Patient Room Monitoring System

Mini Project Report submitted in partial fulfillment.

of the requirement for the degree of

T. E. (Information Technology)

Submitted By

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Saish Khade - 18101B0001
Tanaya Desai - 18101B0059

Under the Guidance of

Prof. Vinita Bhandiwad

Department of Information Technology

Vidyalankar Institute of Technology

Wadala(E), Mumbai 400 037

University of Mumbai

2020-21

CERTIFICATE OF APPROVAL

For

Mini Project Report

On

Sensor Network Lab

This is to Certify that

Komal Rane
Saish Khade
Tanaya Desai

Have successfully carried out Mini Project entitled

"**Patient Room Monitoring System**"

In partial fulfillment of degree course in

Information Technology

As laid down by University of Mumbai during the academic year 2020-21

Under the Guidance of
"Prof.Vinita Bhandiwad"

Signature of Guide | Head of Department

Examiner 1 | Examiner 2 | Principal
Dr. S. A. Patekar

ACKNOWLEDGEMENT

We would like to express our deepest appreciation to all those who provided us the possibility to complete this report. We express our profound gratitude we give to our **Prof. Vinita Bhandiwad** Ma’am, our respectable project guide, for her gigantic support and guidance. Without her counseling our project would not have seen the light of the day.

We extend our sincere thanks to **Dr. Deepali Vora**, Head of the Department of

Information Technology for offering valuable advice at every stage of this undertaking.

We would like to thank all the staff members who willingly helped us. We are grateful to VIDYALANKAR INSTITUTE OF TECHNOLOGY for giving us this opportunity.

The days we have spent in the institute will always be remembered and also be

reckoned as guiding in our career.

1. **Komal Rane**
2. **Saish Khade**
3. **Tanaya Desai**

Table of Contents

Abstract

In the current scenario of technological developments the healthcare infrastructure is still underdeveloped and facing a lot of issues.It is estimated that 2.4% of the deaths in the country are incurred due to improper hygiene and non-monitored medical facilities.The main goal of the project is to built a working system which can help monitor the environment of the patient’s room.

The system is aimed at monitoring the temperature, air quality, humidity and light intensity in the room of the patient. The major aim is to provide a monitored facility to avoid chances of any mishaps and to enhance our existing infrastructure.

1. Introduction

Continued deterioration of public health resources and poor environmental conditions is a major public health concern in developed and developing countries. It is estimated that the pollutants responsible for poor air quality cause nearly 2.5 million premature deaths per year world-wide. Significantly, around 1.5 million of these deaths are due to polluted indoor air, and it is suggested that poor indoor air quality may pose a significant health risk to more than half of the world's population. Due to its link with industrialization, societal health problems associated with poor air quality disproportionately affects developed and developing nations – it is estimated that improper environmental conditions in the room of the patient may account for premature deaths. Remedial action is needed to improve the existing infrastructure and our idea of project is focusing in helping to overcome the existing problems.

2. Aim

The main aim is to develop a simple but robust model which can efficiently detect the room temperature, humidity, air quality and light intensity.

Objectives

The main objectives of the model are described and mentioned as the following :

- To develop an integrated system for patient room monitoring
- To build a cost effective solution model
- To measure and display the temperature and humidity level of the environment.
- To combine advanced detection technologies to produce an air quality sensing system with advanced capabilities to provide low cost comprehensive monitoring.
- To display the sensed data in user friendly format

