

Unit -1

- * Introduction to IoT
- * Characteristics of IoT
- * Physical design of IoT
- * Functional blocks of IoT
- * Sensing, Actuation
- * Basics of Networking
- * Communication Protocols
- * Sensor Networks.

First 4 topics(intro,chat,phy,fun)
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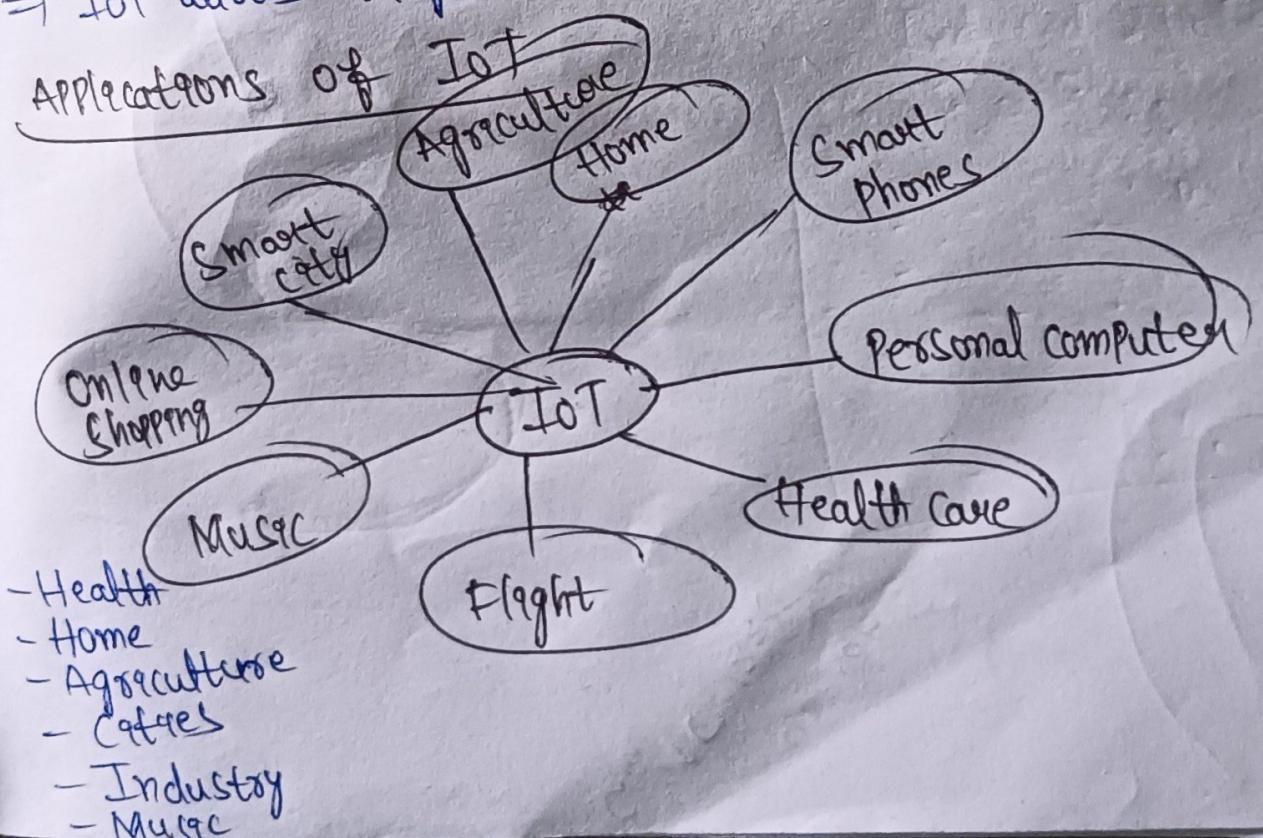
* Introduction to IoT

- IoT stands for Internet of things.
- It is a network of physical objects or things.
- It is a technology.
- It connects devices to the internet.
- It allows them to collect, share data.
- It is a network of interconnected devices that communicate & exchange data with each other over the internet.

Components of IoT

- Sensors
 - Actuators
 - Connectivity
 - Data Processing
 - User Interface
- The scope of IoT is not limited to just connect things to Internet.
- IoT allows things to communicate & exchange data

