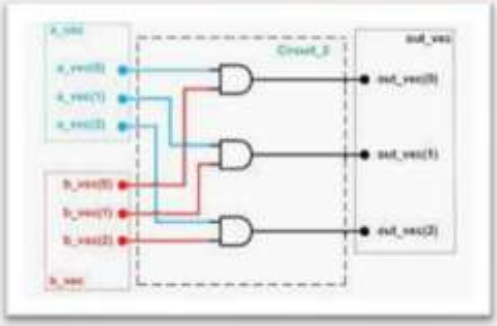
2. Certificate Course in Hardware Modelling using Verilog

Objective:

The course will introduce the participants to the Verilog hardware description language. It will help them to learn various digital circuit modeling issues using Verilog, writing test benches, and some case studies.

Course Instructor

The course was handled by Mrs. N. Latha, Assistant Professor, Department of ECE and Dr. A Suresh Kumar,



Details of the course

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II. Guest Lectures

1. Challenges in circuit design

Resource Person: Dr. K. Hariharan Associate Professor Electronics & Communication Eng., Thiagarajar College of Eng., Madurai.	
	

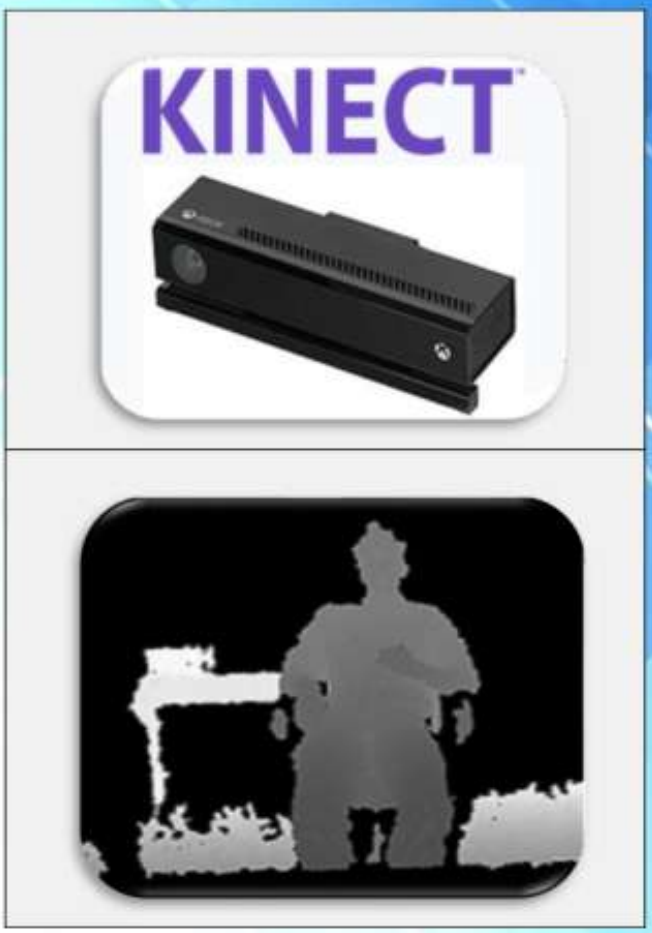
2. DSP Algorithms and processor architecture

Resource Person: Dr. M. Bhaskar Professor Electronics & Communication Eng., NIT Trichy	
	

FACULTY ARTICLES

Kinect- The new approach to 3D imaging

Mr.K Javid, HOD/ECE



Kinect has been developed as a human computer interaction tool by Microsoft, mainly for gaming purposes, but its impact has been further spanned to various field of image processing and computer vision, with areas of application not only including Electronics, but also for non destructive testing and civil engineering.,

The first-generation Kinect™ sensor (Kinect™ v1) was released in November 2010 as part of the Xbox 360 video game console, it is based on software developed by Rare, a company bought by Microsoft™ in 2002, and the technology of the Prime Sense cameras, now owned by Apple, that developed a system to interpret specific gestures without the need to touch anything, by means of an infrared camera and projector and a microchip to track 3D objects in motion. In 2011, Microsoft™ released the first Software Development Kit (SDK) with tools, drivers, APIs, and code samples to enable developing of Kinect™ applications, integrating gesture, facial, voice, and 20 body joints recognition (similarly, OpenNI and OpenKinect emerged as an alternative to the official source).

