7 MAY
2024

CCIOT PROJECT

DOWNTIME DETECTION

ZAINAB RAZA

7 MAY
2024

PROJECT AIM

Develop an IoT-based solution for detecting downtime in the power infrastructure of our college by monitoring the current

WHY ?

The power infrastructure at IIIT faces challenges due to unplanned power cuts and failures, leading to downtime and disruption of services. The lack of automated monitoring and detection systems exacerbates these issues

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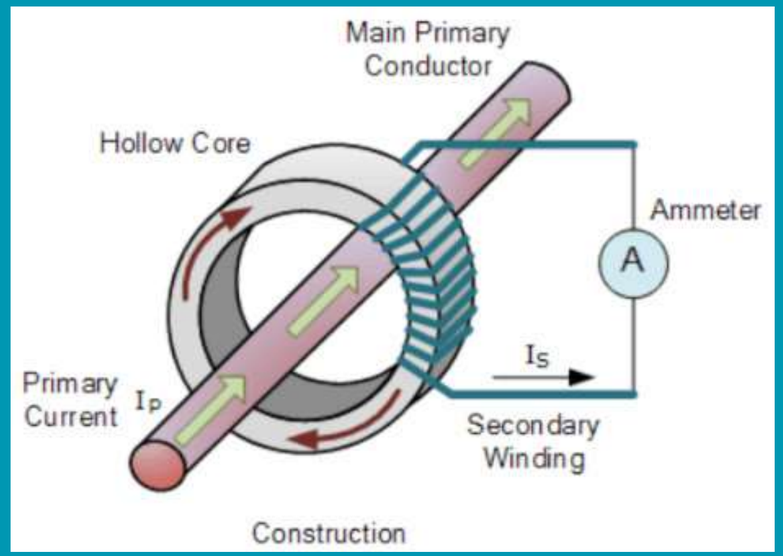
HOW TO SENSE THE CURRENT ?

Current can be sensed using various current sensors.

We are using the CURRENT TRANSFORMER current sensor as it has high accuracy & high current handling capacity for AC measurements

Current transformers operate on the principle of electromagnetic induction.

It works by wrapping a primary winding around a conductor carrying the current to be measured. This induces a proportional voltage in a secondary winding, which is connected to measuring devices



