IOT Warning system

(Temperature and humidity)

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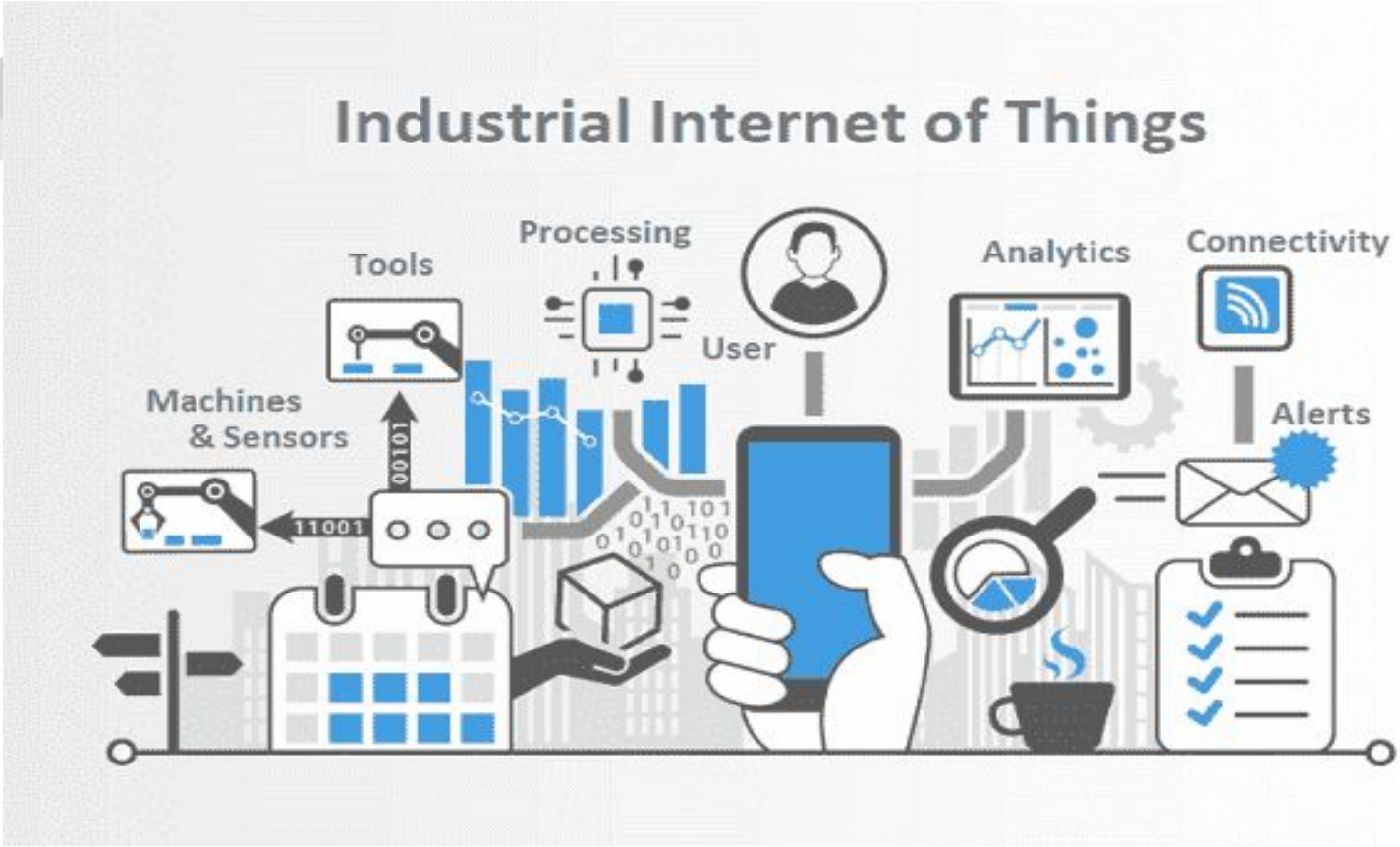
-CSS Team


Industrial Internet of Things
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OUTLINE