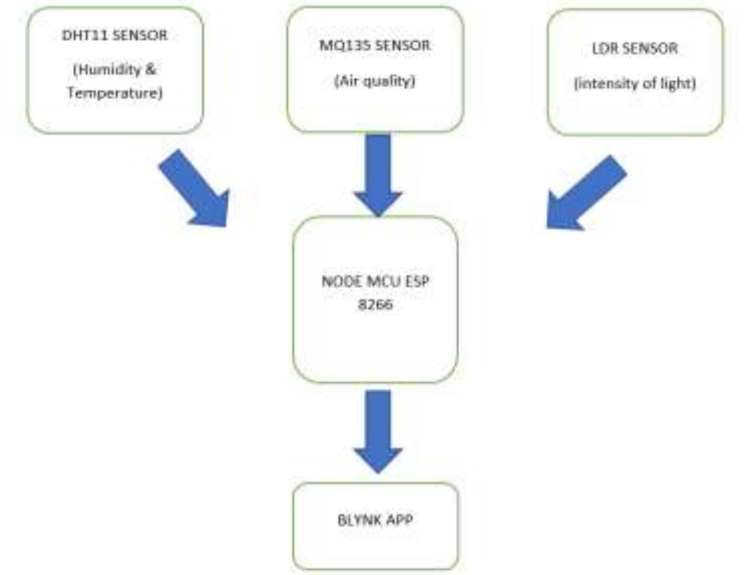
3. Problem Definition

One of the major issues to decreasing healthcare infrastructure is the un monitored use and optimization of resources. There is a big loophole and in majority of cases lack of proper healthcare facilities to tackle the rising need by the patients. In such a scenario with increasing number of patients there is a load on the healthcare system and it burdens the infrastructure leading to unmonitored resources. In such cases there is a urging need for a proper monitoring system to avoid any hasty incidents.

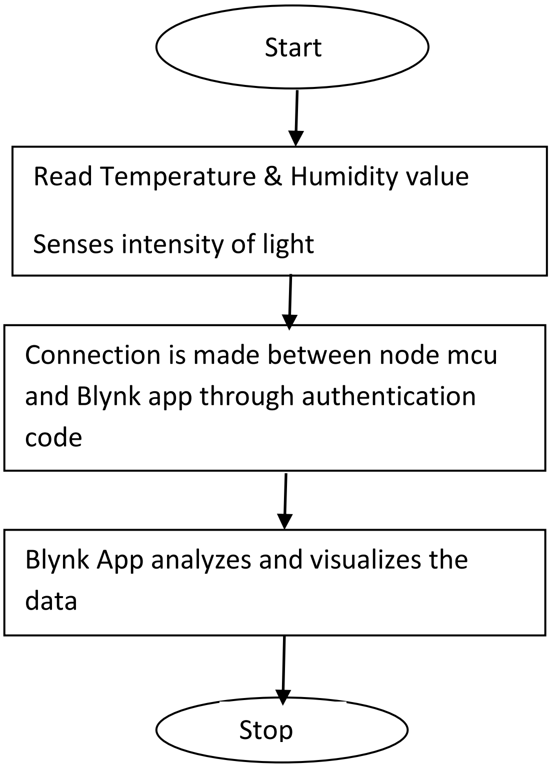
This project provides a combination of process of sensing several gas levels in the air and also the ambient temperature and humidity along with light intensity, thus sensing the quality of the air and intensity of light. The levels of the gases and the temperature is displayed on the Blynk panel which continuously shows the real time output values of the gas sensors, temperature and humidity sensor and LDR sensor.

4. Proposed System

4.1 Block Diagram



4.2 Flowchart



5. Components

5.1 Hardware

- NodeMCU ESP8266
- DHT 11 sensor
- LDR sensor
- MQ135 sensor
- Jumper wires
- Breadboard
- USB Cable

5.2 Software

- Blynk
- Arduino IDE

6. Logic

We put the model in the room. DHT11 will take the Temperature and Humidity and MQ – 135 will take the parameter of Air Quality, LDR will sense the light intensity. We use Blynk for monitoring the value. The node MCU which is connected to internet connection will send the Temperature, humidity and air quality and light data to Blynk cloud and the cloud will send the data to our app.

7. Code

```
 #include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <SimpleTimer.h>
#include <DHT.h>
char auth[] = "****************************"; //Enter the Auth code which was send by Blynk
char ssid[] = "*****";  //Enter your WIFI Name
char pass[] = "********";  //Enter your WIFI Password
#define DHTPIN 2 // Digital pin 4
 const int ldrpin =5;      //D1 pin


#define DHTTYPE DHT11    // DHT 11
DHT dht(DHTPIN, DHTTYPE);
SimpleTimer timer;
void sendSensor(){
  float h = dht.readHumidity();
  float t = dht.readTemperature();
  float q = analogRead(A0);
  int l = digitalRead(ldrpin);
```