Applications of IoT



* Characteristics

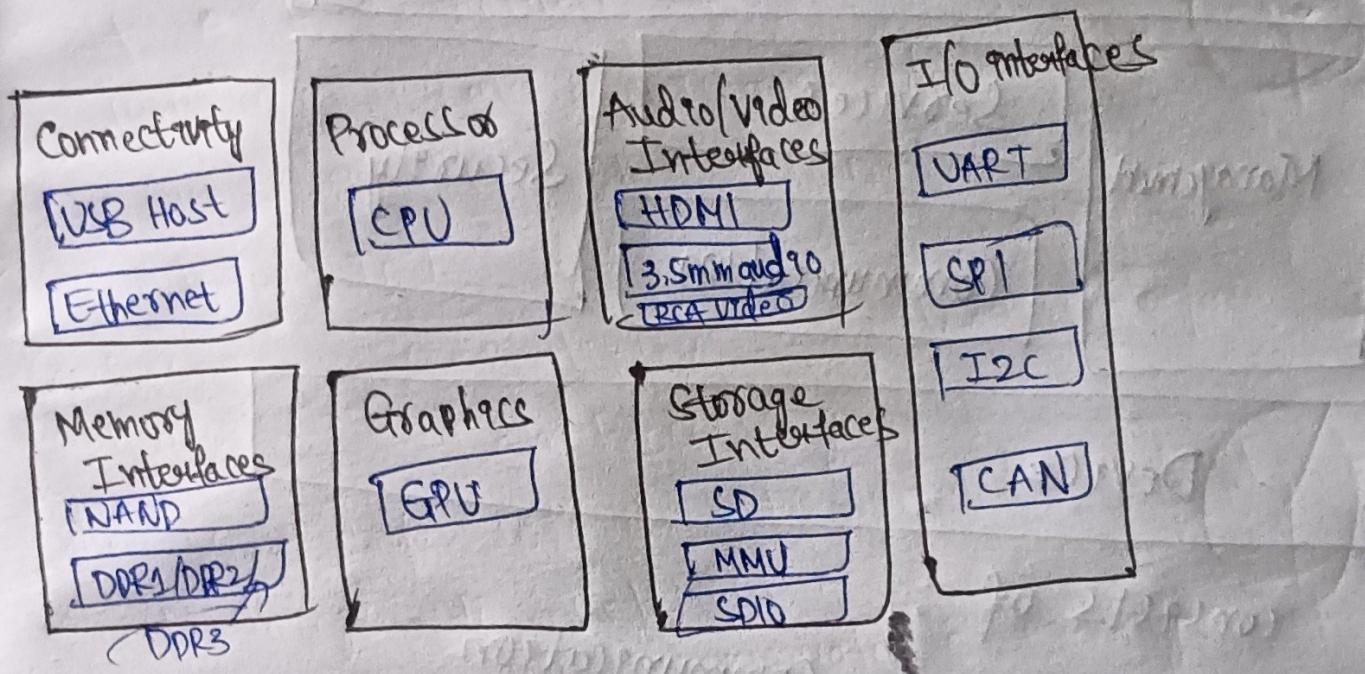
- IoT has several unique characteristics
- And that characteristics make it a powerful & transformative technology.

Char:

- Dynamic & Self adapting
- Unique Identity
- Self configuring
- Interoperable
- Sensing & Data Collection
- Connectivity
- Data Processing & Analyzing
- Security & Privacy
- Automation
- Intelligence

* Physical Design of IoT

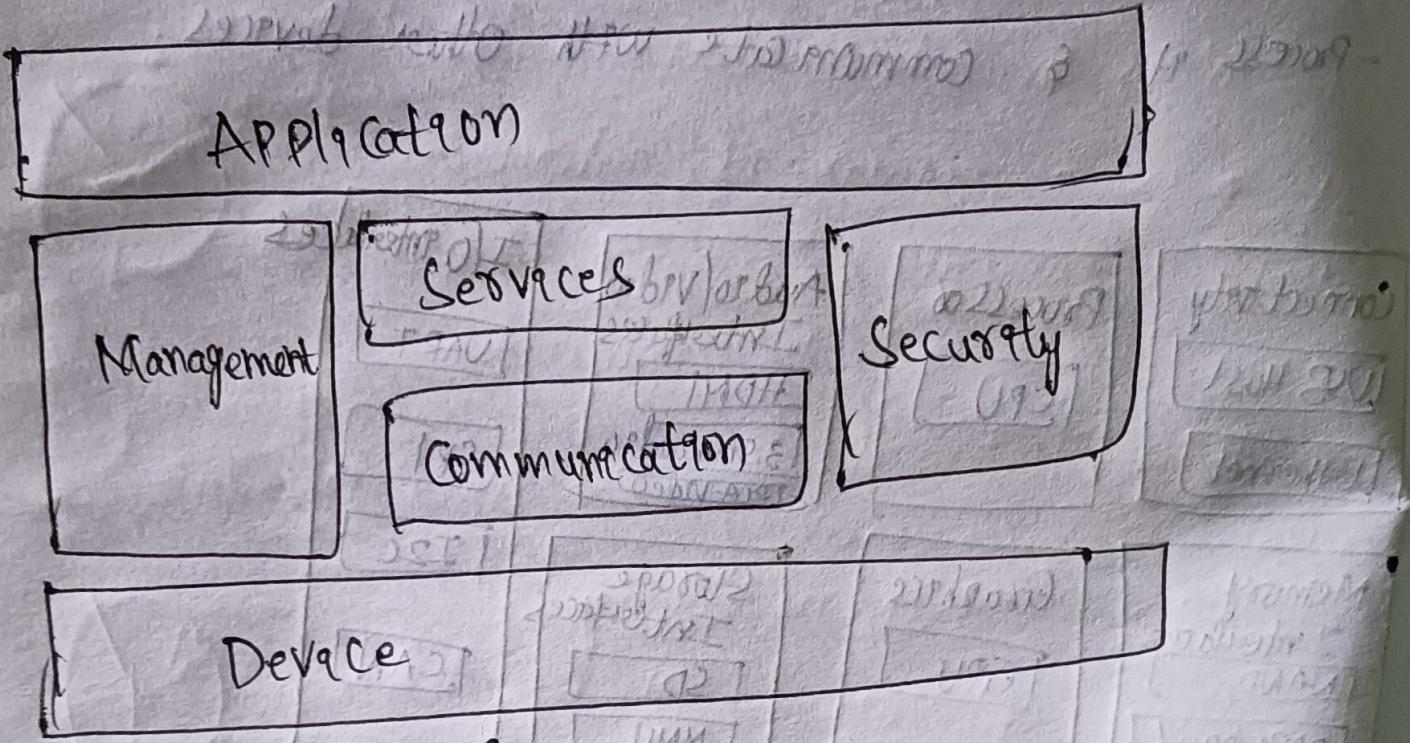
- It refers to the components & devices that make up an IoT System.
- It involves the hardware elements that collect data, & process it & communicate with other devices.



