Preventative Maintenance & Analysis For Solar With Embedded Systems & Machine Learning
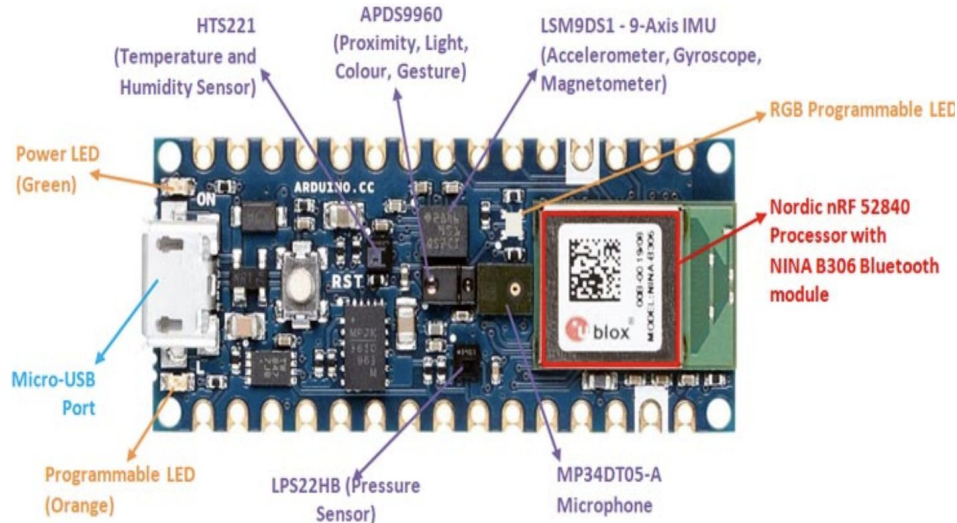
Machine Learning Software Development Cycle

Raw CSV → Dataset → Data config layer / Model architecture / Optimizer and loss → Validation → Saved Model

Development Board & Sensors

HTS221 (Temperature and Humidity Sensor)

APDS9960 (Proximity, Light, Colour, Gesture)

LSM9DS1 - 9-Axis IMU (Accelerometer, Gyroscope, Magnetometer)

RGB Programmable LED

Power LED (Green)

Nordic nRF 52840 Processor with NINA B306 Bluetooth module

Micro-USB Port

Programmable LED (Orange)

LPS22HB (Pressure Sensor)

MP34DT05-A Microphone

System Design Specs & Features

- Board Length 45 mm
- Board Width 18mm
- CPU Flash Memory 1 mb
- SRAM 256 kb
- Detects conditions that lead to; delamination, loose connections, corrosion, oxidation, cracks, hot spots, and inverter problems
- **Data points**: current, voltage, temperature, humidity, air pressure, light intensity, audio, and chemosensor data
- **Objectives**: preventative maintenance, molecular and performance analysis, efficiency and reliability improvements