

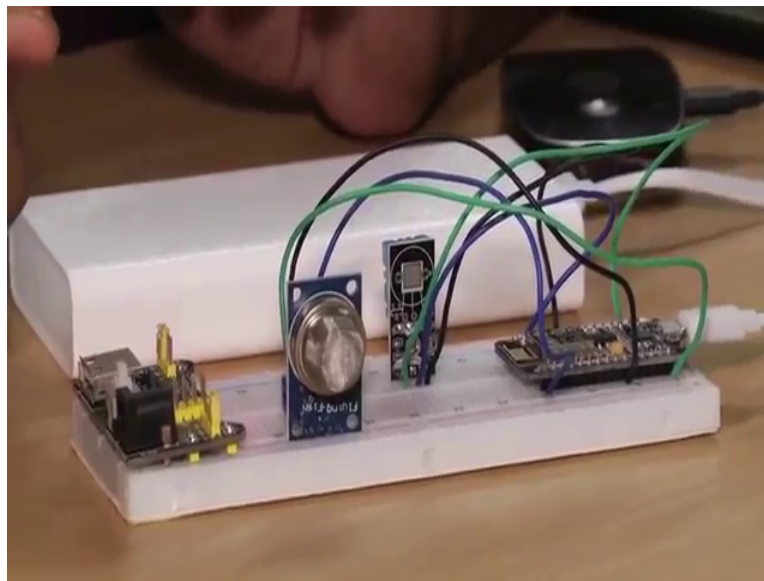
Introduction to Industry 4.0 and Industrial Internet of Things
Prof. Sudip Misra
Department of Computer Science and Engineering
Indian Institute of Technology, Kharagpur

Lecture – 63
Student Projects – Part II

Hello everyone, I am Gaurav Chaturvedi. And I am Deepak Kumar. Our project is about IOT Projection Meter and we are using node MCU DHT11 and MQ135. DHT11 is a temperature and humidity sensor and MQ135 is air quality measuring sensor. So, basically our project had two objectives. First one is we are sending the data from the node MCU to the blink server where the blink, blink server will represent the data in a mobile application.

And our second objective is we are sending the data from the node MCU to the central server where our Linux machine is acting as a central server. So, basically the centre server will act as a data storage purpose and the data will be stored in a CSV file and later on we will be divide KNN machine learning algorithm which will classify the data into as rainy and sunny and it will also tell us about the air quality whether it is good or bad.

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Now coming to the connections.

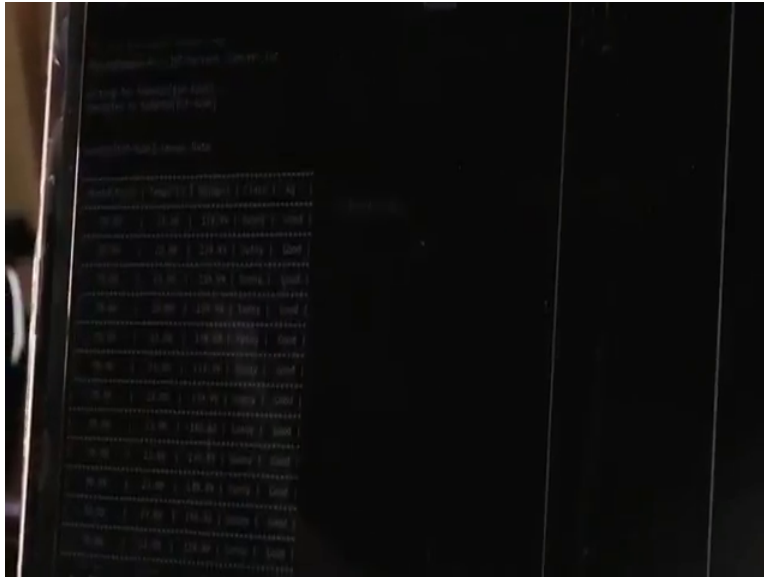
So, here it is a connection here we are powering in node MCU through the power bank and DHT11 output pin is connected to the d 1 pin of node MCU and its ground connected to the ground of node MCU and VCC connected to the VCC of node MCU. And coming to the MQ13 sensor, here its output pin is connected to the a 0 pin of node MCU and its ground to the ground of node MCU and its VCC to the VCC of node MCU. Here DHT11 is sensing temperature and humidity and sending the data in digital format to node MCU and MQ135 sensing air quality and sending the data in analogue format to node MCU.

