Joule Jotter

An IoT based Energy Monitoring Device

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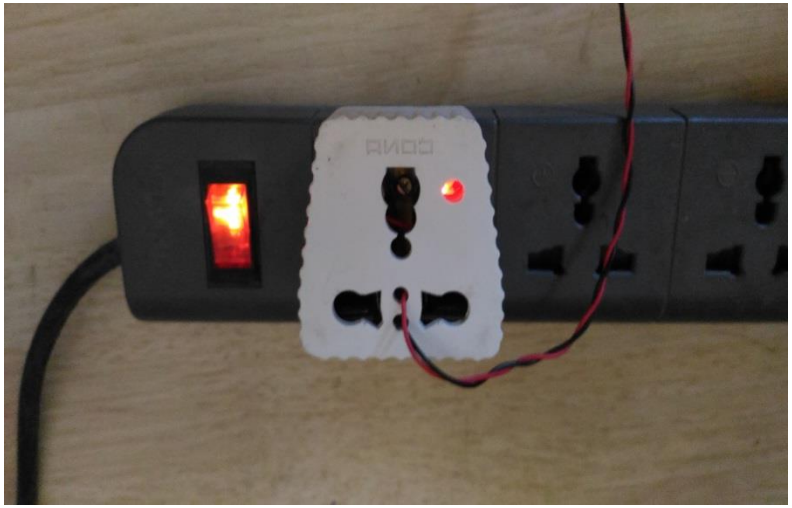
What is a Joule Jotter?

- An IoT based energy monitoring device for pluggable appliances.
- Measures Vrms, Irms, Power, Power factor.
- Data stored on:
  - SD Card(local storage)
  - Server
- Simultaneously monitors two devices.
- The device is configured using an Android app.

