Block diagram of the IoT enabled Solar Energy Harvesting System

1 DESIGN AND DEVELOPMENT OF SOLAR TRACKERS

◉ Hardware Design and consulting

- Consulting services for selection and design of the hardware platform and peripheral components

- Design of Communication Interfaces (Analog and Digital I/O ports) for :
  - Serial Communication: UART, RS232, RS485
  - Wireless Communication: ZigBee, BLE, 6LoWPAN and more
  - Wired Communication: Ethernet

◉ Application Software & Back-Tracking Algorithm Development:

- Support for Design and development of the complete Solar Tracking Application software and RTOS

- Development and Integration of Solar tracking and Back-Tracking Algorithm

- Development of communication interface between Solar Trackers, Field-deployed IoT Gateway and Drive Control. This interface is designed based on TCP/IP, MODBUS, and Wireless protocols.

2 · MOTOR DRIVE AND CONTROL SYSTEM

- **Hardware Design & Consulting services**
  - Consulting services for evaluation and selection of hardware components including Microcontroller, H-Bridge (MOSFETs), Gate Driver IC, Torque & Angle Sensors
  - Design and development of hardware for Brush DC and Brushless DC motors (BLDC)

- **Development of Application Software & Motor Control Algorithm such as Pulse Width Modulator (PWM), Speed Regulation, Field-oriented Control (FOC) and more.**

3 · FIELD GATEWAY

- **Hardware Design & Consulting services :**
  - Requirement gathering and system analysis workshops with our IoT Consultants
  - Consulting services for evaluation and selection of microcontroller , high-performance processors & other hardware components
  - Architecture design and BOM cost optimization
  - Schematics and PCB designing
  - Prototype development and validation support
  - Support for Design for Manufacturability(DFM) and Design for Assembly (DFA)
  - Support for design & development of Interfaces for serial, wired or wireless communication along with :
    - Optional module for 4G/WiFi communication
    - Module for cloud communication, as per your business requirement

- **Software Design & Development :**
  - Support for Porting of the Linux based Operating System (OS)
  - Support for Local data storage and management
  - Integration with wireless/wired communication protocols based on TCP/IP, MODBUS, MQTT(for cloud communication) along with optional module for 4G communication
  - Application Software development on Linux Platform

4 · CONTROL ROOM GATEWAY + HMI

- Hardware and Software development services for Control Room Gateway Device
- Development of operator and process centric HMI application with custom controls
- Support for standardized network protocols like OPC to enable communication with on-field devices

5 | CLOUD APPLICATION AND SCADA DEVELOPMENT

◉ Design and Development of Cloud-Based SCADA Solutions. Following are some of the features of the solution:

- ■ Built-in user-management framework
- ■ Zone/Site level management of plant operations for improved visibility
- ■ Advanced analytics & Report generation of field data
- ■ Data back-up management to ensure business continuity

◉ Design and development of IoT Cloud application including:

- ■ Cloud Web App and Mobile App Development
- ■ Cloud Database Design & Development
- ■ Support for IoT Data Analytics and Reporting capabilities
- ■ Development support for interfaces for cloud-device communication

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