A Kinect sensor consist of an infrared (IR) projector, IR camera, color camera, motorized tilt and microphones. RGB camera delivers three basic color components of the video. Depth Sensor consists of IR laser projector and IR camera. It creates a depth map, which provides the distance information between an object and the camera. Depth measurement is done using structured light technique. A depth image obtained from Kinect is shown in Figure 2. With the advent of Kinect depth sensor, human action recognition and gesture recognition are regaining its popularity as it provides depth data at a low cost and higher accuracy compared to other depth sensors. Compared to traditional cameras, Kinect depth sensor provides several advantages like working in low light levels, giving a calibrated scale estimate, and being color and texture invariant etc.

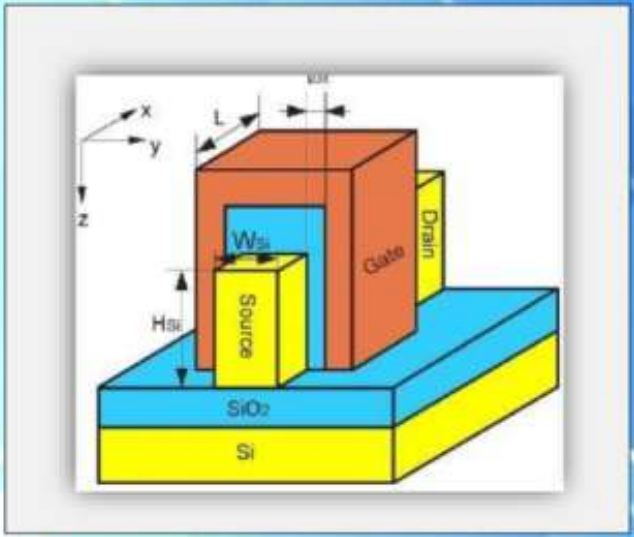
FinFET technology and its advancements

Ms. P Delphine Mary, AP/ECE

Modern mobile and computing devices advance in technology at a fast growing pace. The main focus is on low power and low cost miniature systems. In fact, Moore's law is all about optimizing those parameters to produce the smallest possible transistor size with each new technology generation. Moore in 1965 predicted that the number of transistors Today's chips consist of billions of transistors, and design teams strive for 'better, sooner, cheaper' products.

FinFET makes use of threshold voltage control through multiple supply voltages (TCMS). The threshold voltage at each FinFET gate is controlled using channel dopant concentration, the gate work function, and through a novel technique of application of a voltage to the other gate.

The first FinFET based high performance logic product - Intel's 22nm node microprocessor has been built with FinFET sidewalls sloping at about 8 degrees from vertical. Such shape has several practical reasons for manufacturability of this technology [5] Fins with lower aspect ratio (height: width) are more robust mechanically and so less exposed to damage processing. Sloping sidewalls promise better fill of trenches between fins with fin isolation dielectric. They also have a major drawback – poor short channel control near the bottom of the fin. Such fins would usually require additional doping to lessen this problem. Thus, causing increased random dopant fluctuation. The drawback of sloping fin sidewalls become serious with scaling gate length and will need



a more vertical shape.Some light doping is required to set threshold voltages for better control of leakage current. Those doping are done by implantation. Source/drain doping requires high doses of dopant, thus increasing series resistance. In order to match the effective width of a FinFET device, their fins needed to be very tall. Usually, formation of two fins per minimum pitch allows reasonable fin aspect ratio that meets or exceeds effective width of corresponding planar device. Traditional lithographic patterning has been found to be erroneous resulting in fin length variability. Most of Electronic Design Automation (EDA) tools needs to be adapted for FinFET designs. This process has been largely completed and tools are available from key vendors like Synopsis, Mentor Graphic and Cadence.