- It consists of : - I/O interfaces for Sensors
- Audio/Video interfaces
- Memory interfaces
- Storage interfaces
- Processor
- Connectivity
- Graphics

* Functional Blocks of IoT

- An IoT System has no. of functional blocks
- Those blocks help in sensing, actuation, communication, Managing.



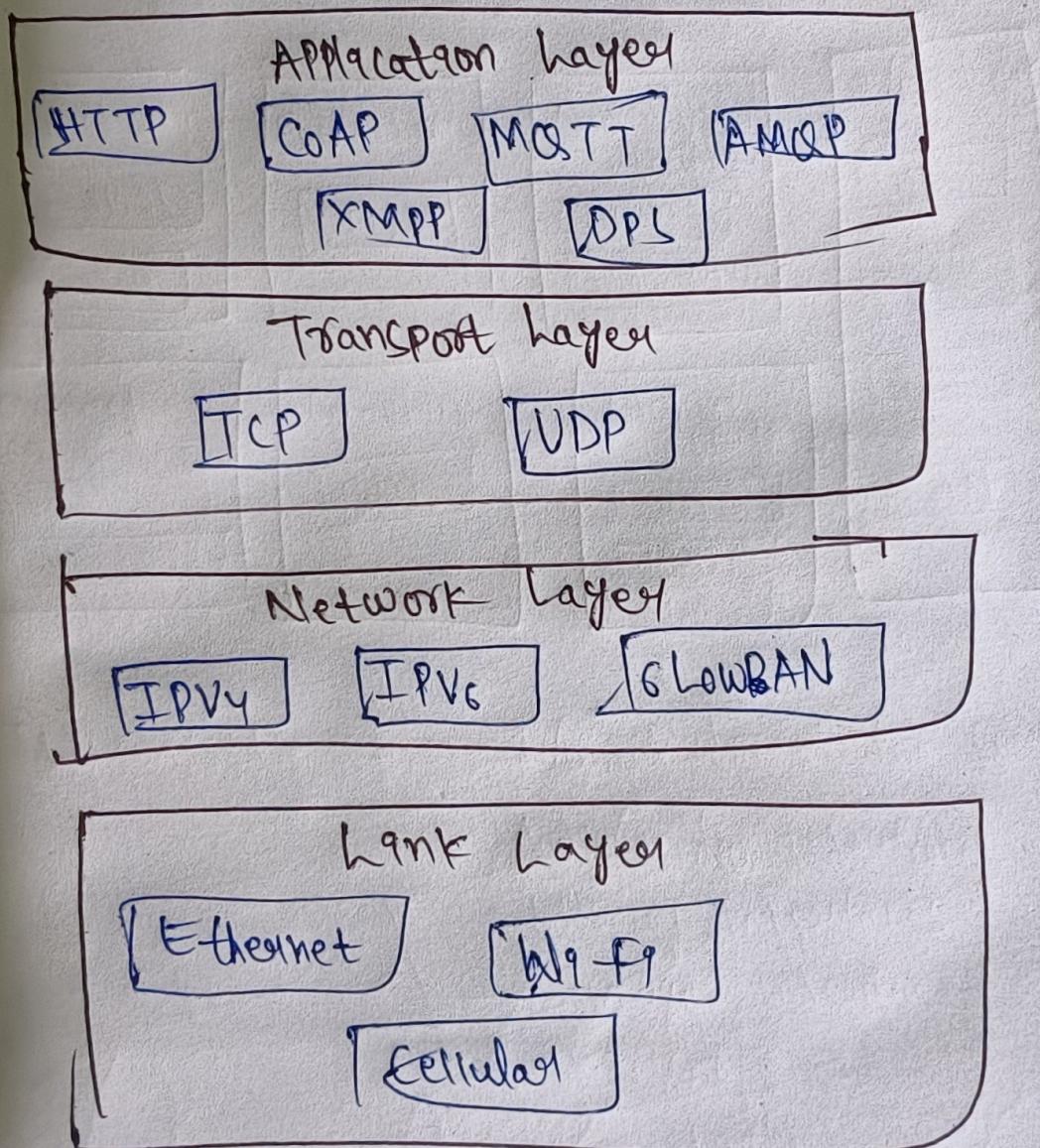
→ It

consists of :

- Device
- Management
- Services
- Communication
- Security
- Application

* Communication Protocols / IoT Protocols

- It can perform exchanging data b/w system
- There are 4 layers in IoT protocol architecture:
 - Link Layer
 - Network Layer
 - Transport Layer
 - Application Layer



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Application layer heading rasi
kindha
Http

4) What are Communication Protocols? Explain?

Communication Protocols

- Communication protocols are set of rules and standards.
- that govern data exchange between devices in a network.
- They ensure reliable and secure data transmission.
- These are rules that devices follow to send and receive data over a network.

2) Define Sensors and explain about different types of sensors?

Sensors

- A sensor is a device.
- It detects & measures physical changes in the environment (like temperature, gas levels)
- And converts them into signals (that can be read by electronic devices)
- Sensors are crucial.
- Because they help machines & systems understand their surroundings.
- They are widely used in:- IoT, to
 - robotics
 - health care
 - home automation
 - Agriculture
 - Environmental Monitoring
 - Drones
 - Space and Astronomy
 - Manufacturing and Production
 - Sports and fitness.
 - Gaming.

Examples of Sensors:

1. Temperature Sensor: Measures heat
Ex: DHT11, LM35
2. Gas Sensor: Detects gas levels
Ex: MQ-135
3. Motion Sensor: Senses movement
Ex: PIR Sensor
4. Pressure Sensor: Measures pressure
Ex: BMP 180
5. Light Sensor: Detects light intensity.
Ex: LDR
6. Sound Sensor: Detects sound levels.
