Event: SAP-IoT Hackathon

Challenge: Reimagine Utilities

Description: Help users in reducing power consumption and lowering operational costs.

Design a cloud-based app that enables:

- Use IoT data from smart meters to analyze power consumption and perform in-depth analysis on usage pattern predicting power failures.
- Segmentation based on energy consumption patterns and energy efficiency benchmarking to look for ways to reduce cost.
- Heat maps showing real time consumption or loss of power during natural disasters.

Time Allotted: 24 Hours.

Date: 30/10/2018.

Venue: Quest Global IIOT-Lab.

INTRODUCTION:

A device that could monitor the power consumption and control it, will help vastly in reducing the wastage of energy. This system would be capable of turning on and off only when the device is connected and charge only when needed, and can be further improved to monitor other appliances. There's a lot of conflicting information out there when it comes to the best habits for charging a smartphone's battery, so let's clear some of that up right off the bat. Lithium ion batteries (the type used in most modern electronics) start to lose their ability to hold a charge over time, and the two biggest factors that contribute to this are excess heat and overcharging.

In a cruel twist of fate, the act of charging your phone's battery causes it to heat up, and topping it off to 100% charge contributes to reduced capacity over time.

To be more specific, ResearchGate found that charging a battery to only 85% yielded a longer lifespan than charging to the full 100%.

Knowing that charging to a full 100% isn't the best practice for long-term battery health, we created a root app that lets you choose your own charging limit.

We have come across the word SMART BATTERY what it exactly means is Smart Battery is to realize the intelligence of battery on the base of common chemical battery and smart battery management system (or called communication control protection system). Smart Battery can monitor the state of battery and communicate directly with smart charger and tell the charge requirement to smart charger at any time. Smart Battery also can communicate directly with smart equipment (such as laptop computer mainframe) through SMBus. Using Smart Battery can indicate and monitor accurately the state of battery and prolong the life of battery.

The IoT has many applications one of those is Smart Power Monitoring and Control Systems. Energy efficient devices can be designed in IoT, which can reduce both, the power consumption and the human effort required to do so. This work has been designed in to implement a smart charging system that automatically controls its behaviour using the webserver/cloud and the phone which is being charged.

SOLUTION:

The solution we developed for the given challenge is to create an application for the device with cloud integrated system which will monitor the device battery percentage and when charging it will send the data / percentage of the battery to cloud server/webserver where it will monitor the battery percentage.

Cloud creates a line or the graph representation of the battery state with time, once the battery is completely charged the device flash light will be on which will be detected by light sensor used in the circuit and it will send the message to cloud that device is successfully charged and cloud will send a signal to the device or the integrated IoT circuit to stop the power consumption by making the circuit switch to go off there by stopping current flow.

There are various modules available, which when paired up with the charging circuit will turn the charger into an IoT based device, like ESP8266, Particle Photon, and other Arduino based Wi-Fi modules.

TOOLS USED:

- **Software**

  1. Arduino nightly IDE

  2. SAP-IoT cloud storage

  3. Android studio

  4. HTML5 API

- **Hardware**

  1. USB cable.

  2. Light sensor

  3. Arduino Board

  4. Bread Board

  5. Bus wires

**IMPLEMENTATION:**

We have done the circuit connection with the light sensor for the detection of light and have also wo written code for the working of the circuit in Arduino IDE where the once the light is detected the system will print 1 when there is no light it will print 0 as the output on the monitor screen.