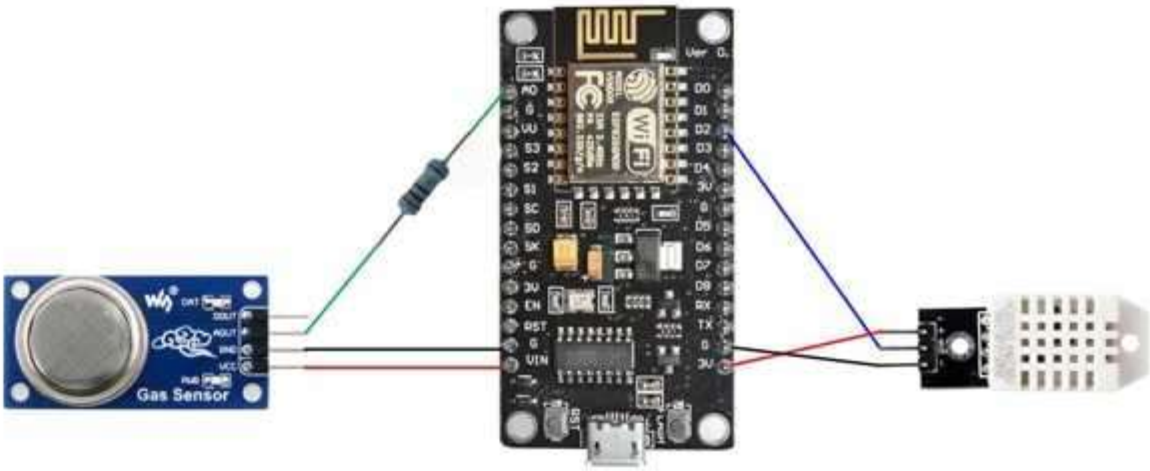
```
  if (isnan(h) || isnan(t)) {
Serial.println("Failed to read from DHT sensor!");
    return;
  }
  // You can send any value at any time.
  // Please don't send more than 10 values per second.
Blynk.virtualWrite(V5, h);    //V5 is for Humidity
Blynk.virtualWrite(V6, t);    //V6 is for Temperature
Blynk.virtualWrite(V0, q);    //V0 is for Air quality
Blynk.virtualWrite(V1, l);    //V1 is for Light
}
void setup()
{
Serial.begin(9600);
Blynk.begin(auth, ssid, pass);
dht.begin();
  // Setup a function to be called every second timer.setInterval(1000L,
sendSensor);
}
 void loop(){
Blynk.run(); // Initiates Blynk
timer.run(); // Initiates SimpleTimer }
```

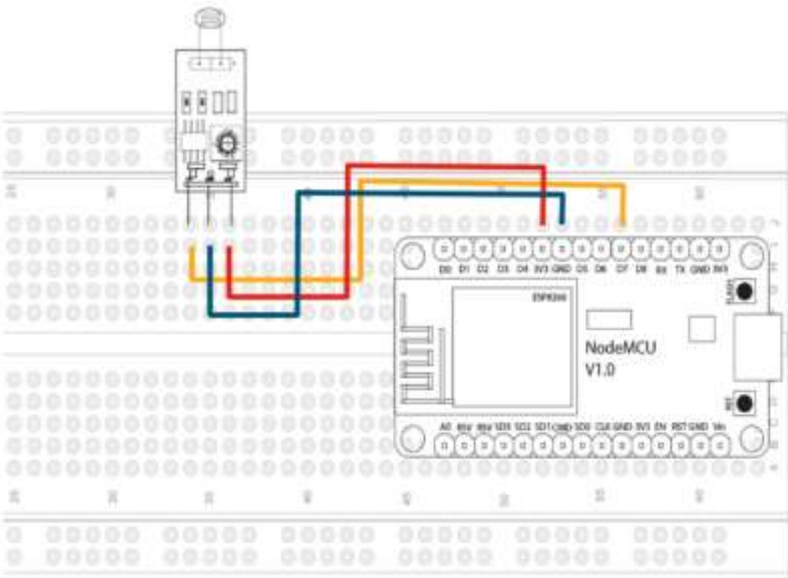
8. Implementation

8.1 Working

- The model is assembled according to the connections required by the sensors.
- After the connections are successfully made, the NodeMCU is interfaced with the sensors and the Blynk application.
- The connection with the Blynk application is made by providing a authentication code
- The sensors take up the necessary parameters and send the data to NodeMCU which is further sent to blynk cloud and displayed visually.