A new era of millimeter wave (MM wave)

Mrs. N Latha, AP/ECE

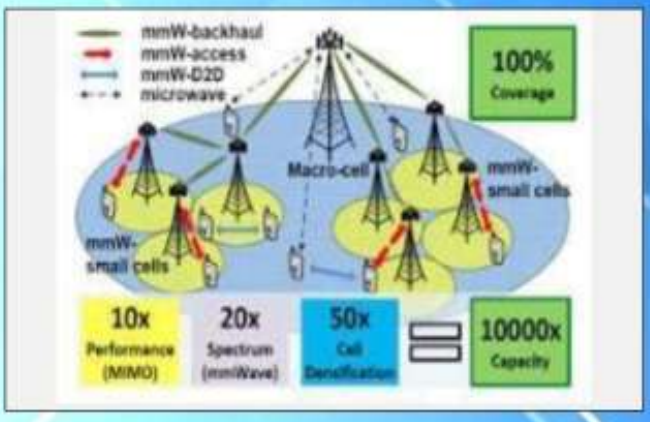
Millimeter wave (MM wave), also known as *millimeter band*, is the band of spectrum with wavelengths between 10 millimeters (30 GHz) and 1 millimeter (300 GHz). It is also known as the extremely high frequency (EHF) band by the International Telecommunication Union (ITU).

Millimeter wave is a band of electromagnetic spectrum that can be used in a broad range of products and services, such as high-speed, point-to-point wireless local area networks (WLANs) and broadband access. In telecommunications, millimeter wave is used for a variety of services on mobile and wireless networks, as it enables higher data rates than at lower frequencies, such as those used for Wi-Fi and current cellular networks.

Propagation restrictions dictate the use of small cell sizes for Wi-Fi and cellular networks. The short propagation distance can increase the number of access points (APs) to cover a large area but also means fewer client devices will share the bandwidth in each cell. Small cells also facilitate the reuse of channels across the WLAN coverage area.

Antennas for millimeter wave devices are smaller than for other frequencies, making them more suitable for small internet of things (IoT) devices.

Millimeter waves are absorbed by gases and moisture in the atmosphere, which reduces the range and strength of the waves. Rain and humidity reduce their signal strength and propagation distance, a condition known as *rain fade*. The propagation distance at the lower frequencies is up to a kilometer, while the higher frequencies travel only a few meters.



A millimeter wave travels by line of sight and is blocked or degraded by physical objects like trees, walls and buildings. Its propagation is also affected by proximity to humans and animals, primarily due to their water content.

Millimeter wave has numerous uses, including telecommunications, short-range radar and airport security scanners. In telecommunications, it is used for high-bandwidth WLANs and short-range personal area networks (PANs). Its high bandwidth capacity is ideal for applications like short-distance wireless transmission of ultra-high definition video and communications from small, low-power IoT devices. The limited propagation distance -- small cell size -- and high data rates make millimeter wave ideal for communications between autonomous vehicles.

In comparison, Wi-Fi currently uses frequencies in the 2.4 GHz, 5 GHz and 6 GHz bands, which are known as microwave *bands*. Cellular networks use frequencies in the 600 MHz to 700 MHz and 2.5 GHz to 3.7 GHz bands.

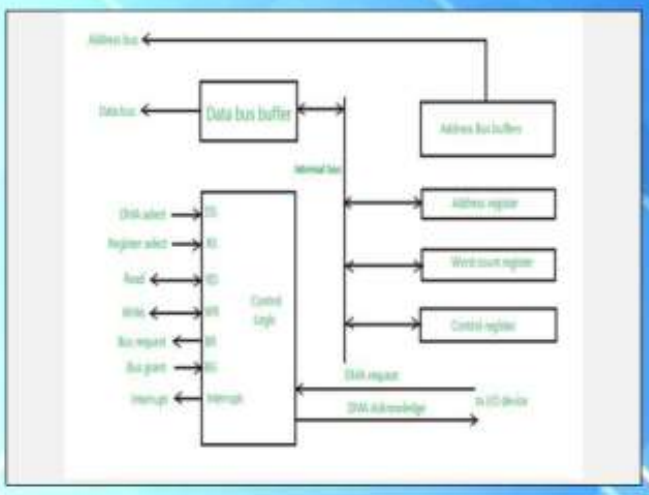
High performance system on chip master-slave bus based advanced DMA

Ms. Hina M, III year,ECE

To communicate between two modules, initially connecting wires are used. Later to avoid data congestion the communication bus was introduced (AMBA BUS: AHB, APB, AXI, ACE, MSBUS). This bus communication used to transmit the data between two modules without data congestion, and also used to reduce the area and power wise. The Arbiter is the controlling block of data transfer through the bus. This arbiter decides the path to communicate between two modules. The transaction is done in DMA method. But in DMA method, some problem occurs if two types of data transaction come to happen in same data path, one has to wait until the other one completes the data transfer. This brings down the performance of the transaction process to become low. To avoid this problem, DMA is replaced by ADMA in which the BUS communication is performed better comparing to the DMA. In this project, a high performance system on chip bus protocol termed the master slave bus based advanced direct memory access (MSBUS ADMA) is proposed. The new signals SRETRY, SSPLIT, MLOCK and MPROT are added in the MSBUS protocol. This signal improves the performance by reducing the delay and interruption.

