

Q1) Tiny ML :-

Tiny ML refers to the field of machine learning that focuses on developing models and algorithms optimized for resource-constrained devices, such as micro controllers and edge devices.

Key characteristics :-

Resource Efficiency: TinyML models are optimized to use minimal computational resources, enabling them to run efficiently on devices with limited CPU power and memory through methods like quantization, pruning and architecture optimization.

Low Power Consumption: TinyML aims to enable machine learning on devices with low power requirements, allowing them to operate for long periods without frequent recharging, which is essential for wearable devices, remote access sensors, etc.

Applications :-

Health care applications: Tiny ML is used in wearable health monitors to track vital signs

continuously, detect irregularities, and provide early warnings, enhancing personalized medicine and remote patient monitoring.

Agriculture Applications: In precision agriculture, ~~The~~ Tiny ML-powered sensors monitor soil moisture, temperature, and crop health, optimizing resource use and increasing yields.

Industrial IoT Applications: Tiny ML facilitates predictive maintenance and condition monitoring in manufacturing by analyzing real-time sensor data to predict equipment failures and reduce downtime.

Q2) Distributed systems:

Distributed systems consist of a network of independent computers working together to manage and process data, especially important in IoT for handling vast amounts of data ~~from~~ from connected devices.

Key characteristics:

Scalability: Distributed systems can scale by

horizontal to add more devices, making them ideal for IoT environments with a large number of connected devices.

Fault Tolerance :

Designed to be resilient, distributed systems handle failures gracefully through redundancy, data replication, and consensus algorithms, ensuring continuous operation despite individual device or network issues.

Applications :

Health care : Distributed systems process data from wearable sensors and smart medical devices at the edge allowing for real-time health monitoring and alerts reducing server load etc .

Industrial IoT : Distributed systems can process sensors to monitor and control processes, enabling predictive maintenance and optimizing production .