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Smart Self-Sustained House

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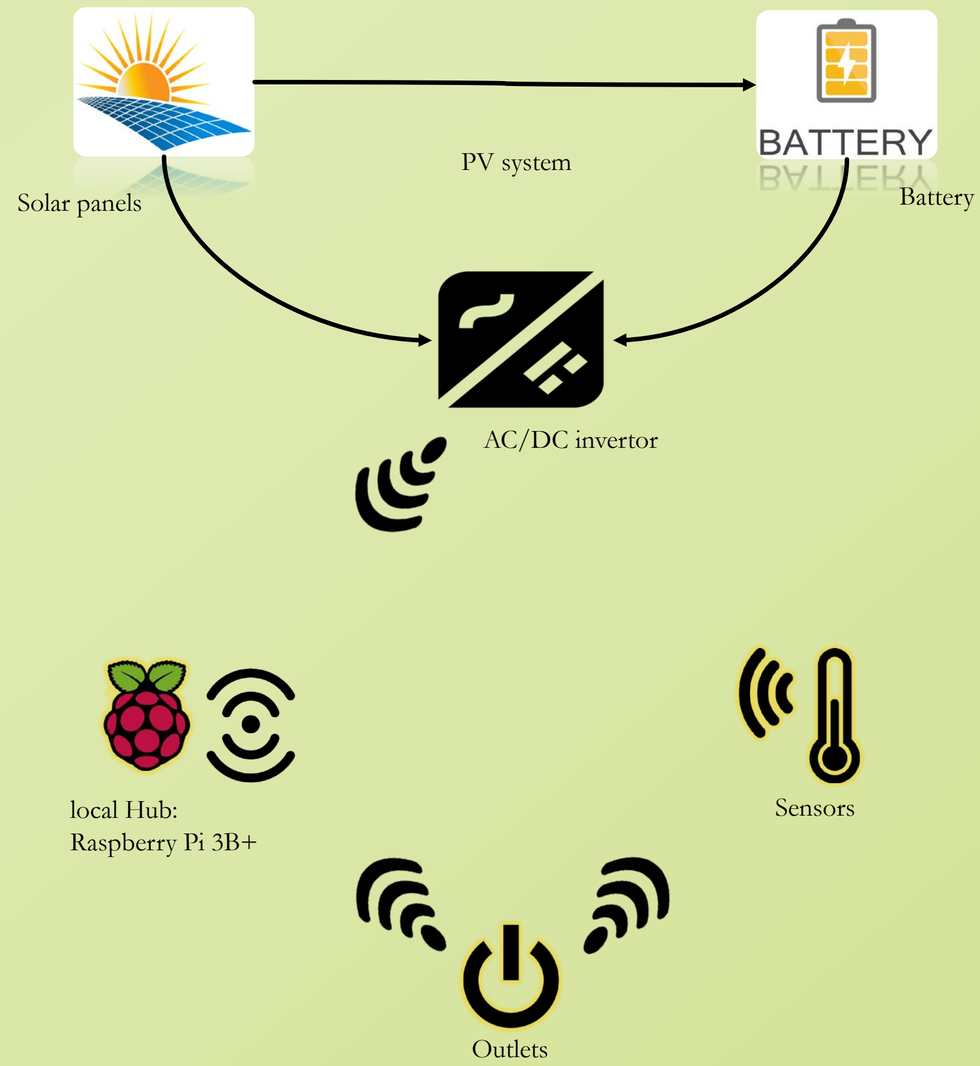
Abstract

This smart house makes smart homes affordable while preserving high quality performance. It uses sustainable power source -solar power- to lower the carbon emission in a time of rapidly increasing population. It generates its own electricity using solar panels, grows food, and uses rain water harvesting techniques to provide water for the residents. The raspberry pi acts as the main hub that controls the house via wi-fi to ESP8266 wi-fi module. The main hub is accessible even in the case of disconnection from the internet.

Main structure

- local hub on the raspberry pi using node-red platform. It displays sensor readings on the GUI and stores the data in a text file on the local hub.
- The raspberry pi outputs commands to the wi-fi module and controls relays connected to it.
- The raspberry pi has relays connected directly to it and controlled by node-red.