- Introduction
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- Implementation Model
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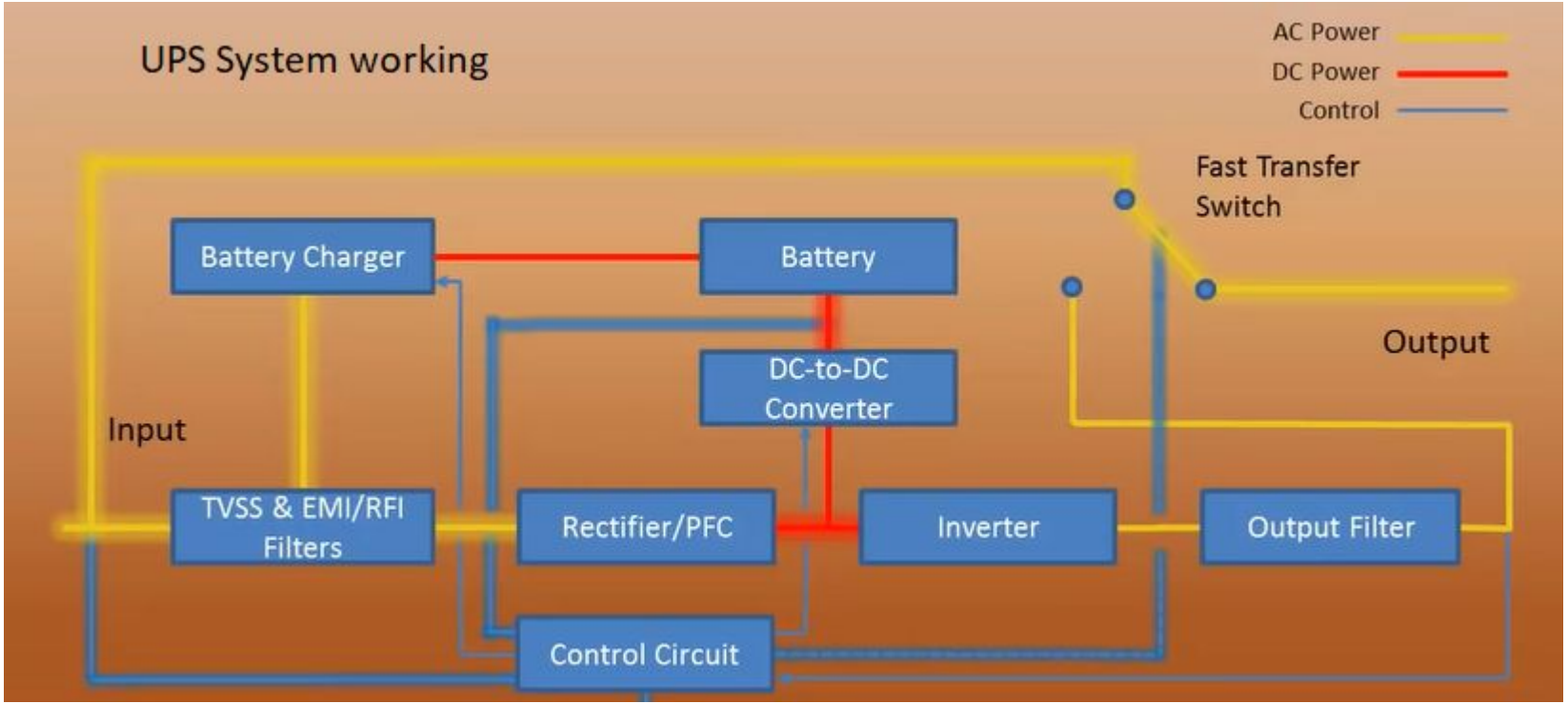
Introduction - RFID Tags

An active RFID tag has its own power source(a battery) -- an on-board, long-lasting battery that enables the tag to transmit data continuously, regardless of whether it's in the field range of a reader. In our model we simulated our design using a heat gun and proposed our application for UPS monitoring system.

