SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 19EEB303 / Microcontroller and its Applications

III YEAR / VI SEMESTER

Unit III – **IOT - ARCHITECTURE REFERENCE MODEL**

Topic:IoT Domain Model

IoT Domain Model

Internet of Things (IoT) technology has a wide range of applications and the use of the Internet of Things is growing so faster. It is the networking of physical objects that contain electronics embedded within their architecture to communicate and sense interactions amongst each other or to the external environment.

Architecture of IoT

The architecture of IoT is divided into 4 different layers i.e. Sensing Layer, Network Layer, Data processing Layer, and Application Layer.

IoT Domain Model

•**Sensing Layer:** The sensing layer is the first layer of the Internet of Things architecture and is responsible for collecting data from different sources. This layer includes sensors and actuators that are placed in the environment to gather information about temperature, humidity, light, sound, and other physical parameters. Wired or wireless communication protocols connect these devices to the network layer.

•**Network Layer:** The network layer of an IoT architecture is responsible for providing communication and connectivity between devices in the IoT system. It includes protocols and technologies that enable devices to connect and communicate with each other and with the wider internet. Examples of network technologies that are commonly used in IoT include WiFi, Bluetooth, Zigbee, and cellular networks such as 4G and 5G technology. Additionally, the network layer may include gateways and routers that act as intermediaries between devices and the wider internet, and may also include security features such as encryption and authentication to protect against unauthorized access.