Hardware Structure



Sustainability

- Photovoltaic system generates electricity for the house
- Plantation to provides food
- Rain water harvesting to collect water

Automation

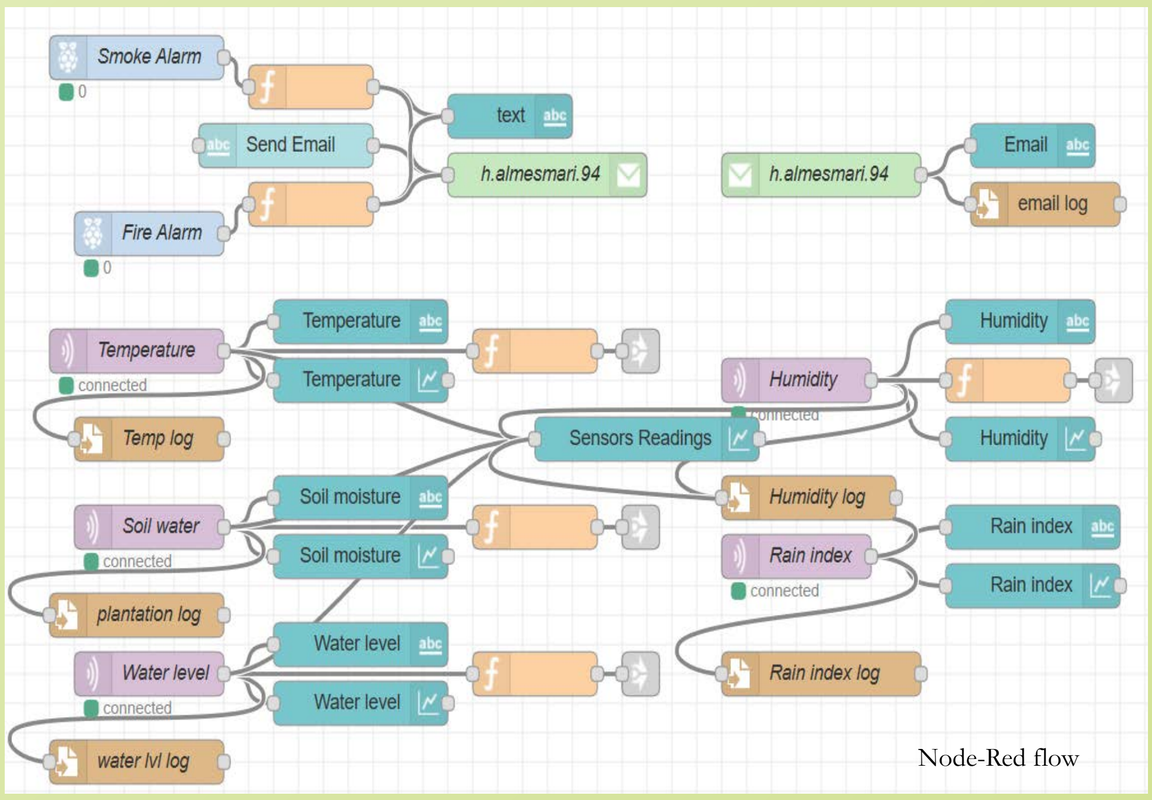
- Raspberry Pi3 B+ is the main hub and the control panel
- The touch screen & GUI App built using node-red Sensors to provide real time feedback