8.2 Circuit Diagram

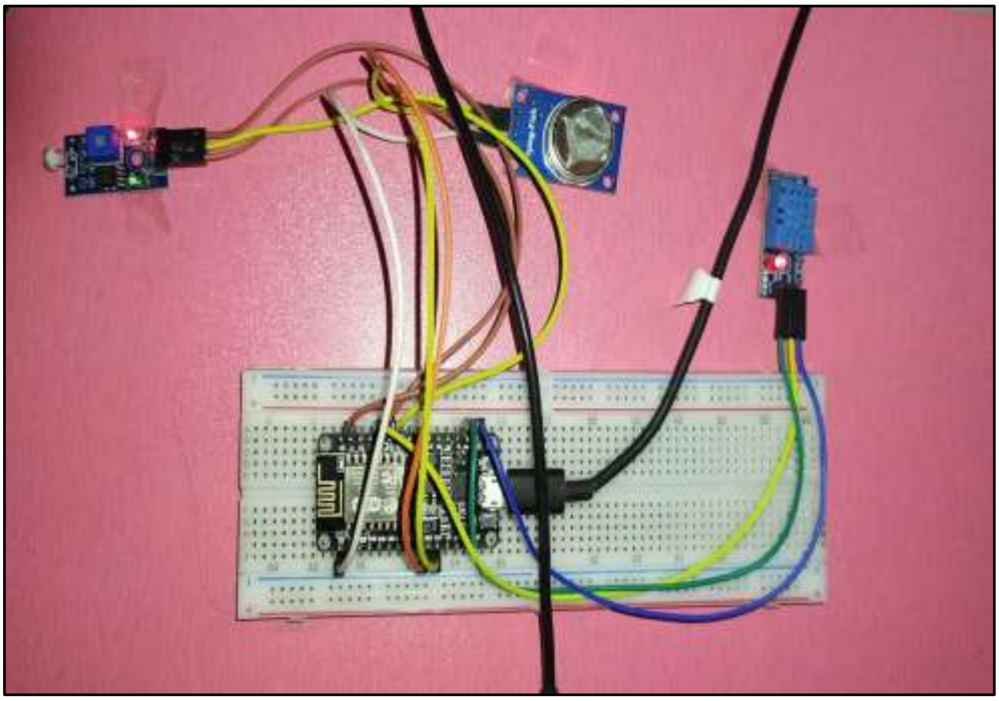




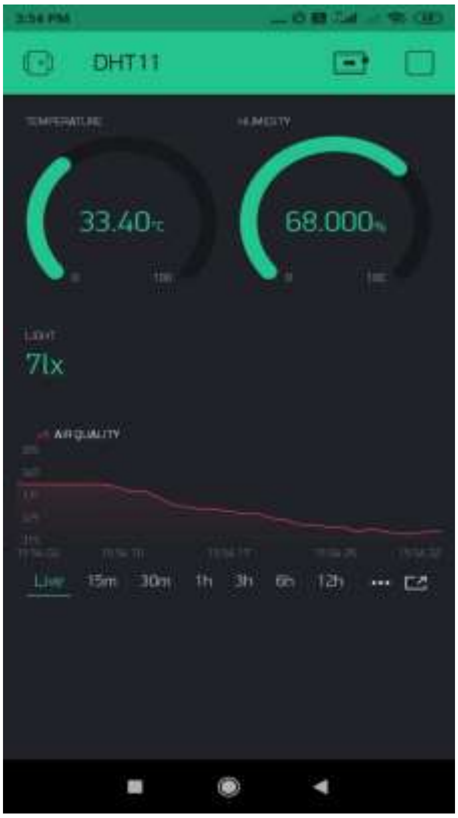
LDR sensor	NodeMCU
VCC	3V3
GND	GND
D0	D7

9. Deployment And Testing

- The finalized circuit image:



- The images of Blynk app:



10. Conclusion

In this project, a patient room monitoring system is developed that allows patients to be mobile in their social areas. The system is intended to help monitor the room conditions of the patient like the air quality, room temperature and light intensity. The main purpose of the device is to make sure that they get medical aid as soon as possible, in case of a possible discomfort. So there will be an increased chance of survival of patients.

Future Scope

- We can add a GPS module in IOT patient monitoring using Arduino MEGA. This GPS module will find out the position or the location of the patient using the longitude and latitude received. Then it will send this location to the cloud that is the IOT using the Wi-Fi module. Then doctors can find out the position of the patient in case they have to take some preventive action.

- Nowadays people are suffering from BP and heart attacks so if we add BP, ECG, EEG sensors in this project. With the help of these sensors we will find Blood pressure and we will check heart condition. Wi-Fi is an external module connected to Arduino mega. It is better if it is built, so complexity can be reduced.

11. References

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- Junaid Mohammed, Abhinav Thakral, Adrian Filip Ocneanu, Colin Jones, Chung-Horng Lung, Andy Adler," Internet of Things: Remote Patient Monitoring Using Web Services and Cloud Computing", 2014 IEEE International Conference on Internet of Things (iThings 2014), Green Computing and Communications (GreenCom2014), and CyberPhysical- pp 256-263, 2014

- Mohammad S. Jassas, Abdullah A. Qasem, Qusay H. Mahmoud," A Smart System Connecting e-Health Sensors and the Cloud A Smart System Connecting eHealth Sensors and the Cloud" Proceeding of the IEEE 28th Canadian Conference on Electrical and Computer Engineering Halifax, Canada, pp 712-716,May 3-6, 2015.