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OTHER SPECIFICATIONS

SCT013-00 CURRENT SENSOR WITH INPUT RATING OF 100 A IS USED

THE VALUE OF THE CURRENT SENSED WILL BE SENT THROUGH ARDUINO TO A DASHBOARD

ARDUINO UNO WIFI REV-2 IS USED AS IT IS COMPATIBLE WITH WIFI

THINKSPEAK IS USED AS A DASHBOARD TO DISPLAY THE CURRENT VALUES

CIRCUIT DIAGRAM

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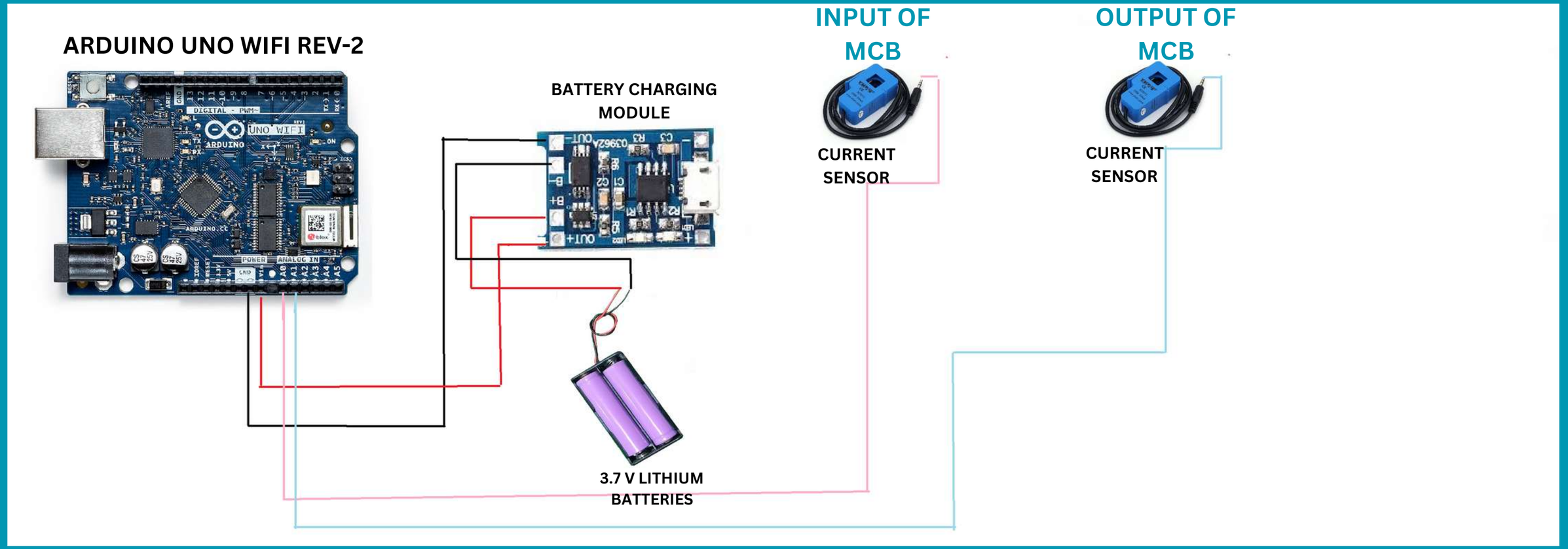

BATTERY MODULE IS USEFUL IN THE CASE WHEN THERE IS A POWER CUT
SO TO POWER THE ARDUINO WE USE LITHIUM BATTERY WHICH GETS RECHARGED USING THE CHARGING MODULE ONCE POWER IS RESTORED

THE SOFTWARE PART