Software

- Python
- Node-red
- json.js
- Connectify hotspot

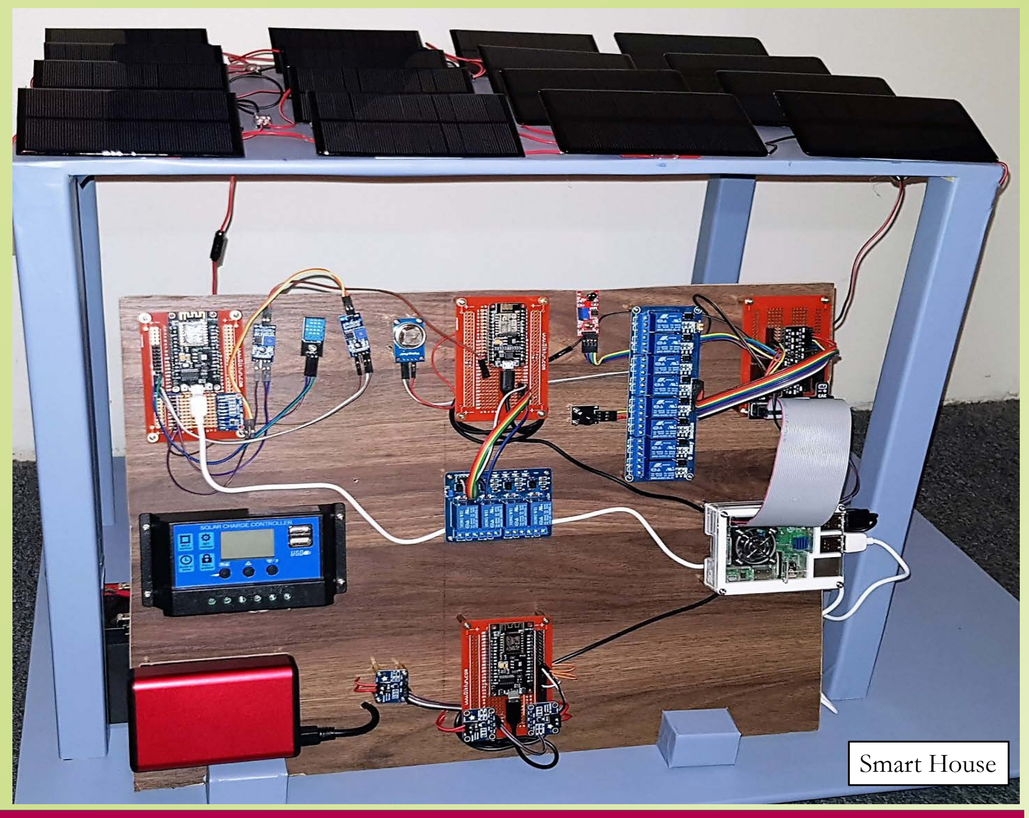
Communication

- Wi-Fi
- Relay switches
- MQTT