- Hasmah Mansor, Muhammad Helmy Abdul Shukor, Siti Sarah Meskam, Nur Quraisyia Aqilah Mohd Rusli, Nasiha Sakinah Zamery," Body Temperature Measurement for Remote Health Monitoring System" IEEE International Conference on Smart Instrumentation, Measurement a

12. Project Video Link

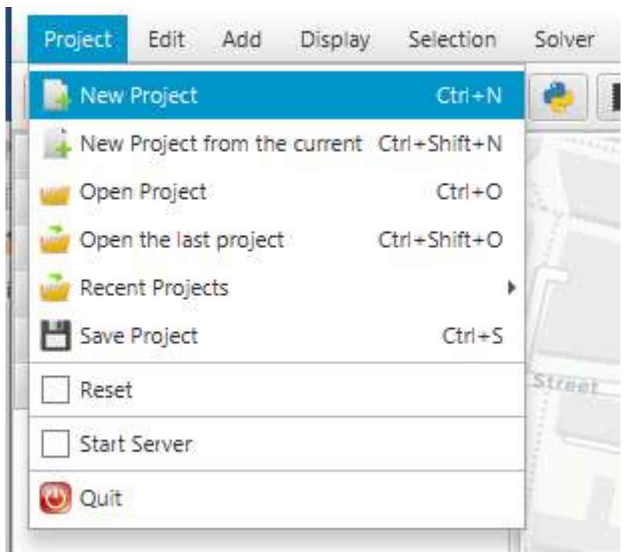
Link: https://drive.google.com/file/d/1bmPsCK-KUgC8VPnMAr_AqHvevVTWGcN1/view?usp=drivesdk

VIT Vidyalankar Institute of Technology Accredited A+ by NAAC	**Department of Information Technology**
Semester	S.E. Semester VI – Information Technology
Subject	Sensor Network Lab
Subject Professor In-charge	Prof. Vinita Bhandiwad
Assisting Teachers	Prof. Vinita Bhandiwad

Student Name	Saish Khade	
Roll Number	18101B0001	
Grade and Subject Teacher's Signature		

Experiment Number	1	
Experiment Title	Installation of cupcarbon and display Hello message on sensor node	
Resources / Apparatus Required	Hardware: Computer	Software: CupCarbon
Theory	CupCarbon is a smart city and IoT wireless sensor network (WSN) simulator. It is a new platform for 2D/3D design, visualization and the simulation of radio propagation and interferences in IoT networks. It was a wide range of devices interconnected through wireless technologies that gave birth to the Internet of Things (IoT). A number of smart gadgets and machines are now monitored and controlled using IoT protocols. Across the world, devices enjoy all-time connectivity because of the IoT.	
Steps	**Installation of CupCarbon:** 1. Installed the lastest version of Java from www.java.com 2. Download CupCarbon IoT 5.0 from https://cupcarbon.com/ 3. Unzip the downloaded cupcarbon.zip file 4. To execute CupCarbon, double click on extracted cupcarbon.jar. If it does not work, you can use the command: java -jar cupcarbon.jar **Display Hello message on sensor node:** **Step 1. Create a new project:** This can be done either by clicking on the "New project" icon of the toolbar or on the menu Project > New project. Choose the name (example: helloworld) and the place where you want to save your project. The project will create a new folder with the given project name. Inside this folder, 1 file (helloworld.cup) and 8 other directories will be created. The content of each directory is given in the following:	

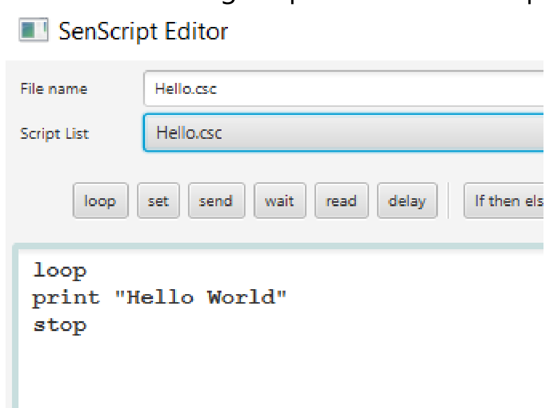
a. config: it contains the simulation parameters file, the building list file, the marker list file and two other directories (sensor and sensor_radios) that contains the list of sensor nodes (one file by sensor node) and the list of the radio modules of each sensor.
b. gps: it contains the list of routes
c. logs: it contains the log file
d. results: it contains the simulation results (a csv file)
e. scripts: it contains the SenScript files of the project
f. netevents: it contains the natural event files
g. tmp, network: are used by the simulator



