Design of a New Photovoltaic Intelligent Monitoring and Control Device

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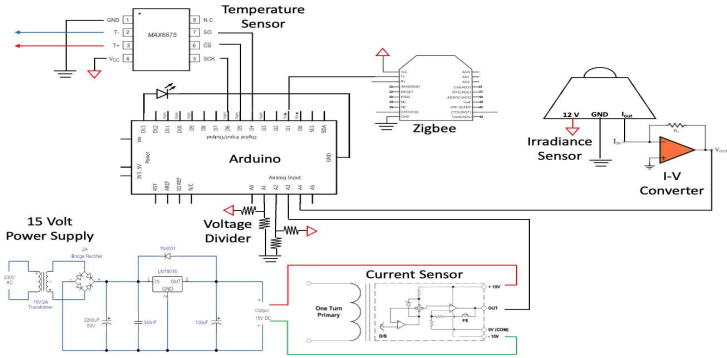
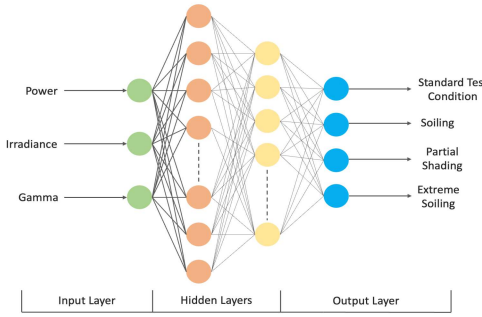
Objective:

To design a smart monitoring and control device that measures the value of voltage, current, temperature, and irradiance to detect solar faults in real-time using machine learning.

Features of Proposed IMCD Hardware

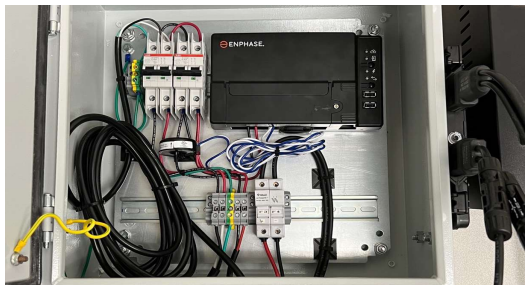
- Temperature, voltage, current, and irradiance data collection
- Better data transmission rate (5 seconds)
- Data communication using Zigbee transceiver
- Real-time fault detection using embedded ML
- Provision for cloud-based fault prediction
- 3-relay architecture for topology optimization
- Secure access and encryption

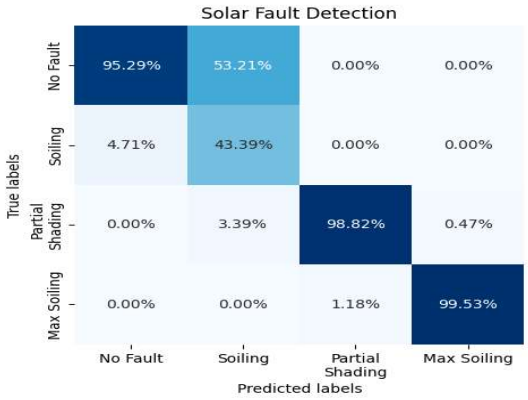




Embedded Machine Learning (ML) Results

- A NN with 2 hidden layers, predicting 4 output classes.
- Achieved test accuracy of 85.97% on embedded ML algorithm.





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