- Email alert

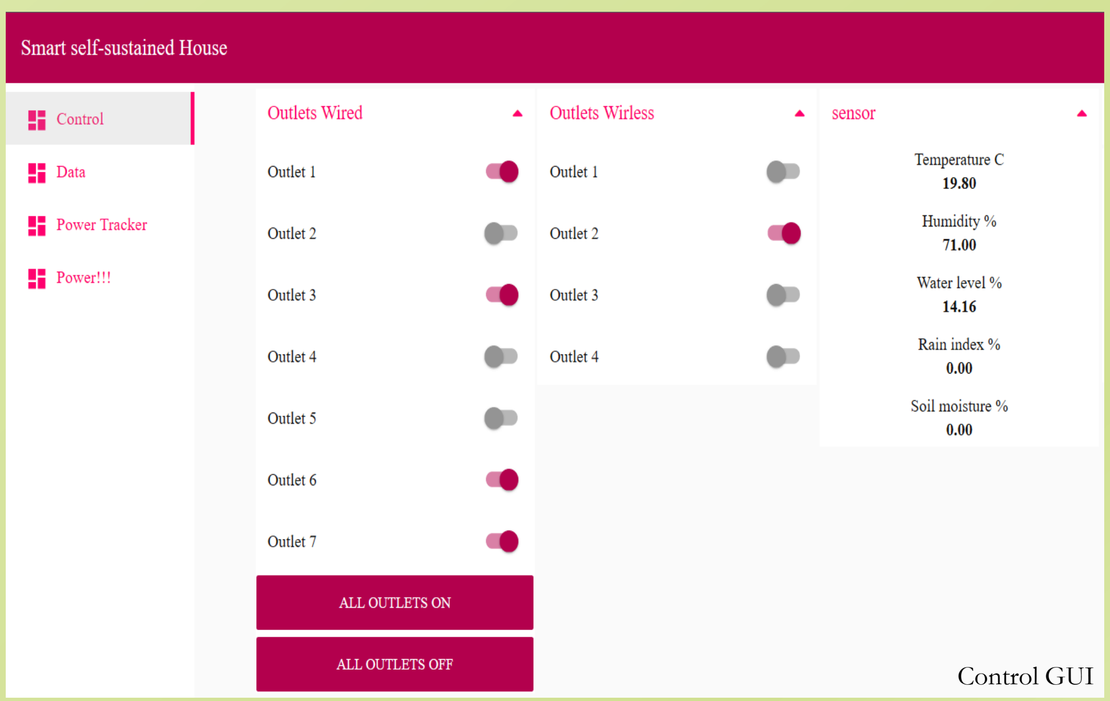


Node-Red flow

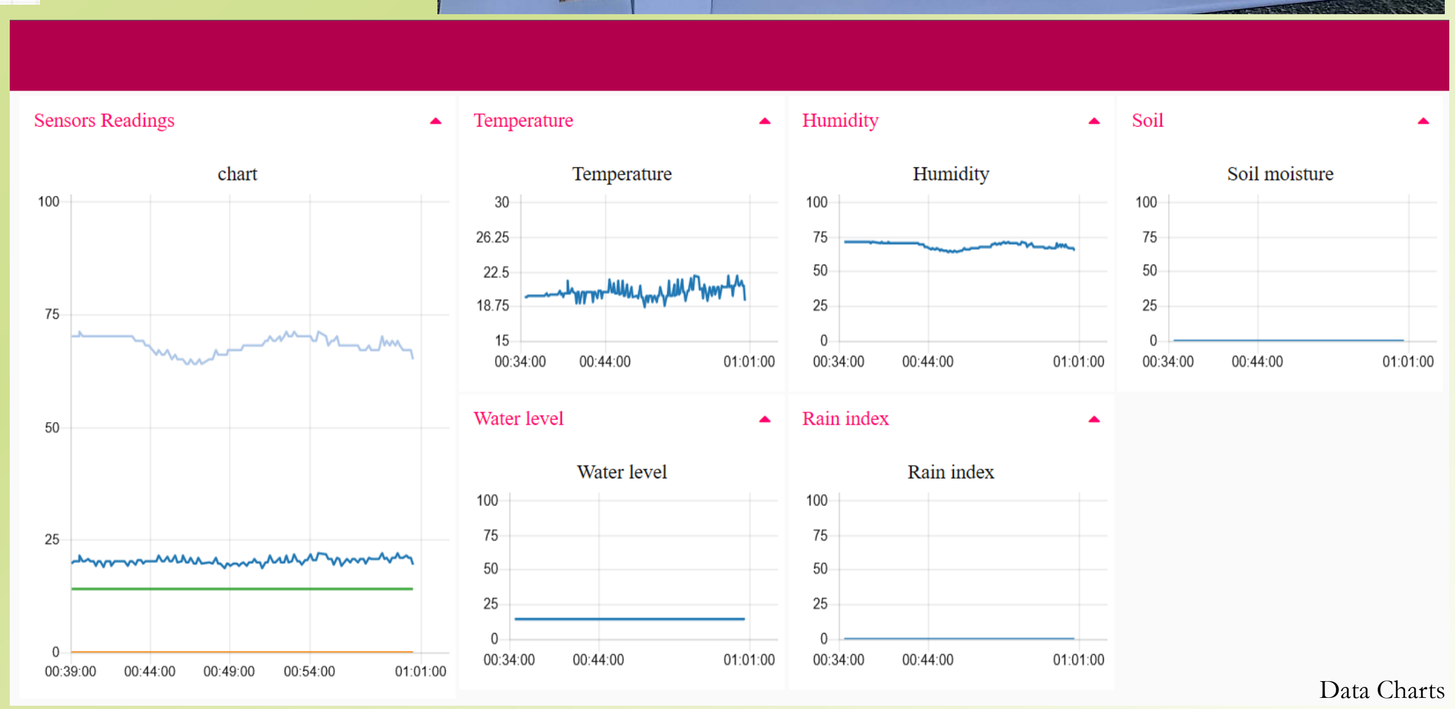
Result



Smart House



Control GUI



Data Charts