ThingSpeak is an open-source IoT platform that collects, analyzes, and visualizes data from sensors or devices.

MQTT (Message Queuing Telemetry Transport) is used as the communication protocol for connection between dashboard and sensor

MQTT's lightweight nature, publish-subscribe model, makes it better suited for sending frequent updates in IoT applications

Current data from CT sensor is recieved by ARDUINO which calculates the rms current and publishes using MQTT on THINGSPEAK. THINKSPEAK shows downtime detected when the current passing through becomes 0

SOLDERED CIRCUIT

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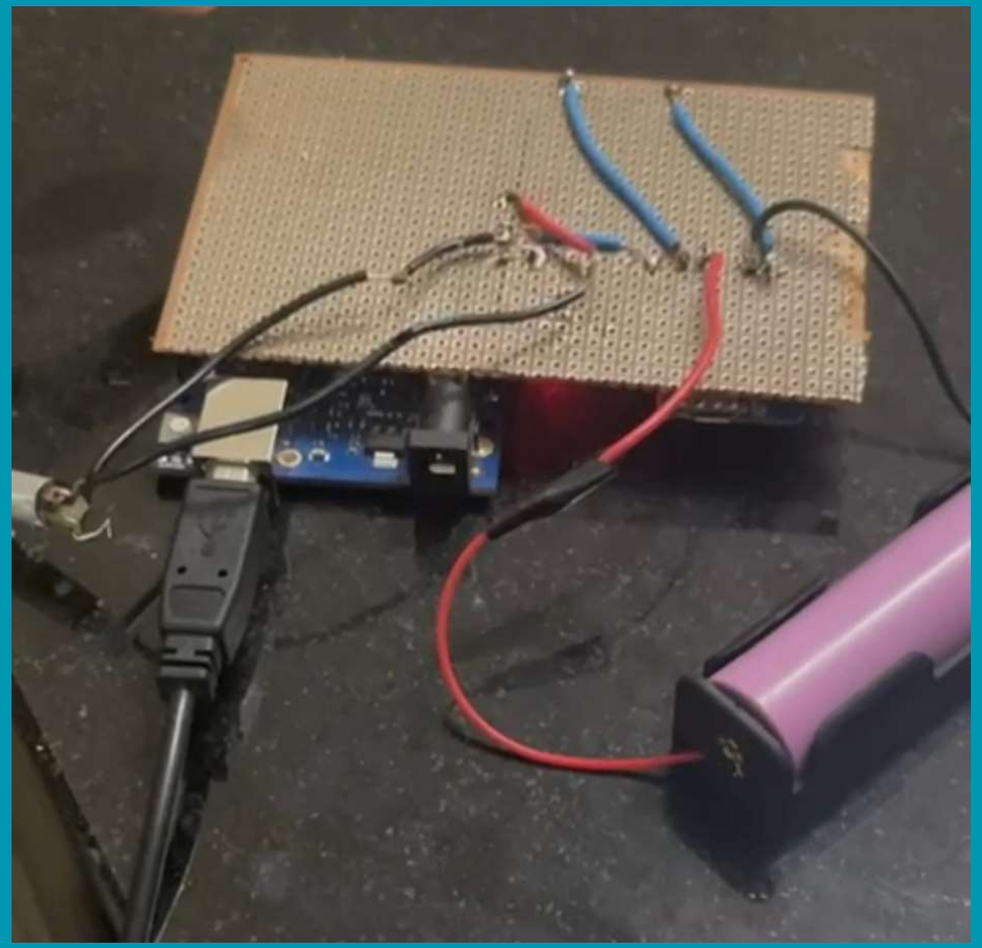