When the device is charging it will not on the flash but when we set the battery percentage in the app at which point the flash should on or perform other actions such as after 60% it should ON flash and when the device does this it is immediately detected by the light sensor in the circuit it starts printing 1 this circuit is meant to send an message to cloud that the battery condition has been met and cloud should send an immediate trigger to the circuit to stop charging.
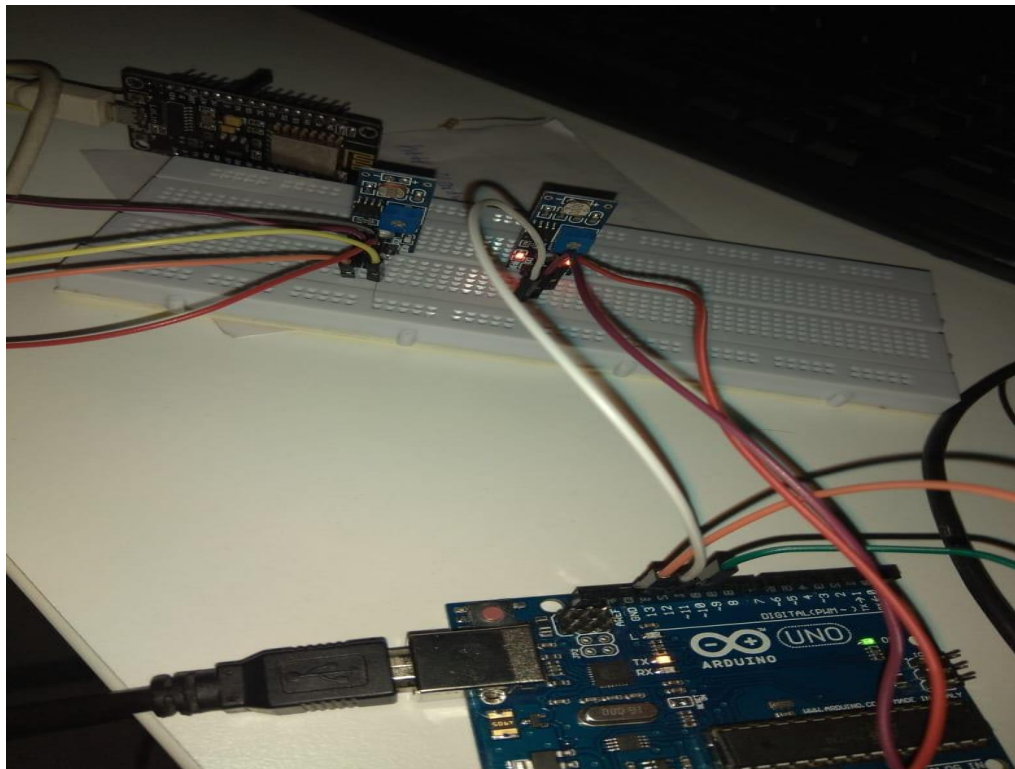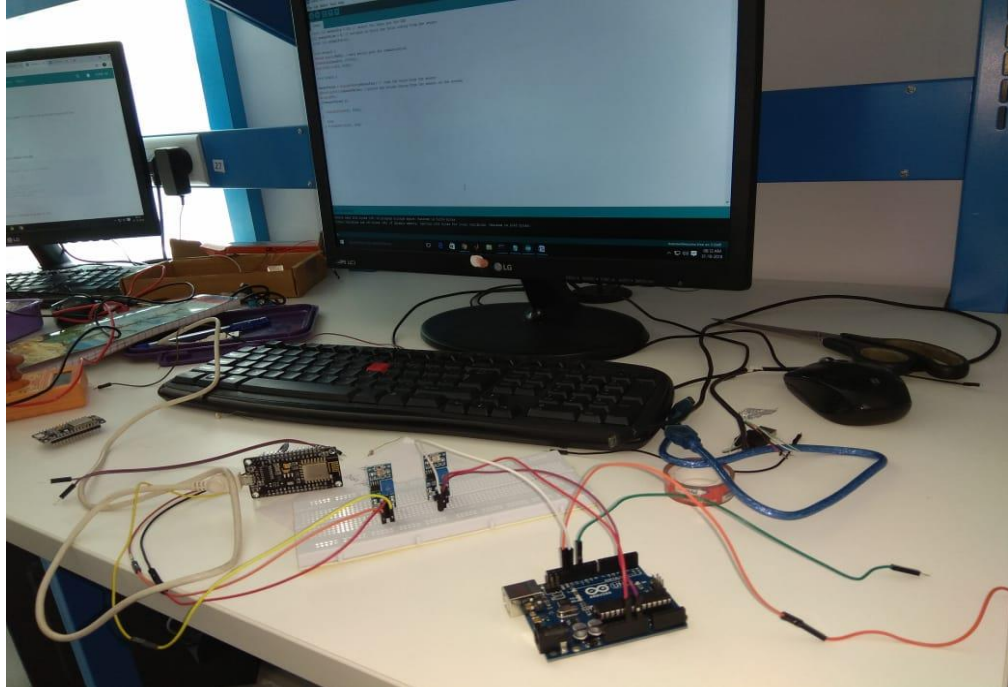
We were able to do the connections, developing app which meets our requirement