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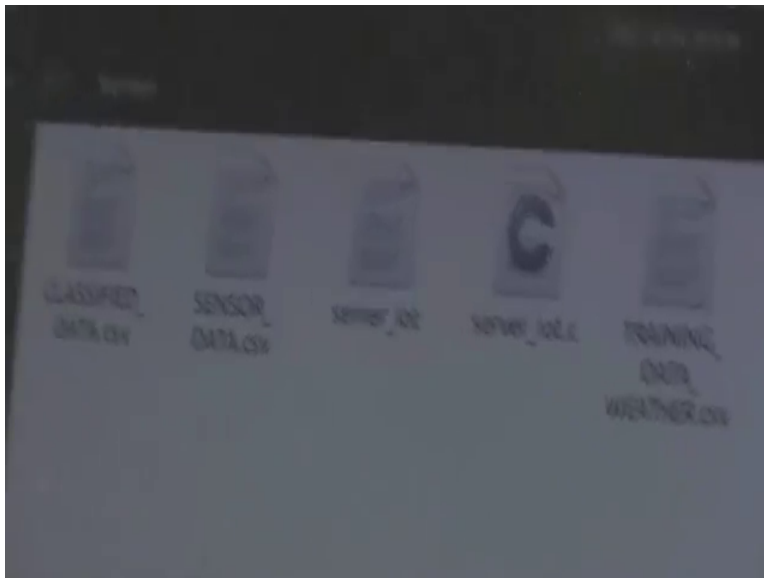
Now we will show the demo. Now so, in the application you can see it is showing humidity temperature and air quality and also plotting the live graph as you can see here. So, here is a live graph.

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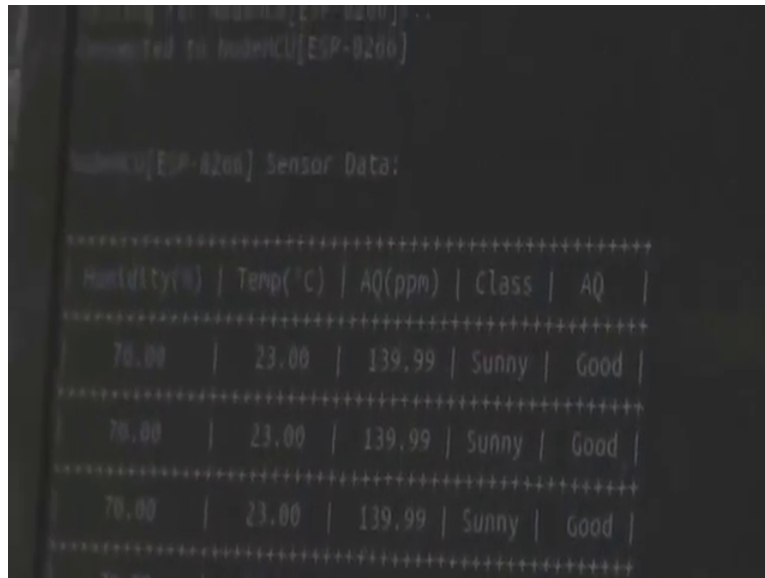
Now, coming to the central server as you can see here, it is show showing humidity temperature.

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We are storing the data in CSV file. Here is the CSV file as you can see here and it is storing with timestamp.

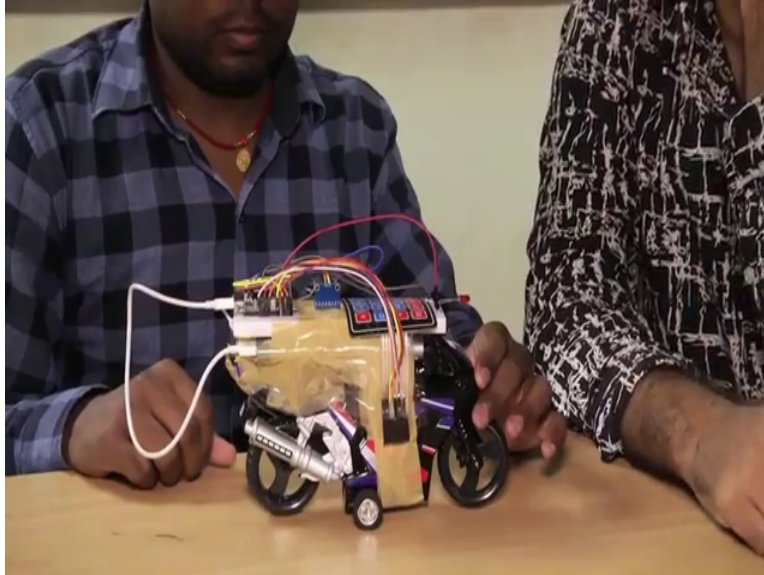
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Now coming to the server, you can see here it is showing the data humidity, temperature, air quality and there is classes of the weather and air quality whether it is good or bad. So, for this we need training data. So for the training data, here we have given the training data to the program in CSV file you can see here. So, now this is the server, it is running and it is showing the data.

