System Overview

Monitor and control solar tracker devices.

Hardware Requirements

ESP32-C3 Modules,Solar Trackers devices with ESP32 including mechanical limits, motor types and status,Gateway Device

Software Requirements

- Firmware for ESP32-C3: Development of custom firmware to handle communication, data collection, and control commands.
- Gateway Software: Development of software for the gateway to aggregate data, send commands, and interface with a central server or cloud.

Functional Requirements

Data Monitoring:

- Tracker Angle: Method for real-time tracking and reporting.
- Sun Angle: Algorithms or sensors required for calculating the sun's angle.
- Tracker Mode: Status indicators for different operational modes (e.g., tracking, idle).
- Motor Status: Real-time monitoring of motor health and activity.

Control Commands:

- Time Setting: Mechanism for synchronizing device time.
- Location Setting: Input fields for latitude, longitude, and altitude.
- Tracker Angle Limits: Interface to set minimum and maximum angle limits.
- Start/Stop Control: Commands to initiate or halt tracking.

Data Communication

- Protocols: Define communication protocols between ESP32-C3 modules and the gateway (e.g., MQTT, HTTP).
- Data Format: Structure for data packets sent from the trackers to the gateway as per BLE/Wifi specifications
- Security: Encryption and authentication methods to secure data transmission.

Fault Tolerance: procedures for handling device or communication failures.
Field Testing: Procedures for testing the system in a real-world environment.