for this project and send the data transmitting to cloud manually along with graph representation of battery status in SAP Cloud and were not successful in sending back a signal to the device to stop due to lack of time.
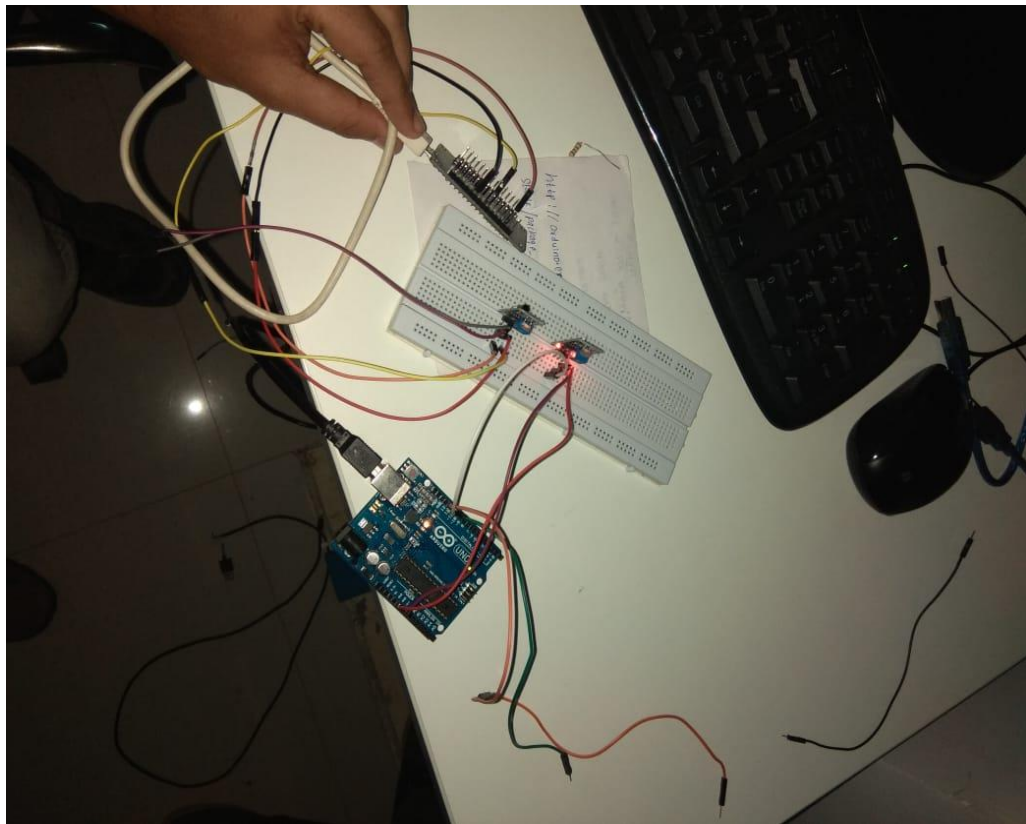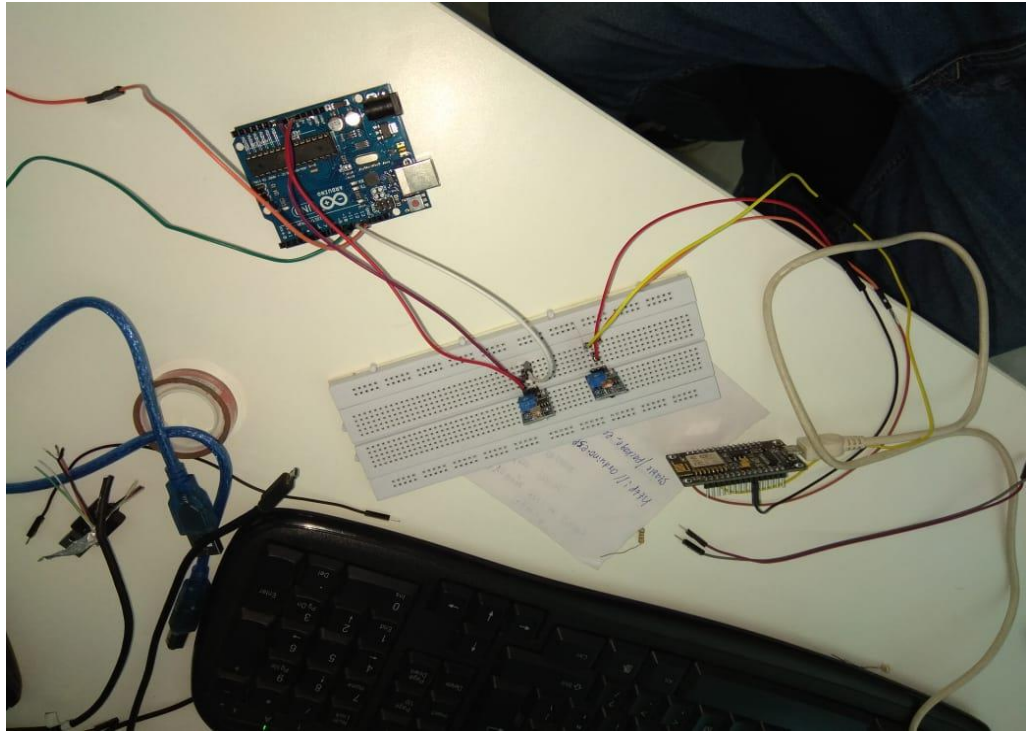
SCREENSHOTS:

- ## CODE:
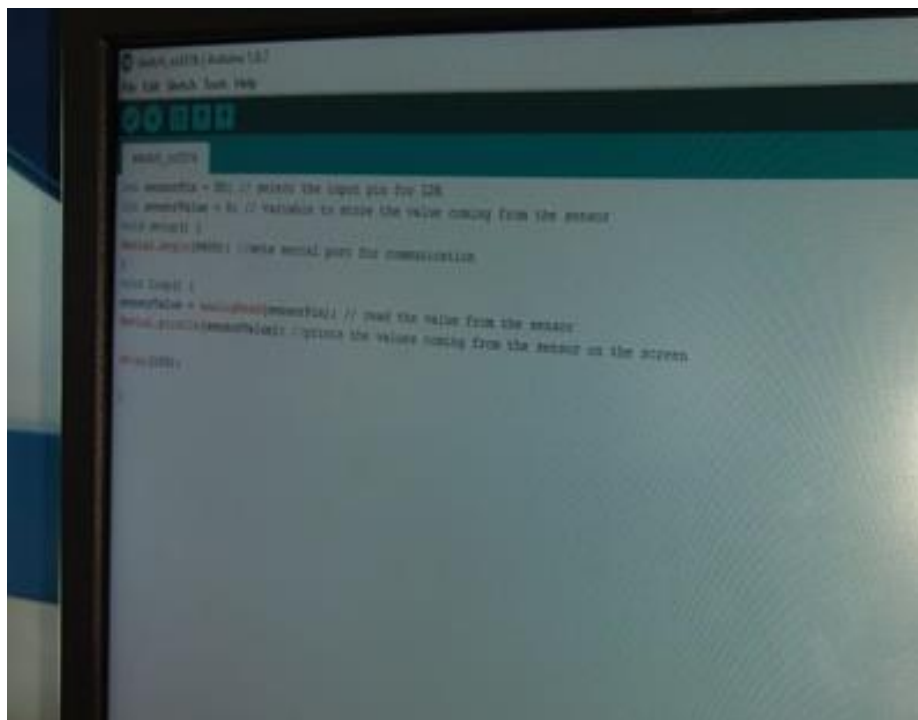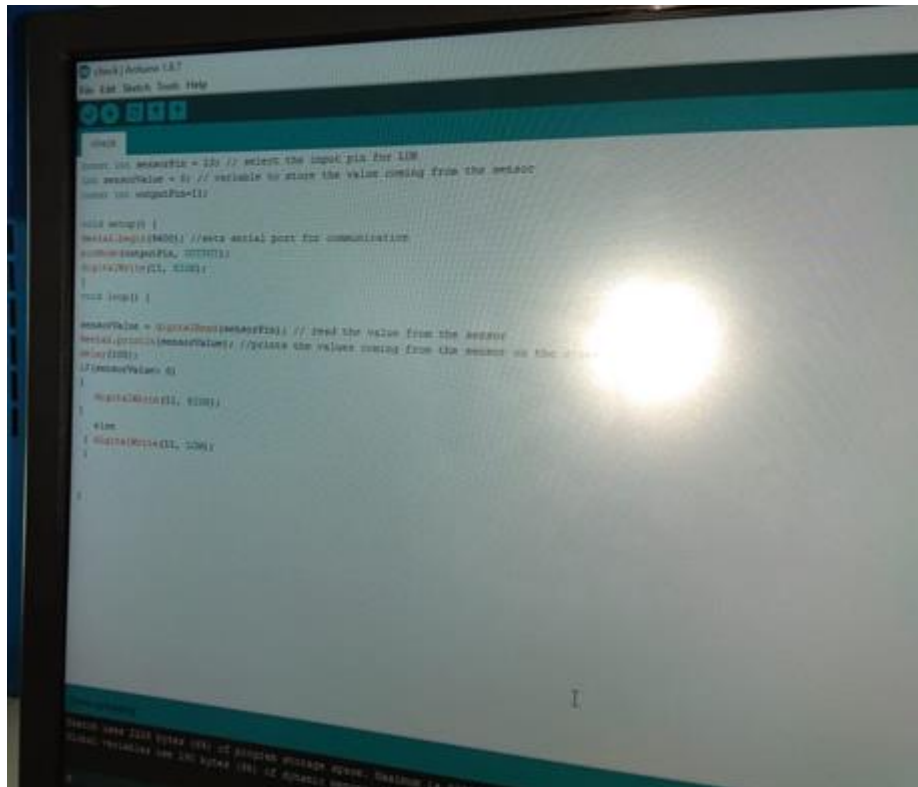
- **CIRCUIT:**

CONCLUSION:

The proposed system can automate the charging process of mobiles and laptops. This system would be capable of turning on and off only when the device is connected and charge only when needed, and can be further improved to monitor other appliances. Further improvements to the system can be made in order to increase the hardware performance.

Furthermore, this circuit can be used with the charging adapter with integrated circuit we can reduce power consumption globally speaking save much more and these saved powers can used in the developments of rural areas where there is no electricity, less electric bill to common man and faster developing country with less energy consumption.

Therefore, the device is able to successfully send the data from the device to the cloud and monitoring of the data in the cloud with graph is done for analysing battery status. With more time we would have been able to receive the data/signal from the cloud to device to stop power consumption.