Hello everyone. We are here to present our class project which is Smart Bike Toolkit. I am Rajkumar M.Tech. first year. He is my teammate Ahwan Mishra, M.Tech. first year computer science. Now some basic information about our project is, this is basically a gadget which help in bike safety, security and also help to detect the bike accident.

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The basic component use in our product; project is node MCU 1.0. This is node MCU 1.0 and accelerometer sensor, gyroscope sensor, GPS sensor and matrix keypad. This is a one sensor MPU 6050 which contain three type of sensor; accelerometer sensor, gyroscope and temperature sensor. We are using only two sensor of; two sensor accelerometer sensor and gyro sensor of this sensor. Now for bike safety purpose and bike safety, and security purpose we using accelerometer sensor and a password protection. Now, for bike accident for checking the bike accident, we are using accelerometer sensor, gyroscope and sending the location of the accident happen; we are using GPS of our mobile.

Now, for communication purpose, we are using MQTT for connectivity we are using Wi-Fi. We are using decision tree algorithm of machine learning for training our training around 500 data set.

Now, I will explain the working principle. Suppose the bike owner has kept the bike here and gone somewhere. Suppose someone else try to steal the bike, then there will be some change in motion and also if the bike has fallen away, then also there will be some change in motion. The motion sensor will detect it; sorry the accelerometer sensor would detect it and it will send, it will publish a impunity message and the owner has a android mobile and he has a mobile client impunity client, he has subscribed to that topic. So, he will get the notification.

Next thing is whenever someone will try to; whenever someone will try to steal the bike using unlocking the password. First of all the owner has to unlock the bike using giving a right password. If someone will try to unlock the bike using wrong password; if it tracks wrong password three times, then also the theft message will go to the owners mobile. So, when the authorized user will call he will give the right password and he will ride the bike.

Suppose he meets a bike accident, then what will happen? The accelerometer sensor and gyroscope sensor both will capture the data and we are using that data analytics for that I will explain that. So, and they will send publish the message of the accident and it will the message will be sent to the mobile of the owners relatives. Now I will say about data analytics. Initially what we did, is we trained the bike about how the accident happens means if we move the bike like that and we trained it how the accident happens. We collected about 500 data sets and then we applied the Sentry algorithm to make the model, then we fit the model to the node MCU ok. This is how our model project is.

So, first of all if someone tries to steal the bike, then he will move the bike; move the bike.

First.

It got the so it will send the threat message, if the bike will fall off..

Without unlocking the password.

Without unlocking the password if the bike falls off, then also it will send the message to mobile I got a notification. Next thing is we got a.

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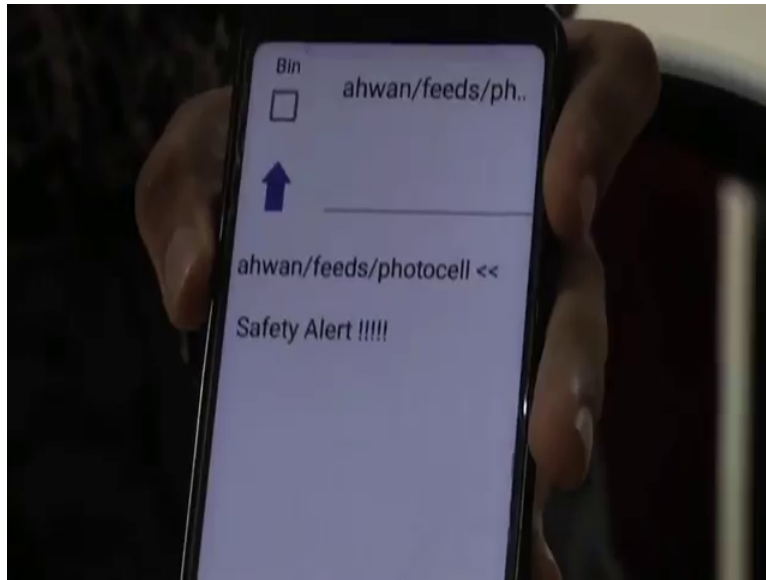
screenshot, we will post a screenshot.