DEPLOYED CIRCUIT

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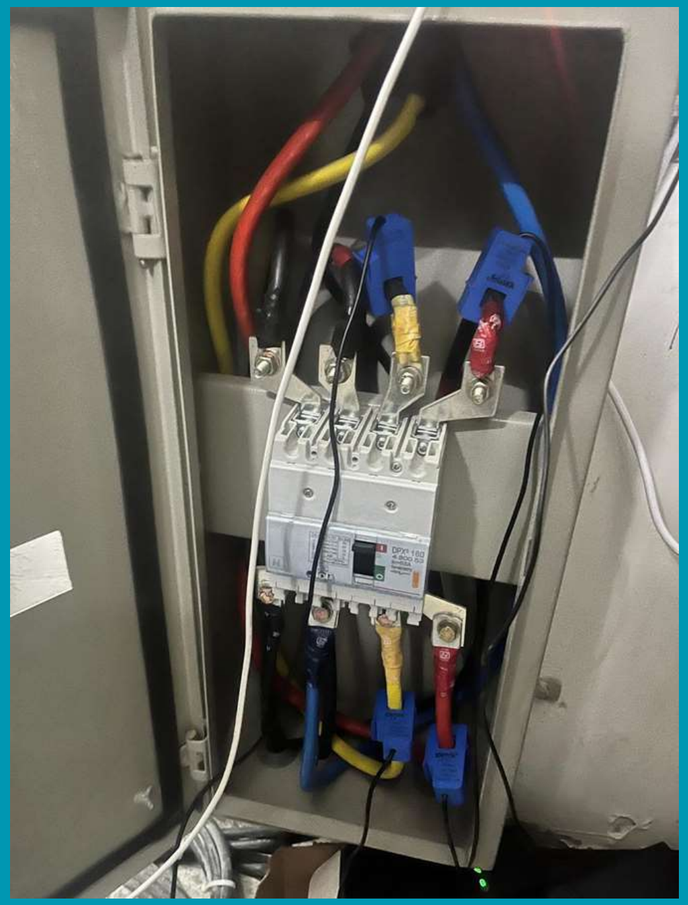
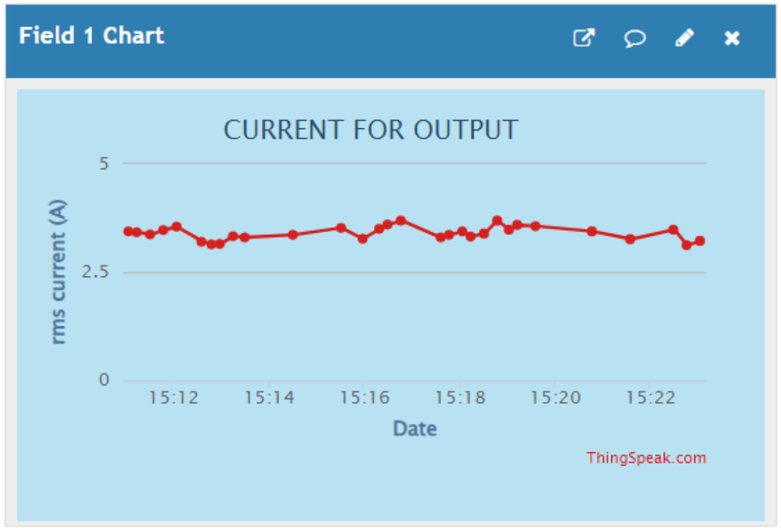
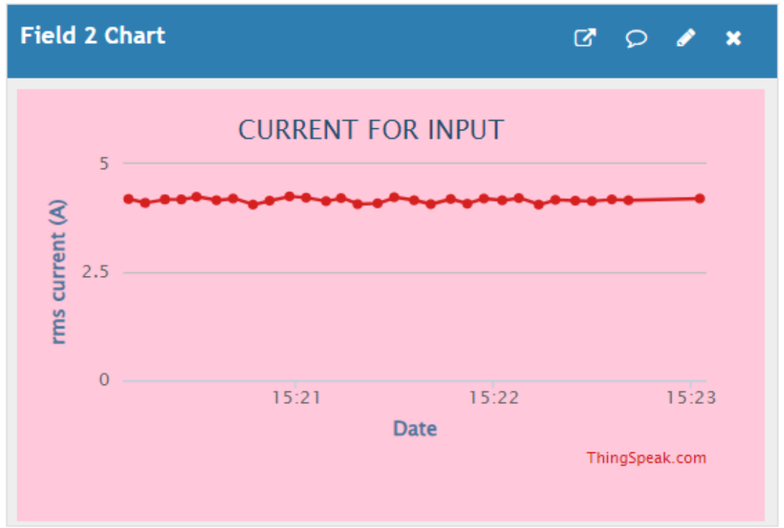