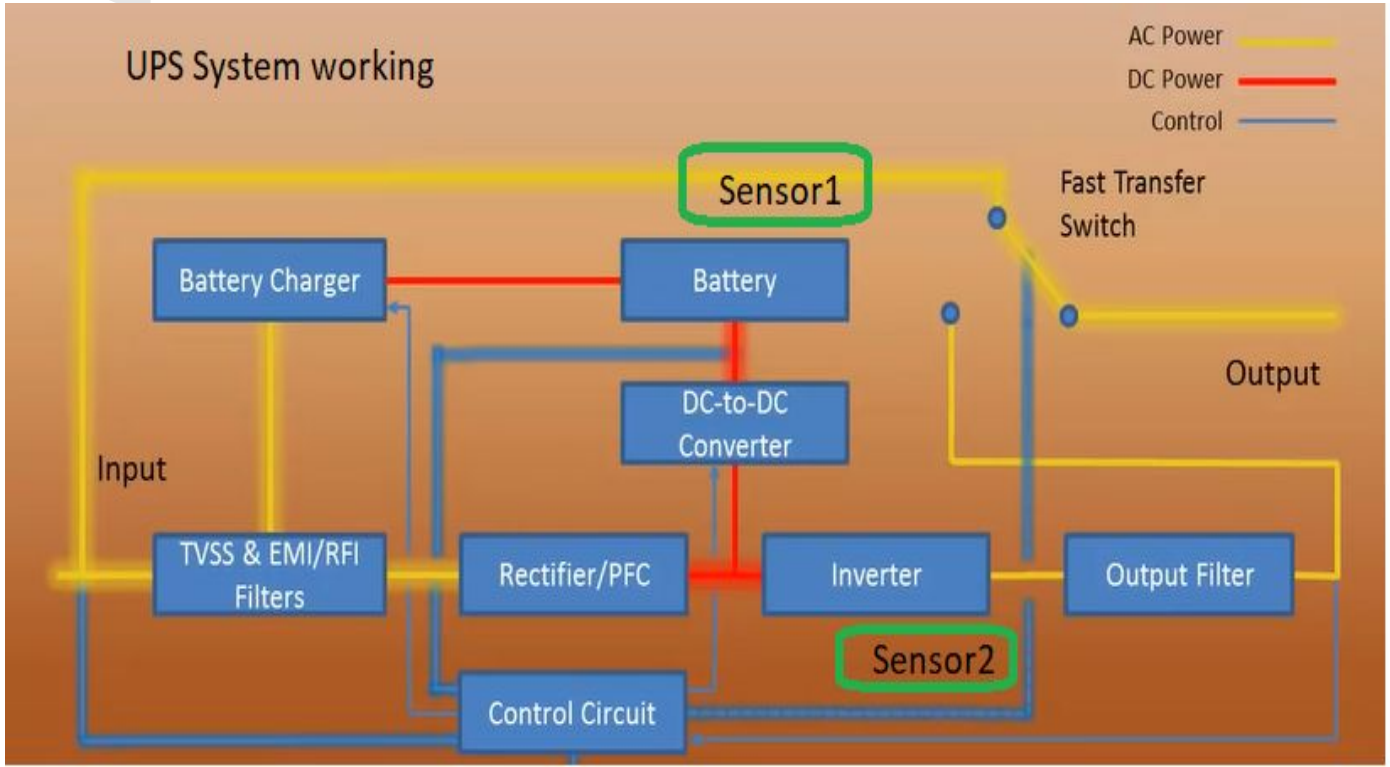
Application:

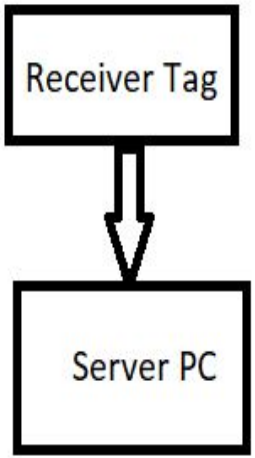
- Highly specific use cases, such as sensing when a container door is open and there is a change in temperature. This gives shippers an extra insight that allows them to make important adjustments, like rerouting a shipment if it spoils.
- Industries that commonly use active RFID tags in addition to shipping and logistics include automobile sales manufacturing, health and medical, construction, mining, remote monitoring and IT asset management.