Someone try to

If someone gives the wrong password unlock [FL] unlock [FL] pause. If someone will give type wrong password for three times, then also it will send a message to the owner. Now restart it.

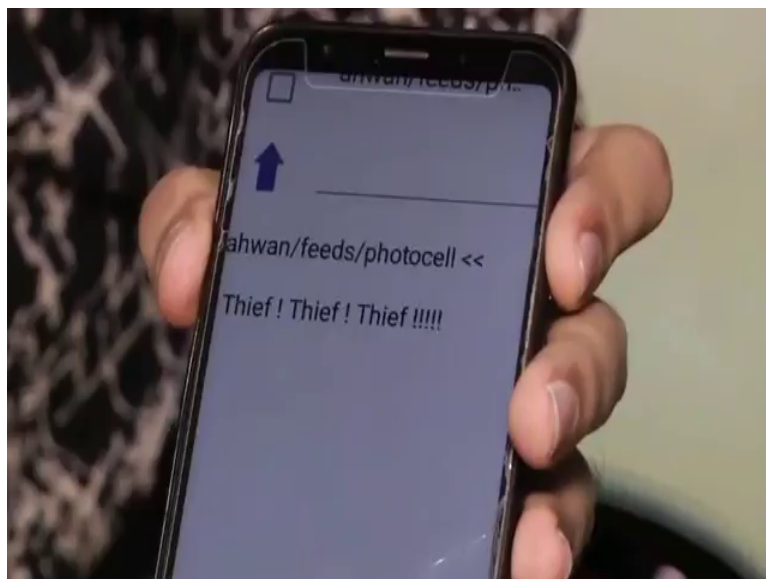
Now authorized user types the correct password. Now he is riding the bike when he will meet the accident, it will send the message. We will show a demo you can see, it will send the message.

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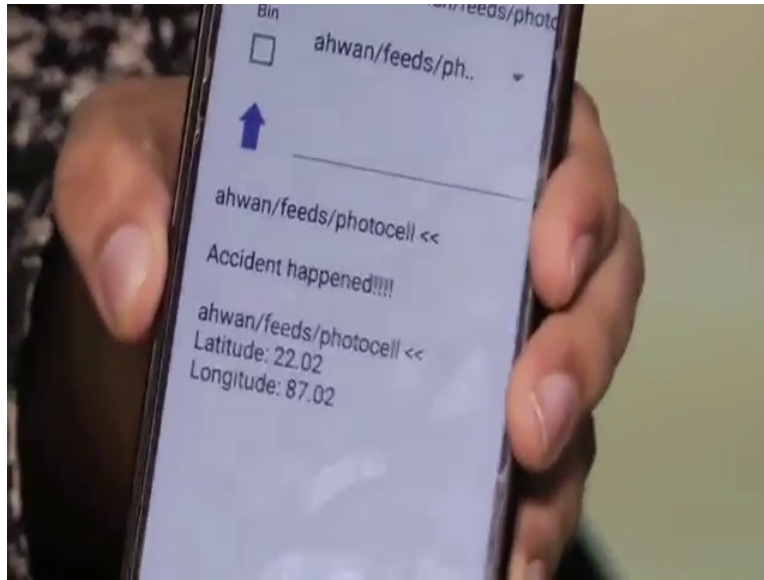
Now I will show this is the message I got, when I got the safety alert means either the bike is fallen or someone tries to steal it.

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Next thing is, this is the message I got when someone gives the wrong password, then its send the Thief! Thief! Thief!!! message.

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This is the message I got when the accident happened and the GPS sensor sends the latitude and longitude to the owners relatives.

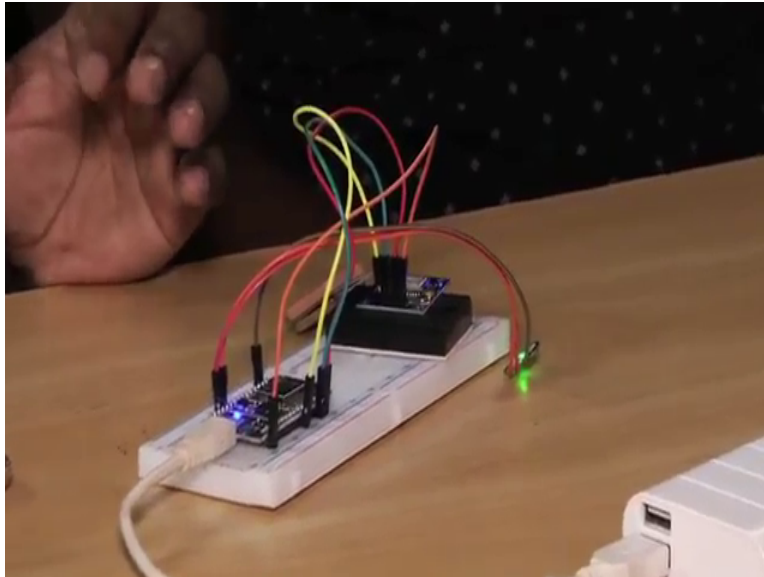
Thank you.