Step 2. Add a new sensor node on the map:
Click either on the Add Sensor icon of the toolbar or from the menu bar (Add à Add Sensor Node).Then, click on the map where you want to add the sensor node. Another click will lead to another new sensor node and so on. To stop adding sensor nodes, just click on the right button of the mouse or type on the escape [esc] button of the keyboard.

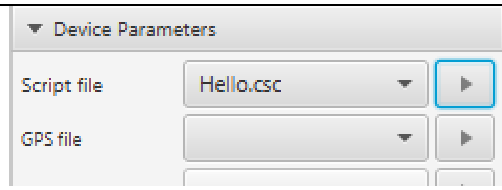
Step 3. Open the SenScript Window:
The SenScript window can be opened by clicking on the icon of the toolbar or from the menu Simulation à SenScript Window.

Step 4. Write the script:
Add the following script in the text area part of the SenScript window:

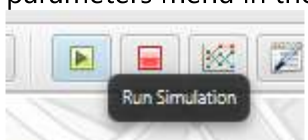


Add the name hello of this script in the File name field, then click on the Save button just in the left part of this field. This will create a file hello.csc in the directory scripts. Finally, close the SenScript Window.

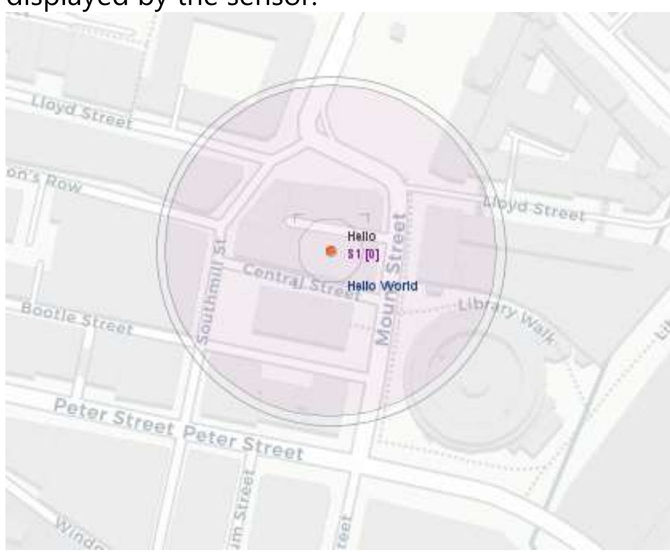
Step 5. Assign the SenScript file to the sensor node:
Select the sensor node on the map. Go to Device Parameters in the left part of the main window. Then, select the hello.csc file in the field Script file. And then, click on the apply button just in the right.
Note that once the script is assigned to a sensor, the center will be colored in orange. This can help to detect graphically sensors without scripts.



Step 6. Run the simulation:
For this example, there is no need to parameterize the simulation, just click on the run simulation. button in the toolbar or in the simulation parameters menu in the left.



Step 7. Simulation results:
In this example the simulation results shows a Hello World message displayed by the sensor.