MODEL OVERVIEW



IMPLEMENTATION MODEL





HARDWARE and SOFTWARE Requirements

Hardware:

- PIP Tag
- Receiver Module
- Hp Laptop (acts as a server)
- Heat gun for simulating environment

Software:

- Ubuntu 16.04
- Python 3.6
- C++
- Code composer studio (Data flashing to PIP tags)

Working Procedure

- Connect the receiver module to the laptop and keep the sensors in the test location. Now run the python code developed

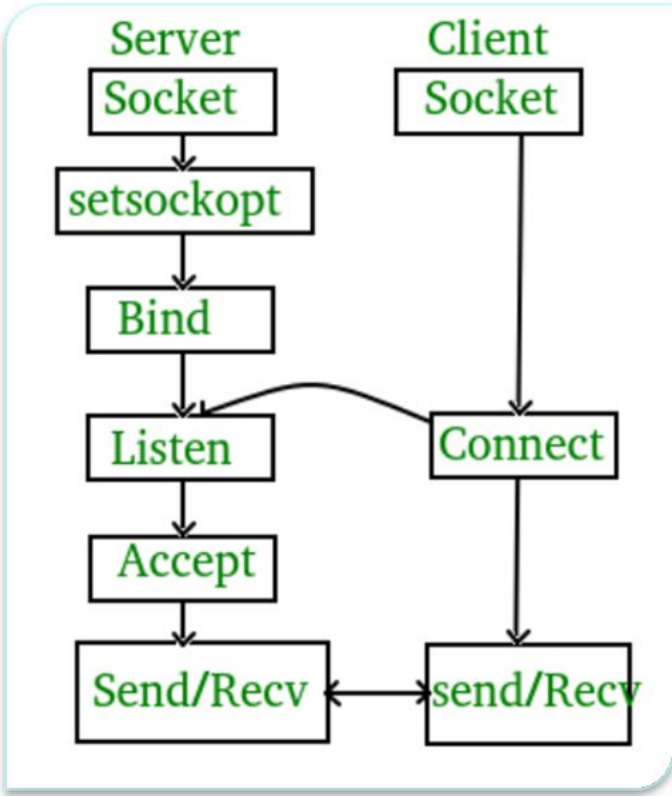
Function of the code

- Ambient temperature and humidity is measured by the PIP tag sensors
- Receiver module receives the data
- Once the code runs in the server
- Using smtp code, required snippet condition is checked
- When the Ambient temperature exceeds the threshold limit, an alert email is sent to specified email address .