Hello everyone. My name is Gaurav Gupta and he is Shagun Guru. We are from Computer Science and Engineering department IIT, Kharagpur. Today we are going to present you a IOT project. The topic of our project is road accident detection using heartbeat sensor. So, basically whenever a person go through a bad road accidents, then it is heart pulse gradually start slowing down. So, whenever its heart pulse beat come below to a certain threshold, then we will send its location and his heartbeat data to its; his relatives.

So, basically through this we can actually save his life by informing his relative as soon as possible. So, now we are going to show you what component we are going to use in our project.

Coming to the components parts in the software part, we are using Arduino for coding and we are using MQTT test and blink apps and other than software we are using hardware. The main components of the hardware are node MCU.

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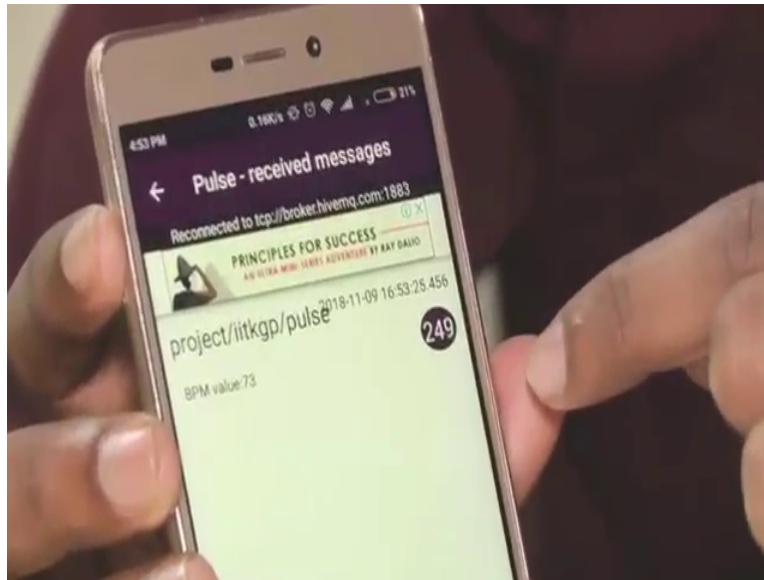
And there are two sensors; one sensor is GPS module and the one is heartbeat sensor. This is the heartbeat sensor and this is the GPS module.

Now, we are going to show you what, how we are going to connect it. So, we have the heartbeat sensors. So, we have connected it through one wire on the ground node and other in the voltage and one is the n an analogue node. And the other now we have the GPS module. We will show you the connection in the pdf we have provided. So, basically we are powering through our a power bank and to basically transfer or to build and for other purposes, we are using MQTT softwares and blink app. Now we are going to show you how the work flow, how this actually work.

Coming to the workflow; first of all from this device, we are sending the GPS location to the users phone, directly to the phone using blink app. In the blink app we are sending that and the sensor I mean send the heartbeat sensor heartbeat data which we are sending from here, it is say

it is directly sending to the MQTT server in the cloud and after that the MQTT server, it is coming to the users phone in MQTT test.