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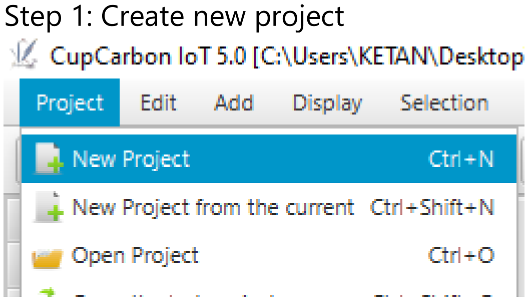
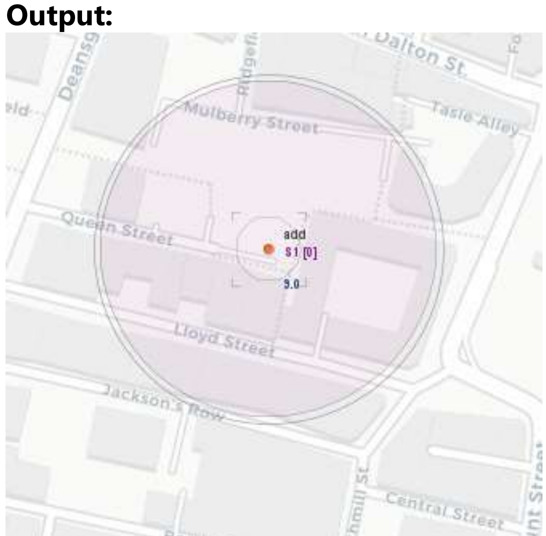
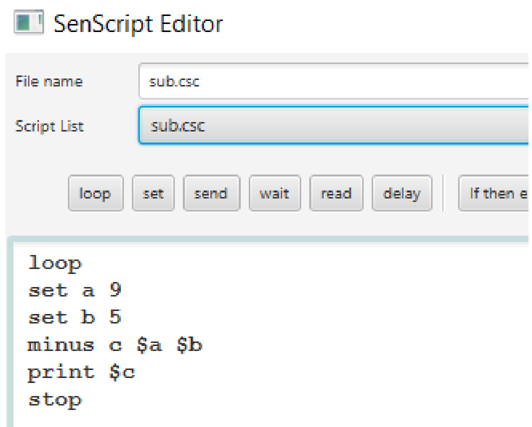
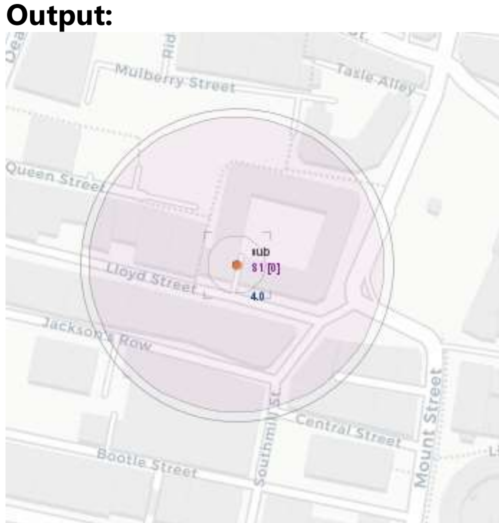
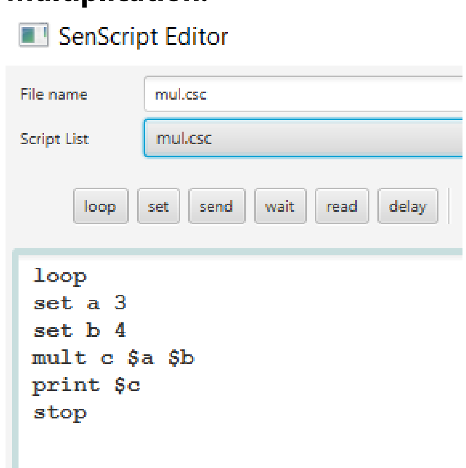
Student Name	Saish Khade	
Roll Number	18101B0001	
Grade and Subject Teacher's Signature		

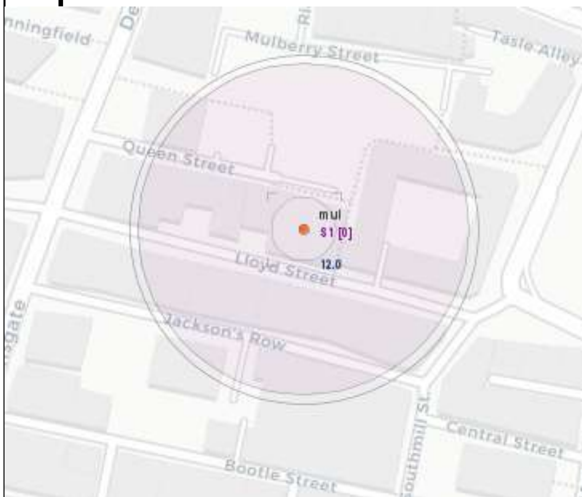
<table>
<tr><td>Experiment Number</td><td colspan="2">2</td></tr>
<tr><td>Experiment Title</td><td colspan="2">Perform various arithmetic operations on a sensor and implement 2 sensors and allow them to communicate when in range</td></tr>
<tr><td>Resources / Apparatus Required</td><td>Hardware: Computer</td><td>Software: CupCarbon</td></tr>
<tr><td>Theory</td><td colspan="2">CupCarbon is a smart city and IoT wireless sensor network (WSN) simulator. It is a new platform for 2D/3D design, visualization and the simulation of radio propagation and interferences in IoT networks.
It was a wide range of devices interconnected through wireless technologies that gave birth to the Internet of Things (IoT). A number of smart gadgets and machines are now monitored and controlled using IoT protocols. Across the world, devices enjoy all-time connectivity because of the IoT.</td></tr>
<tr><td>Steps</td><td colspan="2">Perform various arithmetic operations on sensor:
Step 1: Create new project



