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SUMMARY OF OVERVIEW ON EMBEDDED SYSTEMS

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ABSTRACT :

This research contain brief introduction about embedded systems like What is an embedded system or definition of embedded system ,components of embedded systems ,required operating systems ,supporting softwares , applications of embedded systems ,advantages & disadvantages.

INTRODUCTION :

An embedded system is a hardware system designed to solve a specific problem, along with the software that controls the system. It could be anything from small IoT devices, medical equipment, robots, and cars.

Or we can say that An embedded system is a computer that supports a machine. It performs one task in the bigger machine. Examples include computer systems in cars, traffic lights, digital televisions, ATMs, airplane controls, point of sale (PoS) terminals, digital cameras, GPS navigation systems, elevators and Smart meters.

ABOUT RESEARCH :

This research contain brief introduction about embedded systems like What is an embedded system or definition of embedded system ,components of embedded systems ,required operating systems ,supporting softwares, applications of embedded systems ,advantages & disadvantages. Description of working principal also there with step by step process.

To understand in easy way there is a basic diagram of embedded system in which mentioned essential parts of embedded system like Flash Storage, Clock source, Modular processor block, RAM, Processors ,Power Block Com. Interfaces ,Sensors & Other blocks (Fig 1).

In (Fig 2) hardware unit diagram also there in which memory, CPU, sensors, actuators mentioned.

In (Fig 3) Layered architecture of en embedded system mentioned.
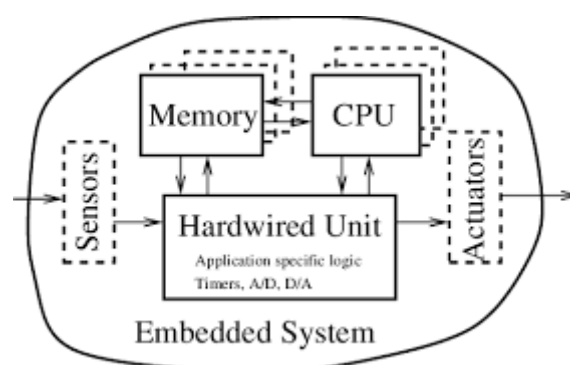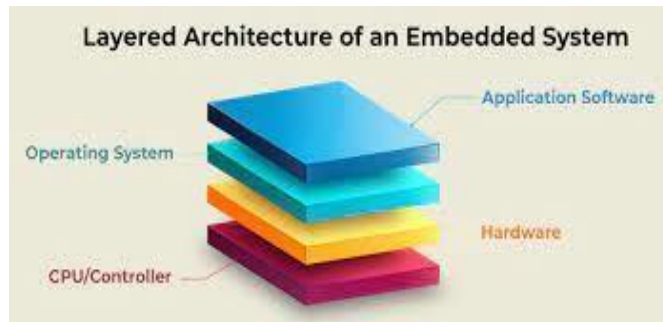
Fig 1

Fig 2

Fig 3

Layered Architecture of an Embedded System
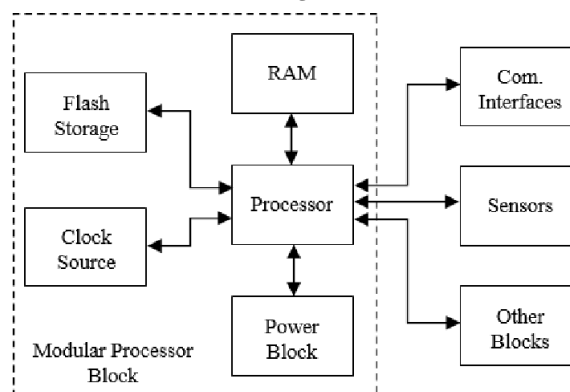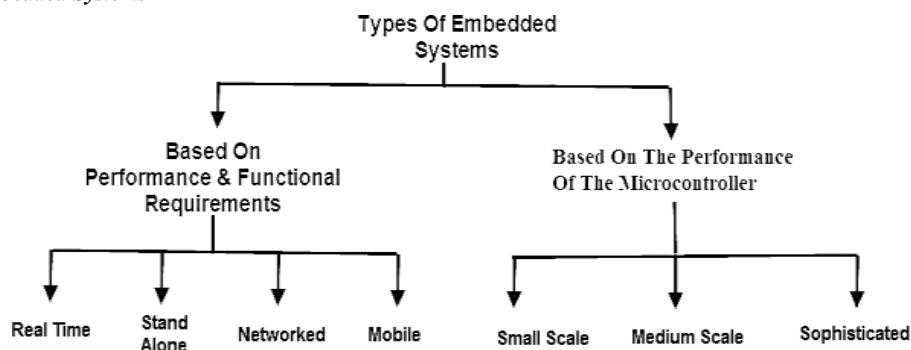
EMBEDDED SYSTEMS :

DEFINATION

Embedded system is a combination of computer hardware and software designed for a specific function. Embedded systems may also function within a larger system. The systems can be programmable or have a fixed functionality. Industrial machines, consumer electronics, agricultural and processing industry devices, automobiles, medical equipment, cameras, digital watches, household appliances, airplanes, vending machines and toys, as well as mobile devices, are possible locations for an embedded system.

WORKING

Embedded systems typically consist of a processor, memory, and the necessary input/output (I/O) devices to provide the desired functionality.

1. The microprocessor controls or processes data according to instructions from software programs stored in memory.
2. This information can be transferred between components using simple serial communication protocols such as I2C and SPI.
3. In addition, embedded systems often include specialized hardware for tasks like analog-to-digital conversion and real-time clock functions, which help with accuracy within tight timing constraints.
4. Finally, many external peripherals allow applications access to additional physical inputs or outputs such as sensors, actuators, displays, or wireless interfaces.
5. These are connected via dedicated ports on the CPU board itself or through an expansion bus that connects multiple peripherals simultaneously (e.g., USB).

Classification of Embedded Systems

Applications of Embedded Systems:

Embedded Systems in Automobiles and in Telecommunications

1. Motor and cruise control system
2. Body or Engine safety
3. Entertainment and multimedia in car
4. E-Com and Mobile access
5. Robotics in assembly line
6. Wireless communication
7. Mobile computing and networking

Embedded Systems in Smart Cards, Missiles and Satellites
1. Security systems
2. Telephone and banking
3. Defense and aerospace
4. Communication

Embedded Systems in Peripherals & Computer Networking
1. Displays and Monitors
2. Networking Systems
3. Image Processing
4. Network cards and printers

Embedded Systems in Consumer Electronics
1. Digital Cameras
2. Set top Boxes
3. High Definition TVs
4. DVDs

Embedded Systems Examples

There are many things with embedded systems incorporated in the Internet of Things (IoT), as well as in machine to machine (M2M) devices. Exceptionally versatile and adaptable, embedded systems can be found in all smart devices today. It is difficult to find a single portion of modern life that doesn't involve this technology.

Here are some of the real-life examples of embedded system applications.
1. Central heating systems
2. GPS systems
3. Fitness trackers
4. Medical devices
5. Automotive systems
6. Transit and fare collection
7. ATMs
8. Factory robots
9. Electric vehicle charging stations
10. Interactive kiosks

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