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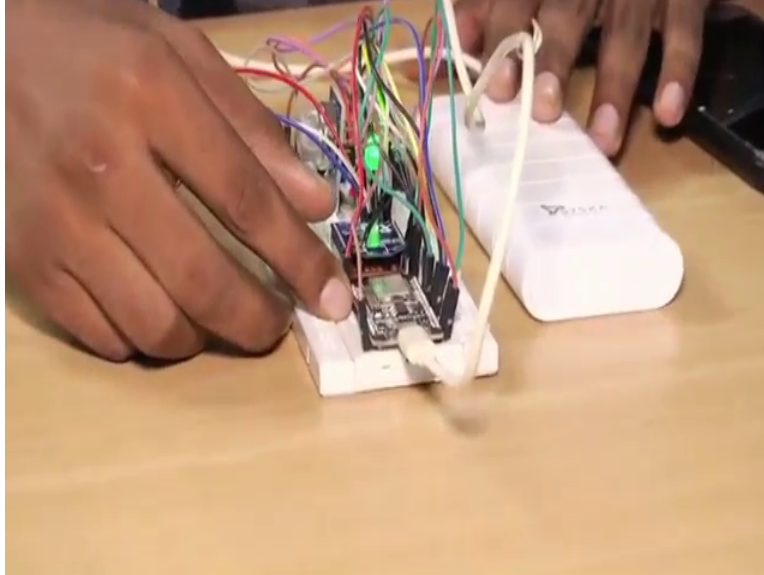


Now we are going to show you how it actually working. Here after touching the sensor, we are getting the reading here of the heart beat through the MQTT broker on our mobile. So, you can see the heartbeat pulse is rating 73 right now and now we will send the location of the person on the blink app. So, here we have the location of the person showing on our blink app. We have set the threshold less than or 75, you can actually set it to the even below then that. So, that whenever person go through an accident, its heart beats pulse is basically below from the normal. So, through this we can actually detect where the person is right now and what is t its heart beat. So, as soon as we get this information, we will be able to rescue him.

Thank you.

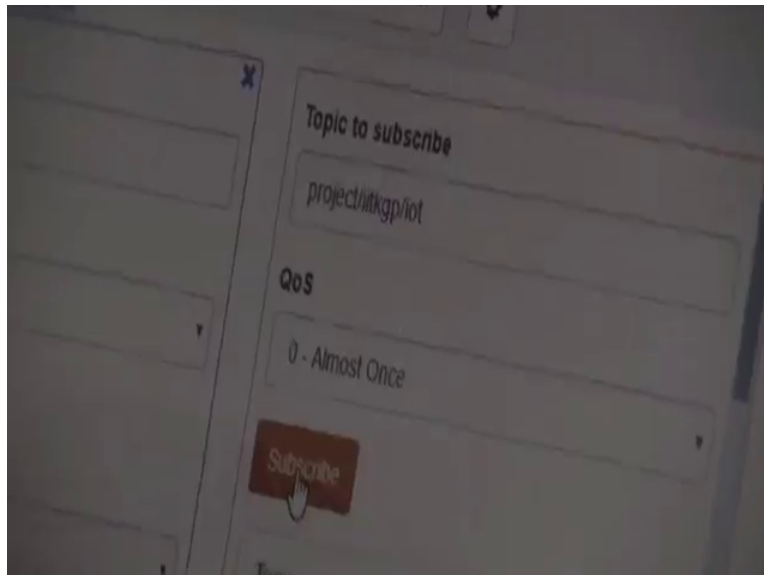
Hello everyone. My name Vishal Kumar from Computer Science and Engineering department. My demo project is fire alarm system, which are used to detect the fire and send an alert the message to owner and the nearest fire station.

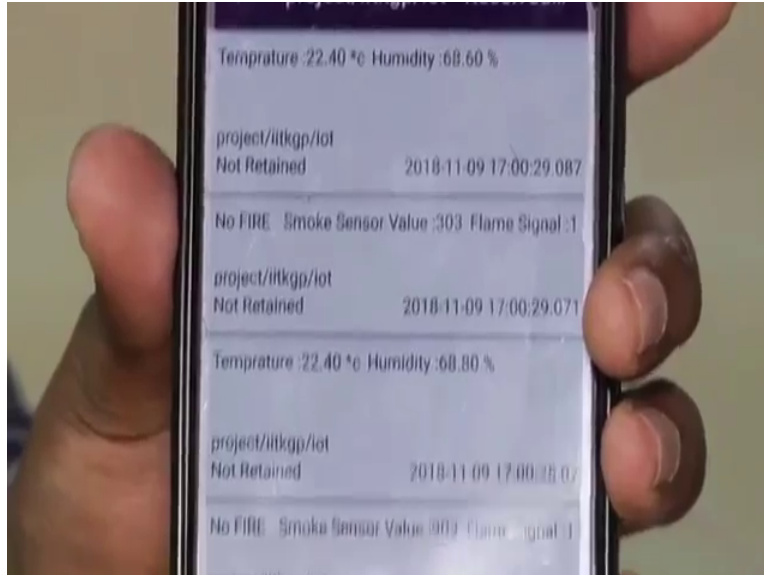
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So, here we use our two nodes which are used one are used for the one; two node which are placed in different places which are used to detect the fire. In first node, here is first node which contained the node MCU which are used for processing of data a second and second; in second node we use the Arduino. And here between two nodes, we communicate through a zigbee and from zigbee, I this node send a data through this node through zigbee device and this node send through Wi-Fi to a broker is MQTT broker which I installed in my local server. Here is a nearest fire station which can subscribe the topics through which are used in a my MQTT.