Ex: Microphone Sensor
7. Humidity Sensor: Measures moisture in the air
Ex: DHT22

2

WIFI Area Network:
• the Network that
• Ex: Bluetooth,
Gateway: Act
Comm
Comm

* Sensing & Actuation

- Ques
- Sensors & actuators are essential components in IoT Systems.
 - Sensors collect data from the environment.
 - Actuators perform actions based on that data.
 - Integration involves connecting these components to a microcontroller or processing unit (Arduino or Raspberry Pi) to work together.

Working

- Sensors collect data (e.g. temperature, humidity)
- The data is sent to a microcontroller.
- The unit processes the data & makes a decision.
- Actuators perform actions based on the processed data.

Integration of sensors & actuators

- Improves automation & efficiency.
- Reduces manual intervention.
- Enables real-time decision making.
- Makes systems smarter and more responsive.

Examples

1. Smart Garbage Bin

- Sensor: Ultrasonic Sensor

- Actuator: Lid Motor

- Working:

- Sensor detects a hand near the bin.

- Motor automatically opens the lid.

- After a few seconds, the lid closes.

2. Automatic Scoreboard Update

Sensor: Ball Tracking Sensors (using cameras & motion sensors)

Actuator: Digital Scoreboard.

Working:

- the sensor tracks the ball's movements
- records runs or wickets.



3. Automatic Irrigation System

4. Automatic Sanitizer Dispenser

5. Automatic Door Opening System

6. Automatic Water level Controller

* Basics of Networking

- It involves connecting devices & sensors
 - to communicate & share data
- Networking in IoT means, connecting smart devices to the internet.
- So they can share data & communicate with each other.

④ Main Parts of IoT Networking

1. Devices/Sensors
2. Gateways
3. Protocols
4. Servers
5. User Interface.

How Devices Connect

- WiFi
- Bluetooth
- ~~Zigbee~~ Zigbee
- LoRaWAN

Challenges

- Security risks
- Connectivity issues
- Compatibility (Different devices may not work together)