A Seminar on

Embedded Systems

Event name: "Kickstart a Successful Journey in Embedded Systems"

Date of event: 3rd May, 2024

Venue: Aryabhata Seminar Hall, Dept. of ECE, KSSEM

Number of participants: 70

Targeted Audience: 3rd and 4th Year ECE Students.

The department of Electronics and Communication Engineering, KSSEM, in association with IEEE KSSEM Student branch organized a Seminar on, "Kickstart a Successful Journey in Embedded Systems" on 3rd May, 2024 at 11:30AM.

The resource person, **Mr. Chandrashekhar V**, Hardware and Software Consultant, accompanied by Ms. Anusha C, MD and Mr. Keerthi Mallesh, Technical Engineer at Microvision Embedded Pvt. Ltd. Bangalore were present at the campus to deliver the talk. Dr. Renuka V Tali, IEEE Branch Councilor for KSSEM Student Branch, Dr. Kishore M, Mr. Ravikiran B A, Mr. Dileep J and other faculty members of the department graced the event with their presence. The seminar was attended by third and fourth year students. IEEE student member Ms. Priyanka N (4th Sem B Sec**)** delivered welcome speech and also introduced the Guests to the gathering.

Discussion:

Embedded Systems:

Embedded systems are specialized computers integrated into larger systems to perform specific tasks like data processing and graphics. They consist of processors, memory, and input/output units, serving various sectors like consumer electronics, automotive, and aerospace. These systems can be real-time, standalone, networked, or mobile, categorized by performance and functionality.

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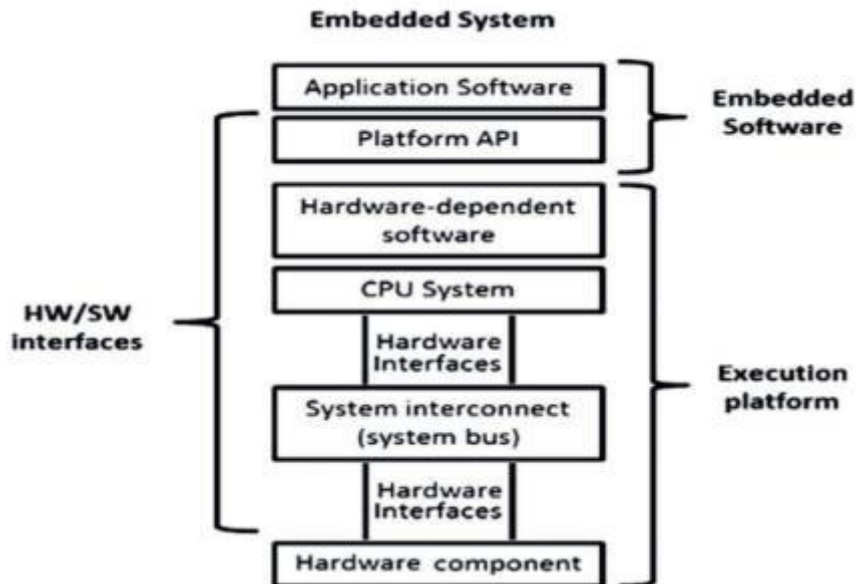**K. S. SCHOOL OF ENGINEERING AND MANAGEMENT**
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Architecture of Hardware and Software:

Timers:

Timers in embedded systems are crucial components used for measuring time intervals, controlling task execution, generating PWM signals, and triggering events. They play a vital role in Real-Time Operating Systems (RTOS), providing precise timing for critical tasks and synchronization of events.

Microprocessor and Microcontroller:

A microprocessor is a programmable electronic chip that functions like a central processing unit (CPU) in a computer, handling general-purpose computing tasks. It is primarily used for computational purposes and requires external components like memory and peripherals to function effectively. Microprocessors are versatile and can be programmed for various applications, making them suitable for a wide range of tasks. A microcontroller is a single-chip computer system that integrates the CPU, memory, I/O ports, and other essential components on a single chip. Microcontrollers are designed for specific control applications, offering real-time processing capabilities without the need for external components like a microprocessor. They are commonly used in embedded systems for tasks requiring real-time control, such as in appliances, automotive systems, and industrial automation.

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Reset option in Embedded Systems:

In embedded systems, the reset option plays a critical role in managing system stability and functionality. Various reset sources exist, including Power-On Reset (POR), JTAG Reset, Software Reset, Brownout Reset, External Reset, and Watchdog Timer, each serving specific purposes like handling power fluctuations, software errors, and system initialization. Resetting a device can address freezes and faults, allowing the system to start afresh and recover from unexpected conditions, ensuring reliable operation in embedded application.

Program Memory and Data Memory:

Program memory is used for storing the program code and instructions, while data memory is used for storing program data and variables. Program memory is generally read-only and accessed using specific instructions like MOVE, while data memory can be read and written using a wider range of instructions. Embedded systems often have more program memory than data memory, as the program code can be larger than the data requirements. This allows using program memory to store data when the data memory space is insufficient. Accessing program memory typically takes longer than accessing data memory, as program memory is optimized for code storage rather than fast data access. The software architecture in embedded systems must manage both program memory and data memory effectively to ensure efficient execution and utilization of the limited hardware resources.

Benefits of Using Embedded Systems in Industrial Automation:

Improved machine monitoring: Embedded systems enable real-time monitoring of industrial equipment parameters like flow rate, vibration, pressure, and temperature. This proactive monitoring helps improve productivity, optimize equipment capabilities, and measure performance. Enhanced machine control: Embedded systems can be integrated with industrial equipment like CNC machines and robotic machinery to precisely control specific functions like fluid flow rates. This leads to improved efficiency and reliability Compatibility with Industry 4.0 and IoT. Embedded systems enable the connectivity and data integration required for industrial automation to align with the Industry 4.0 and Industrial Internet of Things (IIoT) paradigms.

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Photo Gallery
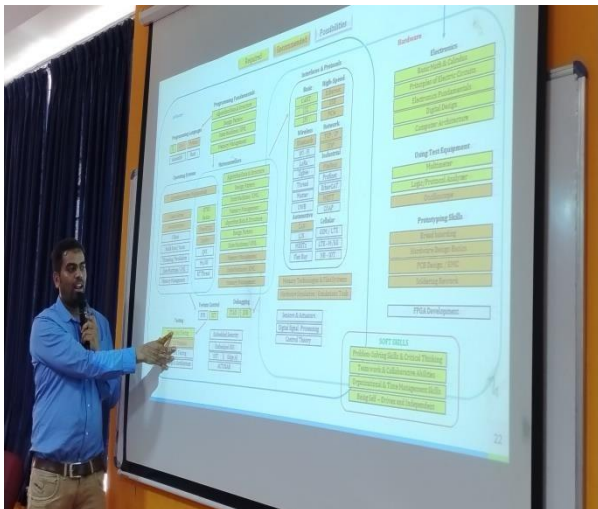
On behalf of all IEEE members, Ms. Ananya N (6th Sem A sec) expressed her gratitude and thanked the Management, Principal, Dr. Rama Narasimha, HoD, Dr. K Senthil Babu, teaching and non-teaching staff by presenting vote of thanks.

Co-coordinator

Signature of HOD, ECE
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