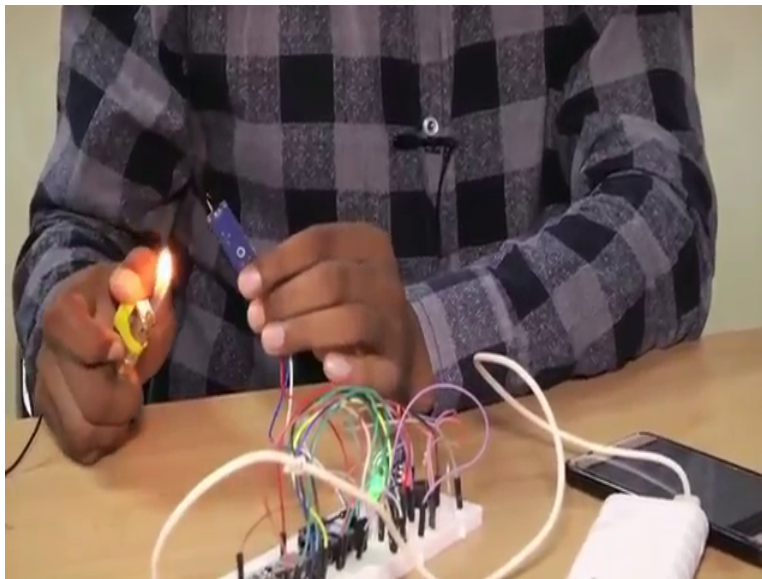
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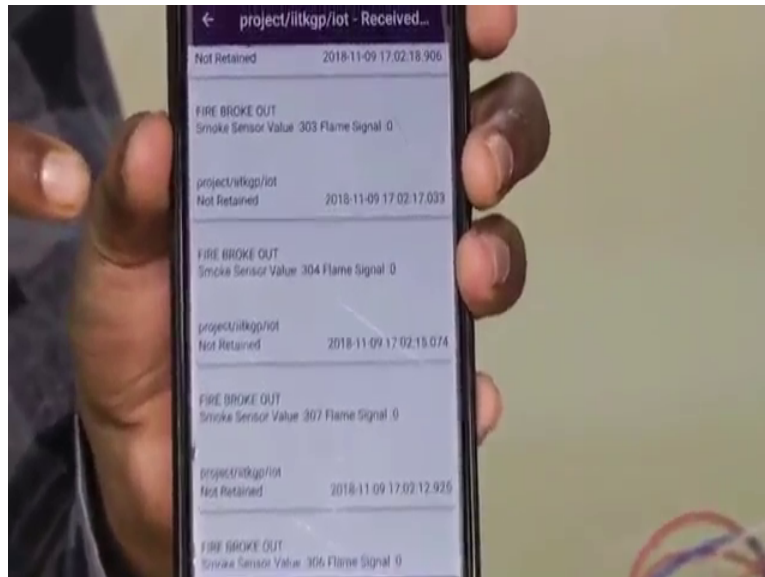
So, owner also subscribe the topic offer MQTT they also get a message that is a sent by the broker which i have installed locally. In this while they also get a no fire and current situation of the room where the node are installed. So now we are put off fire.

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Now here is the flame sensor which are detect for the fire. Now we are test the depth if there it is a flame which detect by the flame sensor and automatically they buzzer the sound. So, nearby people also get a alert and also flee from the that place. On here also get a message, there is fire.