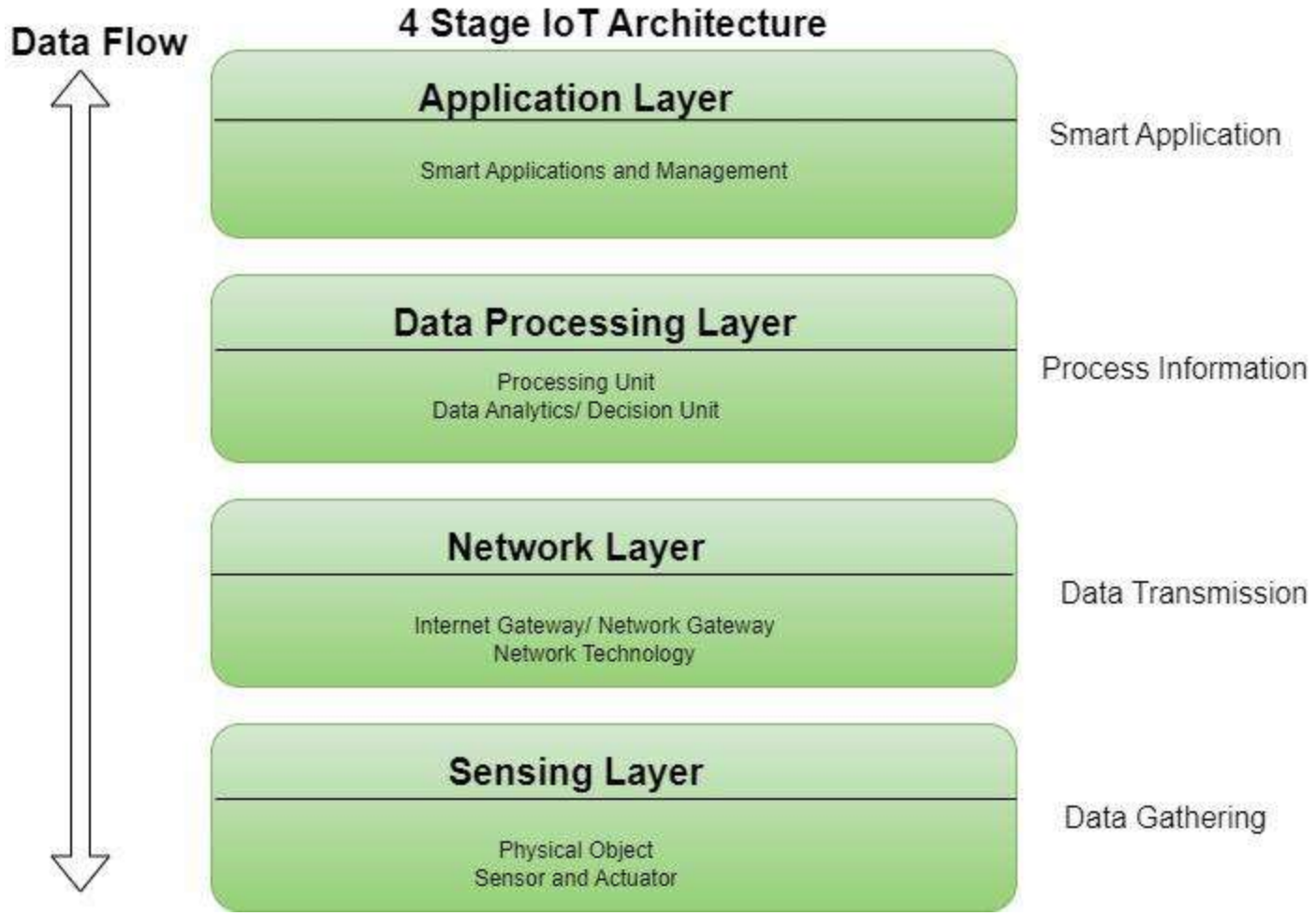
IoT Domain Model

•**Data processing Layer:** The data processing layer of IoT architecture refers to the software and hardware components that are responsible for collecting, analyzing, and interpreting data from IoT devices. This layer is responsible for receiving raw data from the devices, processing it, and making it available for further analysis or action. The data processing layer includes a variety of technologies and tools, such as data management systems, analytics platforms, and machine learning algorithms. These tools are used to extract meaningful insights from the data and make decisions based on that data. Example of a technology used in the data processing layer is a data lake, which is a centralized repository for storing raw data from IoT devices.

IoT Domain Model

Application Layer: The application layer of IoT architecture is the topmost layer that interacts directly with the end-user. It is responsible for providing user-friendly interfaces and functionalities that enable users to access and control IoT devices. This layer includes various software and applications such as mobile apps, web portals, and other user interfaces that are designed to interact with the underlying IoT infrastructure. It also includes middleware services that allow different IoT devices and systems to communicate and share data seamlessly. The application layer also includes analytics and processing capabilities that allow data to be analyzed and transformed into meaningful insights. This can include machine learning algorithms, data visualization tools, and other advanced analytics capabilities

IoT Domain Model



IoT Domain Model

Advantages of IoT

•Execute multiple tasks at a time like a computer.

•Easiest internet connectivity

•Works on GUI (Graphical User Interface) mode because of HDMI port.

•Best suited for server-based applications i.e., can be connected via **SSH–Secure Shell**-to access the Rpi command line remotely and file sharing via **FTP–File Transfer Protocol**.

•More reliable for software applications.

IoT Domain Model

Disadvantages of IoT

•Security concerns and potential for hacking or data breaches.

•Privacy issues related to the collection and use of personal data.

•Dependence on technology and potential for system failures.

•Limited standardization and interoperability among devices.

•Complexity and increased maintenance requirements.

•High initial investment costs.

•Limited battery life on some devices.

•Concerns about job displacement due to automation.

•Limited regulation and legal framework for IoT, which can lead to confusion and uncertainty.

IoT Domain Model

Modern Applications of IoT

•Smart Grids and energy saving

•Smart cities

•Smart homes/Home automation

•Healthcare ,Earthquake detection ,Radiation detection/hazardous gas detection

•Smartphone detection ,Water flow monitoring ,Traffic monitoring

•Smart door lock protection system ,Robots and Drones

•Healthcare and Hospitals, Telemedicine applications

•Biochip Transponders (For animals in farms)

•Heart monitoring implants (Example Pacemaker, ECG real time tracking