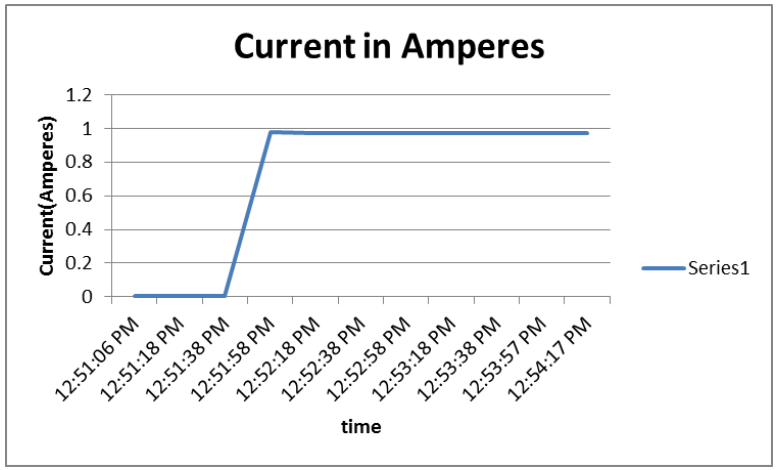


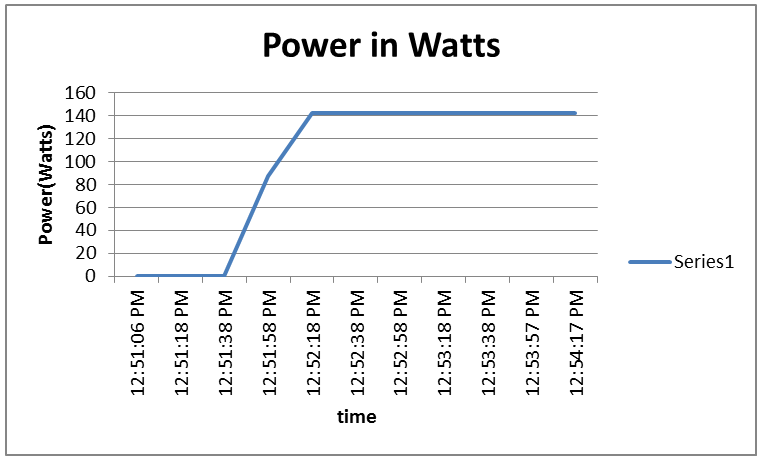
Slave

Master

Plot of Irms and Power of a heater

Vrms: 230V

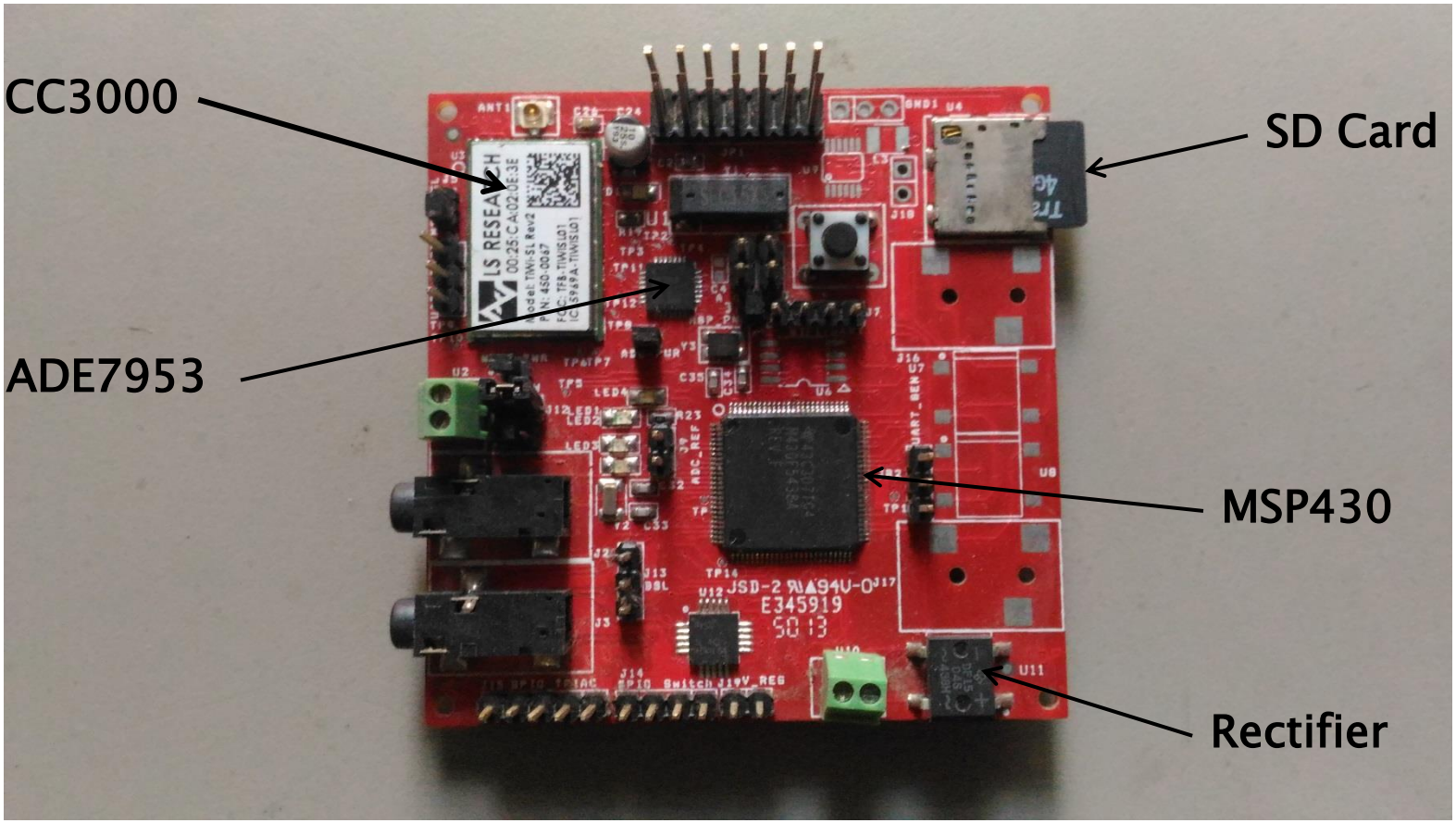




Hardware:

- Micro-controller: MSP430F5438A
- Electrical sensor: ADE7953
- Wi-Fi connector: CC3000
- Power transformer
- Current transformer
- SD card

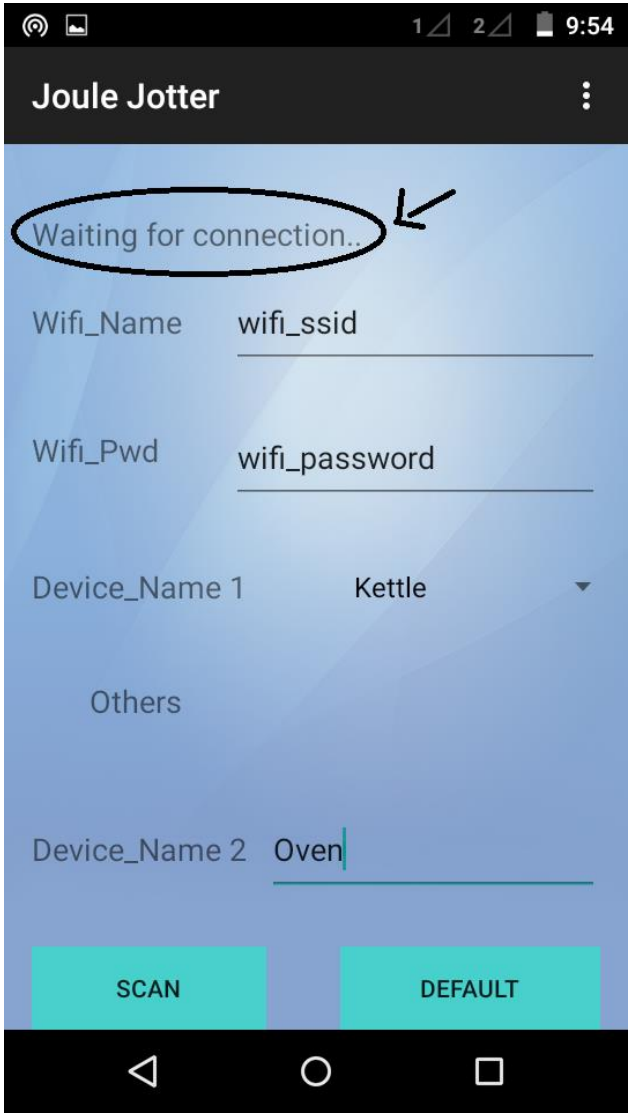
Joule Jotter board

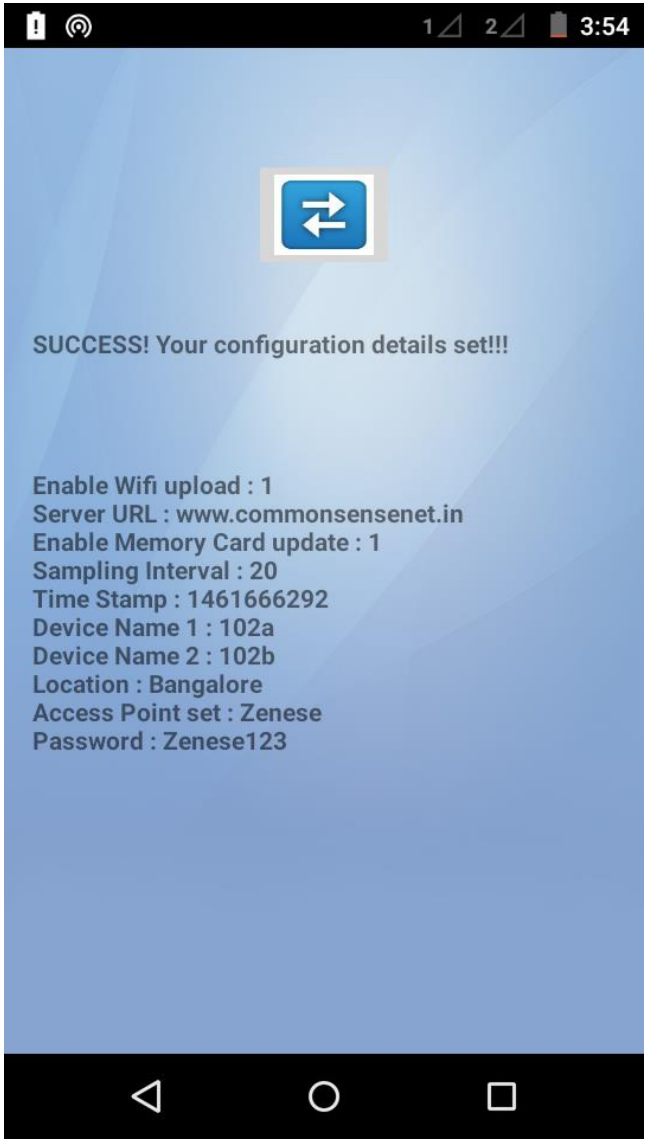


Software:

- An Android app to configure the Joule Jotter with the following parameters:
  - Wifi SSID
  - Wifi Password
  - Device Name 1
  - Device Name 2

Configuration App





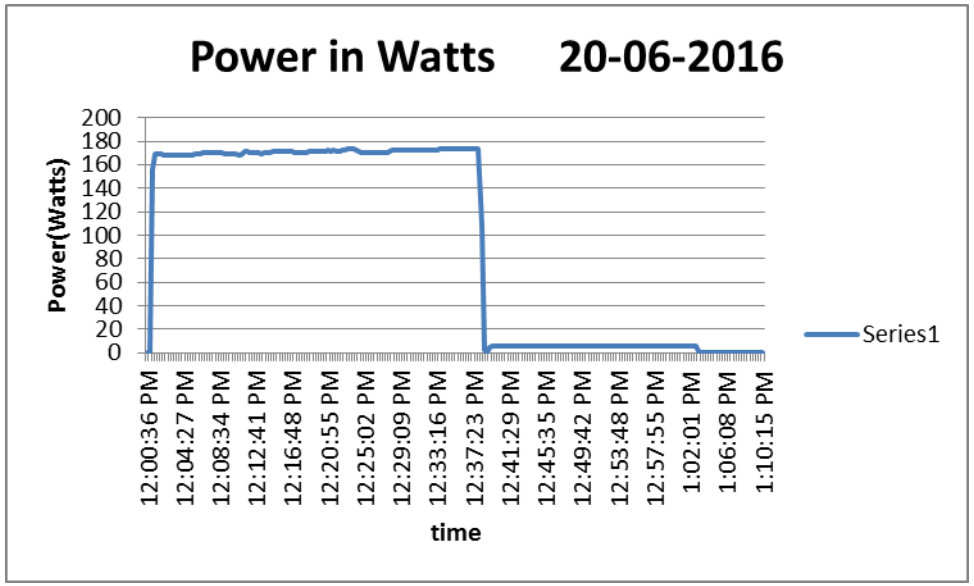
Server:

- A local server set up at DESE, IISc.
- Data is stored on database of the server.
- Accessible by any individual using “Joule Jotter”.
- Data can be retrieved any time for analytics purposes.
- URL: www.commonsensenet.in/JJdata

Power monitored for two different loads

Time	Irms	Vrms	Power	PF
12:37:04 PM	1.098757	236.4668	173.44262	-0.63675
12:37:23 PM	1.098309	236.458	173.47304	-0.63681
12:37:42 PM	1.098868	236.4771	173.48106	-0.63675
12:38:00 PM	1.099411	236.6147	173.70204	-0.63678
12:38:19 PM	0.105438	237.4731	106.63403	0.687561
12:38:38 PM	0.004202	237.7699	2.947956	0
12:38:57 PM	0.004202	237.7766	0	0
12:39:16 PM	0.043098	238.0882	4.5044	-0.53125
12:39:35 PM	0.043408	238.1012	5.755	-0.52737
12:39:54 PM	0.043041	238.3047	5.756602	-0.53067
12:40:13 PM	0.042889	238.0158	5.753398	-0.53525
12:40:32 PM	0.042953	238.281	5.753398	-0.53122
12:40:51 PM	0.042944	238.1791	5.758202	-0.53125