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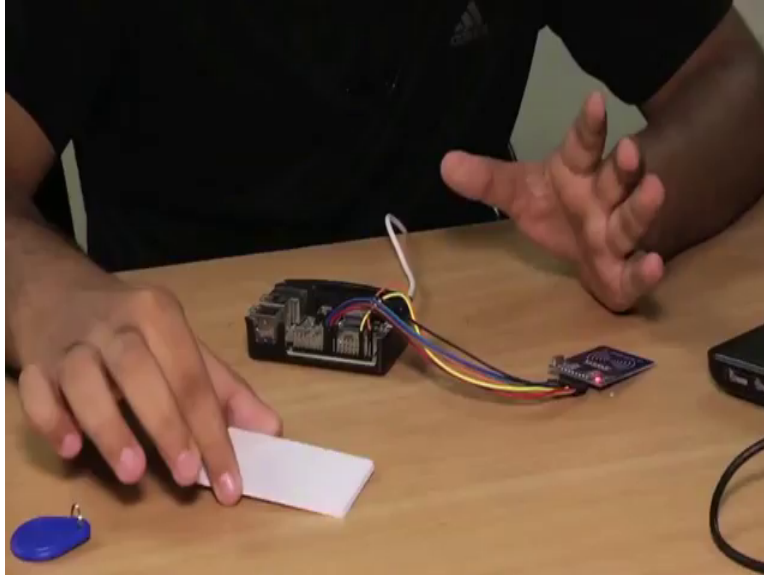
That is a; he also get a message that is a fire broke out what is the condition?

Keep it percent.

Here we show the fire broke out which alert the owner about the condition of room and what is the condition if there is also there is any smoke. So, smoke sensor show the value of the room condition. Thank you.

Hi, I am Akash; I am M. Tech. first year student from Department of Computer Science and Engineering IIT, Kharagpur.

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So, the demo that I am going to show is about RFID based attendance system. So, basically we are using RFID technology that is very short range communication technology and then building attendance system out of it. So, already RFID systems are widely used in all the companies and for authorization as well as attendance purposes, various institutes also use these for student authorization and attendance.

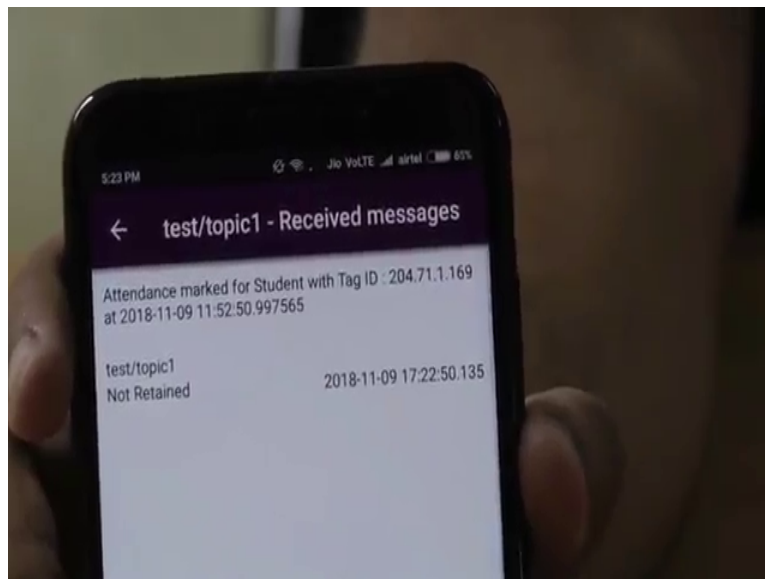
So, the hardware components involved are this is Raspberry Pi that is model 3 B plus and this right here is RFID RC522 scanner that is basically a RFID scanner. So, these are RFID tags all these tags these are two different types of tags, but although the thing is same. So, these all have a unique Id associated with them. So, this scanner whenever we will place these in the close proximity of this scanner, the data their unique Ids will be read and accordingly we can process it by writing the code in whichever way we want. The way this is going to work is the students will be given these RFIDs. So, each RFID their unique Id will be associated to one student and using this they will mark attendance and this device will be placed in the class. And whenever they will place this card like this so, their UIDs will be read and their attendance will be marked.

So, how we are approaching on this is we are setting a timer for like that is on our convenience, but we are setting it for 10 minutes. So, in the middle of the class or in the beginning of the class basically, professor will turn on the system and then students will students can easily mark their attendance. And now their attendance will be stored in database that is set up in this Raspberry Pi and each attendance will separately be notified to professor on using MQTT protocol and also

whenever the all the students have marked attendance or the timer that we have set is expired the complete list of students those who are present and those who are absent will be notified, will be published to the; published over MQTT and professor can receive it.

So, also there are some other things like some sort of data analytics is performed which will also be give sent to a professor. So, that they can judge students based on their attendance like which student is attending classes more frequently and so on ok. So now this system is running I have run the code.

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Now whenever I scan it, there will be a message and that will happen for every Id and if some unauthorized Id is placed, then there will be no message and even our code will not accept it and we will simply reject that entry.

Thank you.