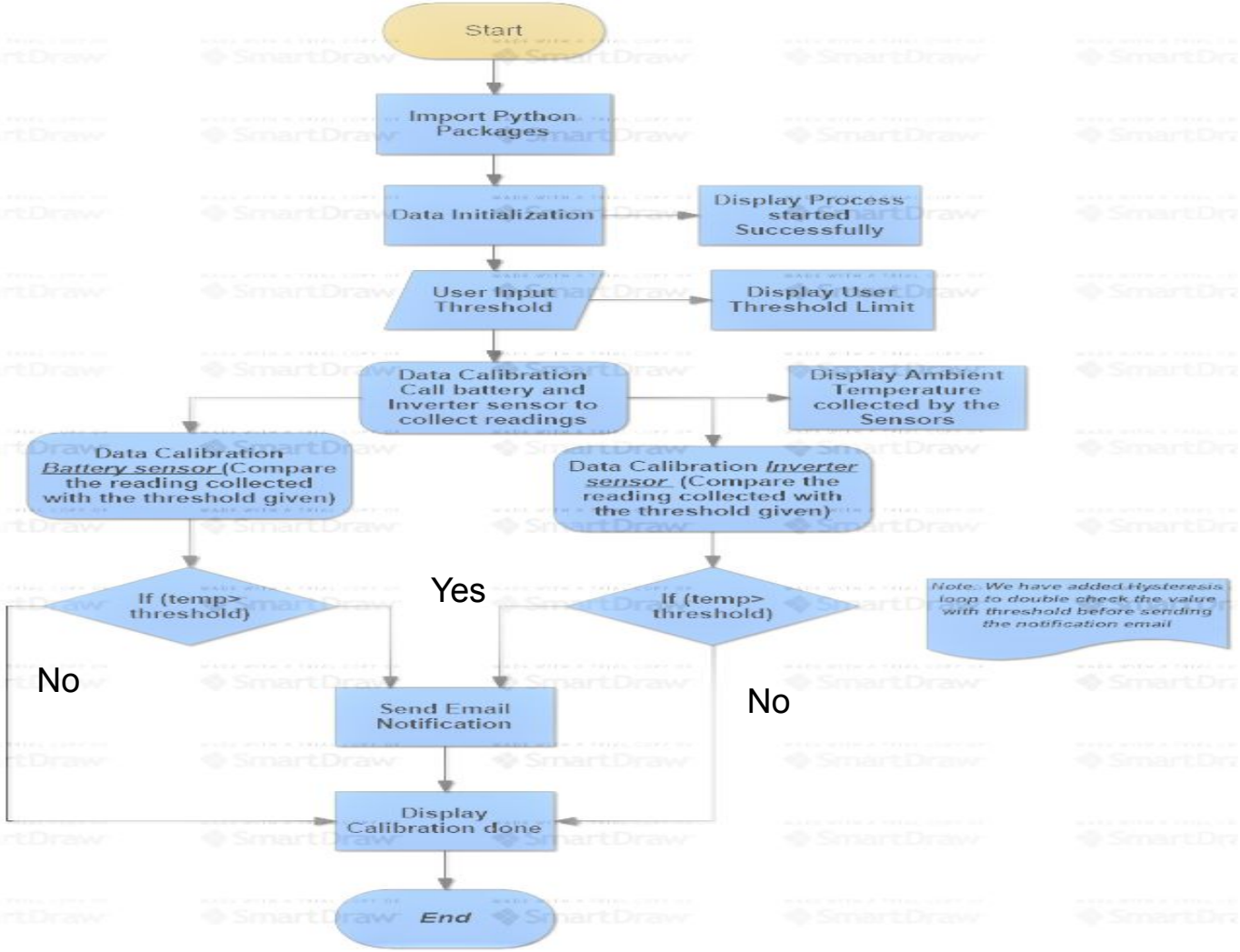
PIP TAG - SOCKET CONNECTION

A **socket** is one endpoint of a two-way communication link between two programs running on the network.

- Socket programming is a way of connecting two nodes on a network to communicate with each other.
- One socket(node) listens on a particular port at an IP, while other socket reaches out to the other to form a connection.
- Server forms the listener socket while client reaches out to the server.