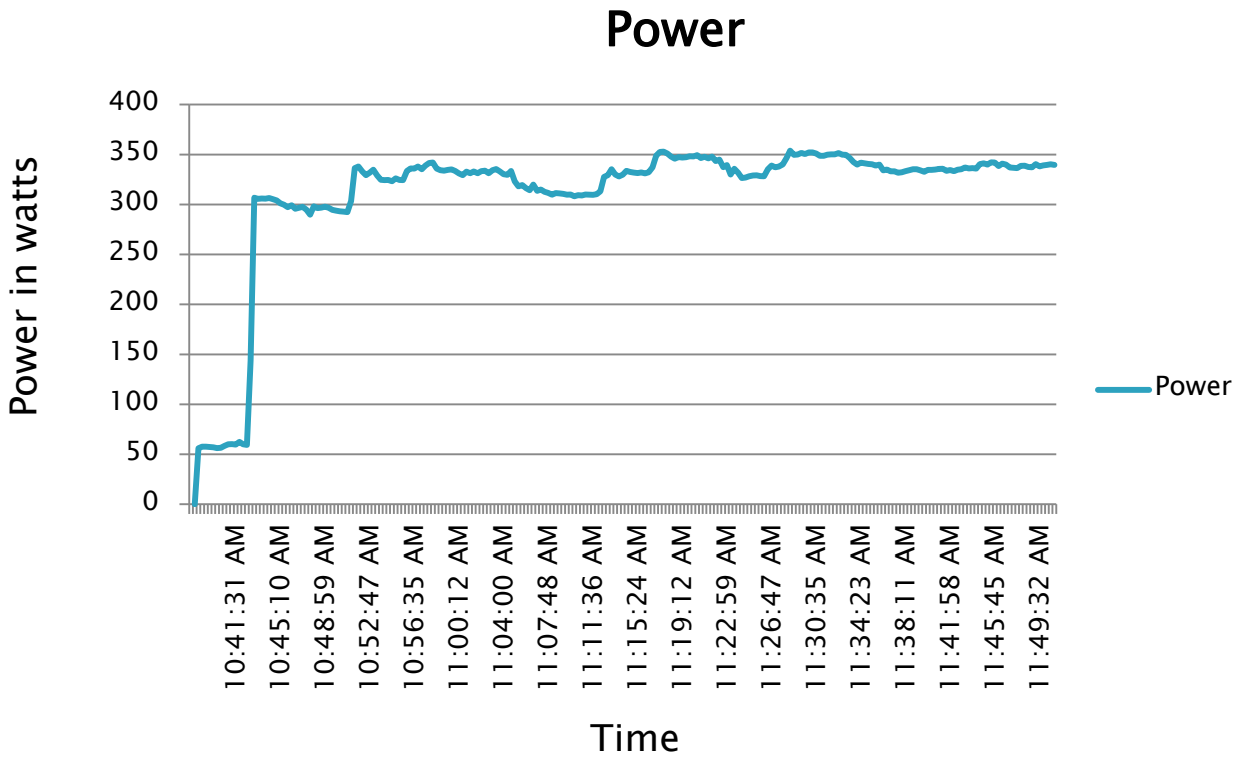
Data



Plot of power

Aggregated data

- Loads plugged to the joule jotter.
  - Hot air blower, DC power supply, mobile charger, laptops.



Advantages:

- Dual monitoring.
- Rollback: Handles the data monitoring in unexpected scenarios (loss of power, internet etc) .
- Convenient configuration using a smart phone.
- Monitors heavy loads like microwave oven, refrigerators etc.
- Data analytics to use a device more appropriately.

Questions?