Helioprobe request for technical assistance:

Summary:

With decreasing cost of electricity contracts, optimizing a solar plant's performance with low cost and error free operation becomes important but is challenged by reduced CAPEX for these operations.

One such area affected by reduced CAPEX is the monitoring of panel assets where it is only cost feasible to have inverter level monitoring and not string level monitoring. Customers simply cannot afford an IoT device per panel. The end result is in the granularity of the data provided. With inverter level monitoring can see which sector of the PV installation is declining but not which panel is at fault.

The most common faults happen to be:

- Disconnected strings
- Bypass diode issues
- PV panel hotspots
- DC connector/ fuse reliability
- Panel level faults

It is clear that Inspections are essential to maintaining solar cell performance and minimizing potential power loss. Currently human driven inspections with thermal cameras and current clamps provide the base level methodology for inspecting panels but this is slow, error prone and costly. The dropping cost of Drone technology permits faster thermographic analysis but the costs remain high as US Federal regulations mandate that commercial drone operations be conducted by licensed pilots. Due to anomalies in the law, often two FAA licensed drone pilots are needed, one to keep their eyes on the drone the other to keep their eyes on the controls. Add to that the cost of processing the images and filing the flight plans, often it is only the largest utility providers that can go this route by actually hiring and having a drone team internally on staff. The industry needs the efficacy of drone analysis but at a cheaper cost and more frequently to reduce shortfall. Helioprobe will provide this through a combined IoT and UAV proposition.

Technical requests / resources request:

1) AMI compliant / compatible cloud resources - doing machine learning is compute and $$$ hungry
2) Expertise in "Digital Twin" modelling and the generation of visual synthetic data for creating AI+ML training sets with good distributions
3) Expertise in domain adaptation and transfer learning with regards to computer vision algorithms. We would like to train each AI to teh customers local conditions for best performance.
4) Expertise in software and systems simulation and modelling computationally (not FEM analysis or CFD)