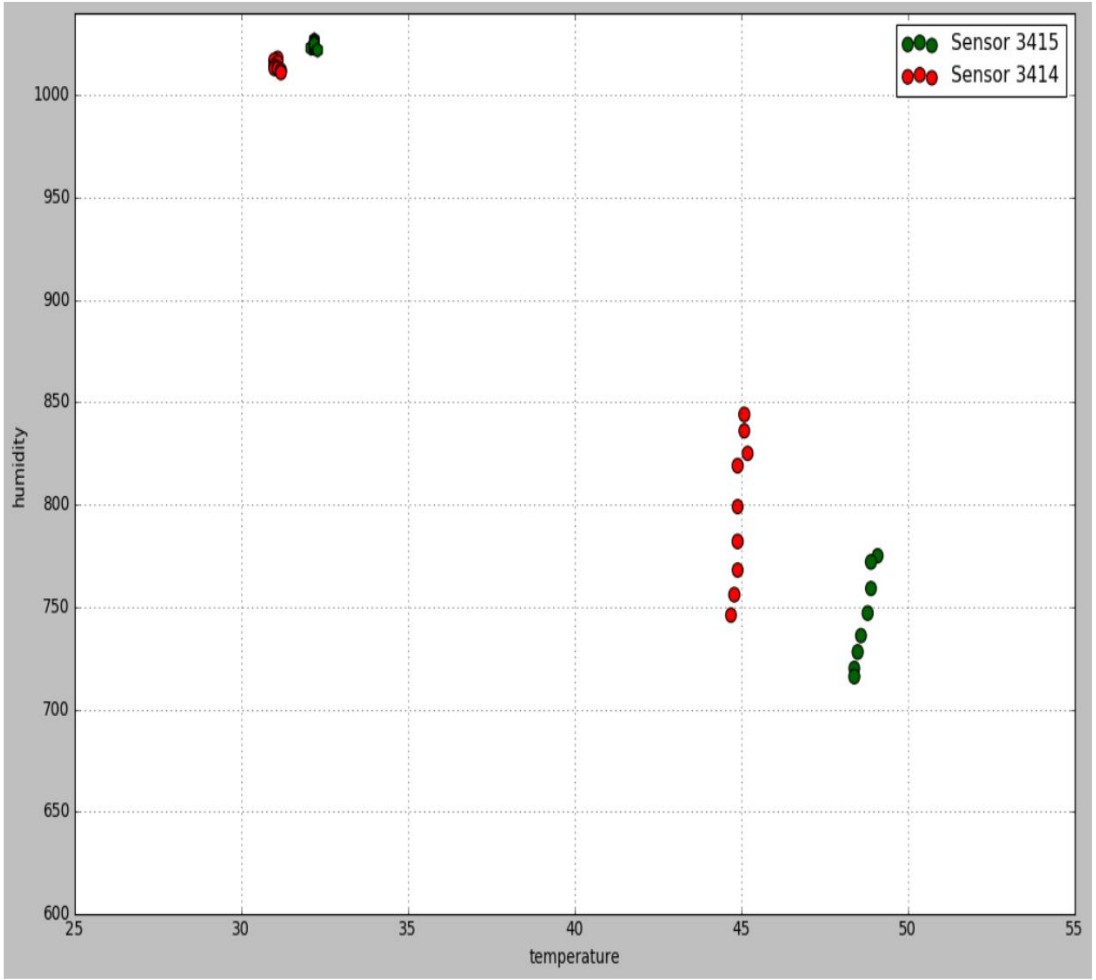


Python code Flow chart



RESULTS

- Threshold was set to 50
- Alert was activated after threshold was reached using heating gun.
- Graph shows the growth from ambient temperature to simulated temperature .



OBSERVATION

- As we know temperature and humidity are negatively correlated .
- We observed as temperature increases , the spacing between molecules increases,leading to decrease in the percentage of water vapour the air currently holds (humidity decreases)

3	31.0	1014	44.9	819
4	31.0	1013	44.9	799
5	31.1	1013	44.9	782
6	31.1	1013	44.9	768
7	31.2	1012	44.8	756
8	31.2	1011	44.7	746

	temperature	humidity	heatingrise1	humidityrise1
temperature	1.000000	-0.465023	-0.458165	-0.723651
humidity	-0.465023	1.000000	0.980969	0.891691
heatingrise1	-0.458165	0.980969	1.000000	0.870220
humidityrise1	-0.723651	0.891691	0.870220	1.000000

Limitation

- The tag cannot function without battery power, which limits the lifetime of the tag.
- Battery outages in an active tag can result in expensive misreads.

Apart from the battery issue, which needs replacement for every two to five year (depends on model of tag), the pip tags are more reliable for many residential as well as commercial application with minimum cost involved.

Conclusion

- We designed a warning system, using temperature and humidity sensors to have of ambient weather for proper functioning of UPS system
- The calibration of the sensors was done and threshold was made flexible to extend the work to other application
- PIP Tags can also be used for measurements of other parameters.
- Our system aimed at developing a warning system ,which can be used in a variety of ways in healthcare as well as inventory sensitive to humidity and temperature changes .
- Machine learning algorithms can be used to make it automated .

Future Enhancements

- Anomaly detection using machine learning algorithms . Anomaly detection has crucial significance in the wide variety of domains as it provides critical and actionable information.
- Further development in these sensors may help in weather prediction

THANK YOU