DMA Controller is a hardware device that allows I/O devices to directly access memory with less participation of the processor. DMA controller needs the same old circuits of an interface to communicate with the CPU and Input/Output devices.

Fig. shows the block diagram of the DMA controller. The unit communicates with the CPU



through data bus and control lines. Through the use of the address bus and allowing the DMA and RS register to select inputs, the register within the DMA is chosen by the CPU. RD and WR are two-way inputs. When BG (bus grant) input is 0, the CPU can communicate with DMA registers. When BG (bus grant) input is 1, the CPU has relinquished the buses and DMA can communicate directly with the memory. The CPU initializes the DMA by sending the given information through the data bus.

- The starting address of the memory block where the data is available (to read) or where data are to be stored (to write).
- It also sends word count which is the number of words in the memory block to be read or write.
- Control to define the mode of transfer such as read or write.
- A control to begin the DMA transfer.

The DMA controller has three registers as follows.

- Address register - It contains the address to specify the desired location in memory.
- Word count register - It contains the number of words to be transferred.
- Control register - It specifies the transfer mode.

ARTIFICIAL INTELLIGENCE BASED SAFETY HELMET

Mr. Abdul Hameed A, II year,ECE

In India, nearly 20 million. people commute by no-wheelers every day. The main purpose of this helmet is to provide safety for the rider. this can be implemented using Artificial Intelligence. To make our country a safe riding environment, a device should try to identify whether the motorcyclist is carrying a helmet or not in real-time. Driving without a helmet is like risking one's life. In the event of an accident. a motorcycle tacks the structural support that a car keep drivers safe and protected. Even when a rider takes all possib1e precautions for accidents resulting in injury still occurs.

Artificial Intelligence Based Safety Helmet" is designed and developed to accomplish the various tasks in an adverse environment of an industry. The intelligent machine is loaded with several units such as IR Transmitter fi Receiver, LCD. microcontroller. UF transmitter and receiver which synchronously work with the help of a start of-the-art Arduino Uno I microcontroller. Tb.is system is a now to the technical advancement.

This prototype system can be applied effectively and efficiently in an expanded dimension to fit for the equipment of industrial. research and commercial applications.

Microcontroller is the heart of the device which handles all the sub devices connected across it. Atmel microcontroller is used for this purpose.

VR is a family of microcontrollers developed since 1996 by Atmel, acquired by Microchip Technology in 2016. These are modified Harvard architecture 8-bit RISC single-chip microcontrollers. AVR was one of the first microcontroller families to use on-chip flash memory for program storage, as opposed to one-time programmable ROM, EPROM,

or EEPROM used by other microcontrollers at the time.AVR microcontrollers find many applications as embedded systems. They are especially common in hobbyist and educational embedded applications, popularized by their inclusion in many of the Arduino line of open hardware development boards. In 2006, Atmel released microcontrollers based on the 32-bit AVR32 architecture. This was a completely different architecture unrelated to the 8-bit AVR, intended to compete with the ARM-based processors. It had a 32-bit data path, SIMD and DSP instructions, along with other audio- and video-processing features. The instruction set was similar to other RISC cores, but it was not compatible with the original AVR (nor any of the various ARM cores). Since then support for AVR32 has been dropped from Linux as of kernel 4.12; compiler support for the architecture in GCC was never mainlined into the compiler's central source-code repository and was available primarily in a vendor-supported fork. At the time that AVR32 was introduced, Atmel had already been a licensee of the ARM architecture, with both ARM7 and ARM9 microcontrollers having been released prior to and concurrently with the AVR32; later Atmel focused most development effort on 32-bit chips with ARM Cortex-M and Cortex-A cores.

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