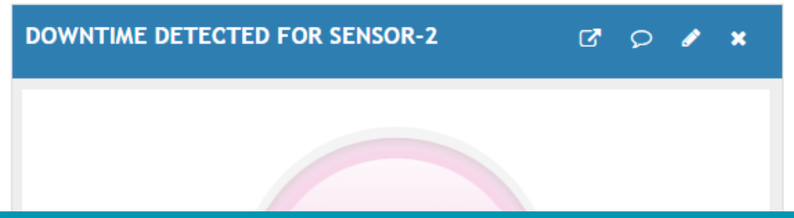
CLAMPED TO YELLOW WIRE - INPUT OF MCB
CLAMPED TO THE BLACK ABOVE IT IS THE CORRESPONDNG OUTPUT TO THE MCB

Channel Stats

Created: 16 days ago
Last entry: less than a minute ago
Entries: 57435



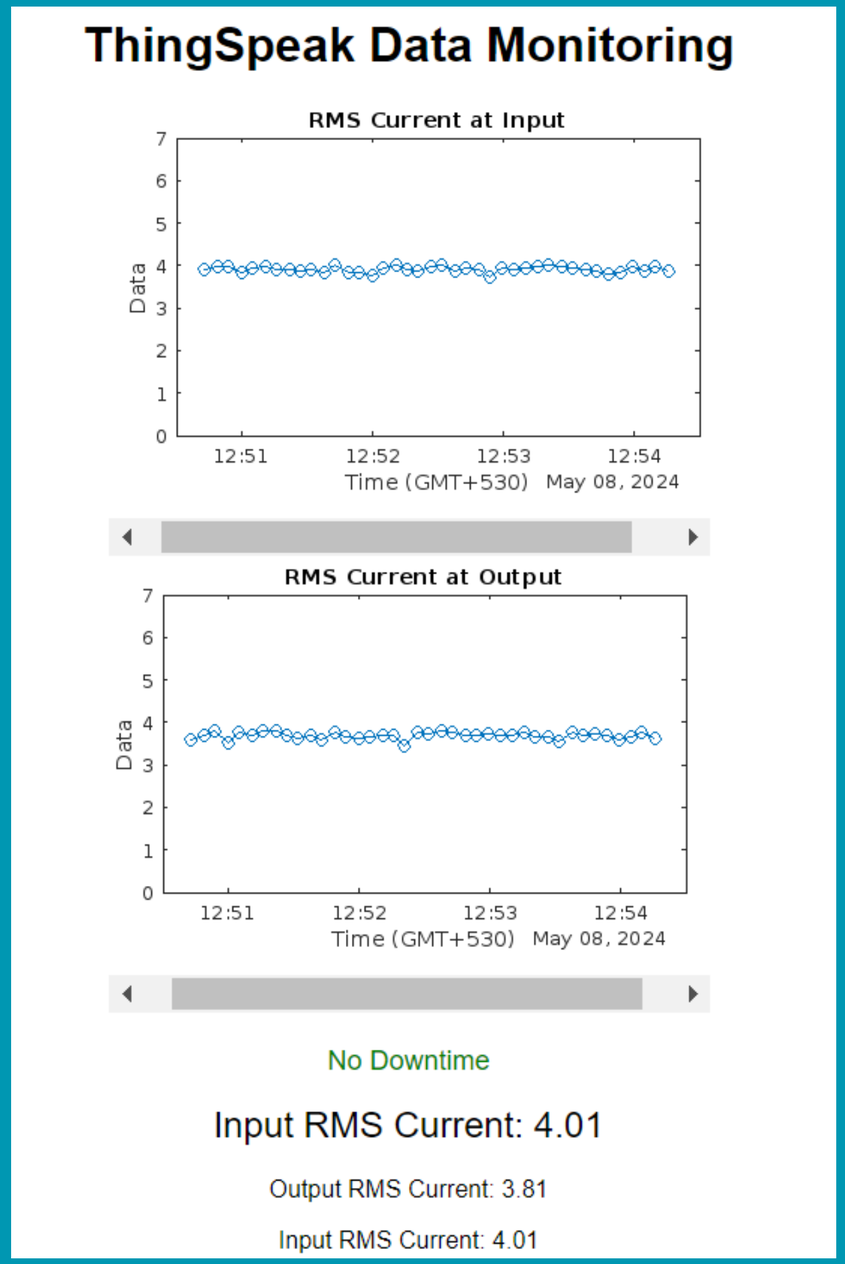




ACTUAL CURRENT FLUCTUATES FROM 3.3 TO MAX 5 A
AS TESTED BY THE CLAMP METER. MOSTLY IT IS 3.9-4.4 A

I HAVE DEPLOYED DATA OF LAST 7 DAYS
AND 15 DAYS OF TESTING DATA

WEBPAGE HOSTED ON GITHUB

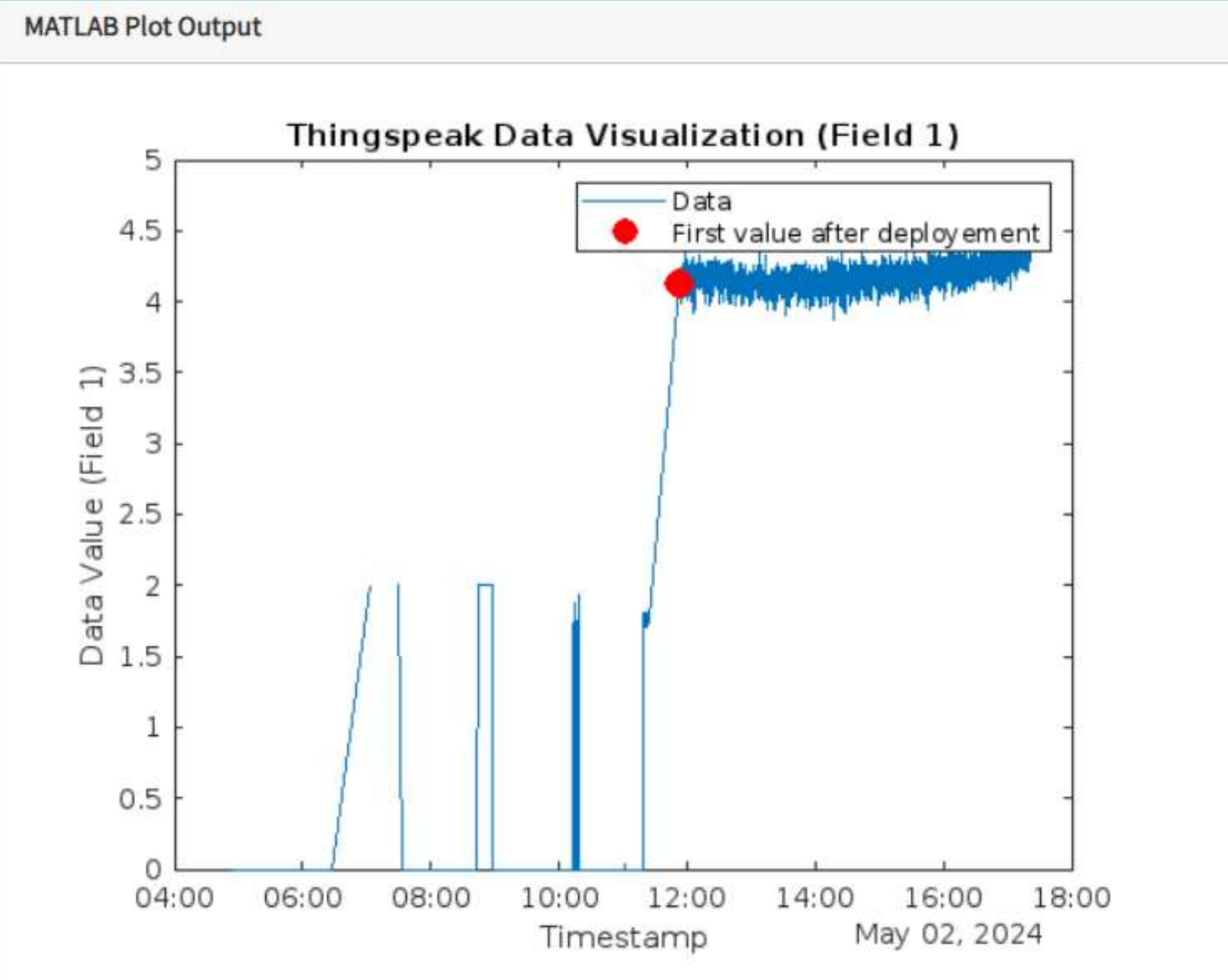


USING HTML,JAVASCRIPT AND CSS, I HAVE ALSO CREATED A WEBPAGE SHOWING REAL TIME GRAPH AND DATA.

THIS IS HOSTED ON GITHUB SO CAN BE EASILY ACCESSIBLE FROM ANYWHERE

https://zainy324.github.io/

DATA COLLECTION



I DEPLOYED MY CIRCUIT ON 2ND MAY

DEPLOYED VIDEO

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BB INSTANT TESTING

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CONCLUSION

MY PROJECT SUCCESFULLY DETECTS THE REAL TIME CURRENT AND PLOTS IT ON A DASHBOARD

IT CAN DETECT WHENEVER THE CURRENT GOES TO 0 (DOWNTIME) WITHOUT EVEN GOING NEAR THE UPS ROOM

IT CAN GIVE ALERT THROUGH THE INDICATOR WHEN THERE IS DOWNTIME AND CAN ALSO SEND MESSAGES THROUGH THINKTWEET AND OTHER PREMIUM SOFTWARES