</td></tr>
</table>

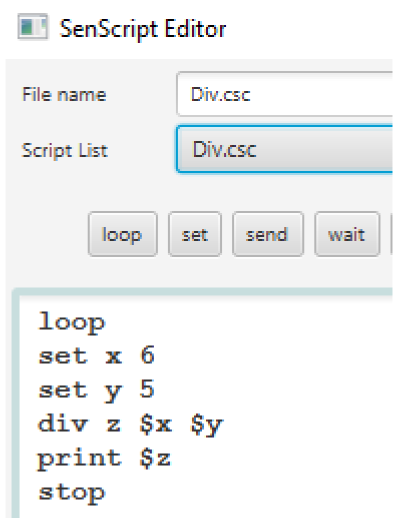
	Step 2: Select sensor and mount it on map  **Addition:**  **Output:** 

	Subtraction:  **Output:**  **Multiplication:** 

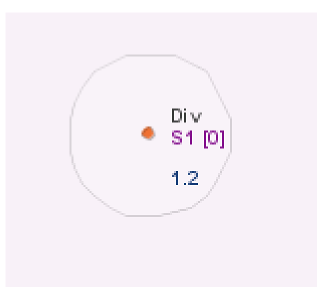
Output:



Division:

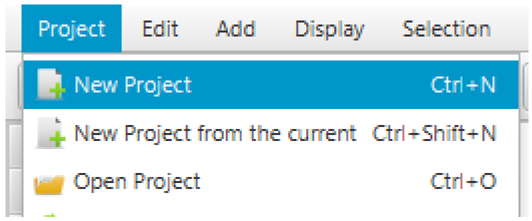


Output:

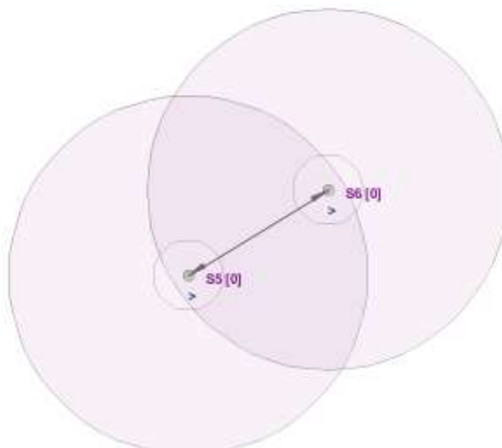


Communicate two sensors in range:

Step 1: Create new project:

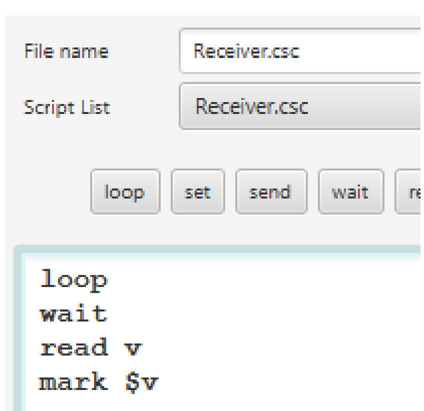


Step 2: Add two sensors nodes on map

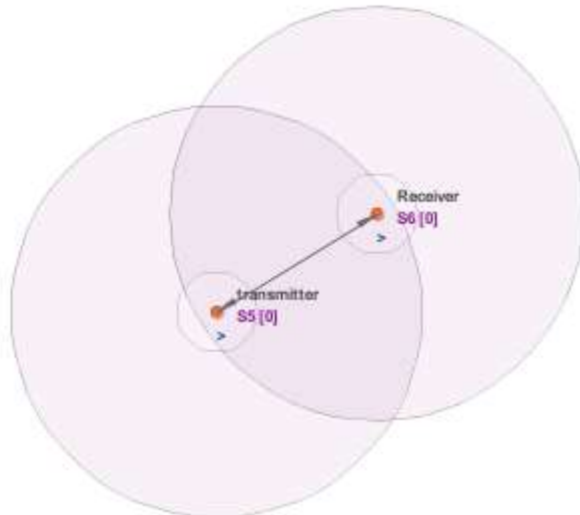


Step 3: Write Senscript code for transmitter (node 1)

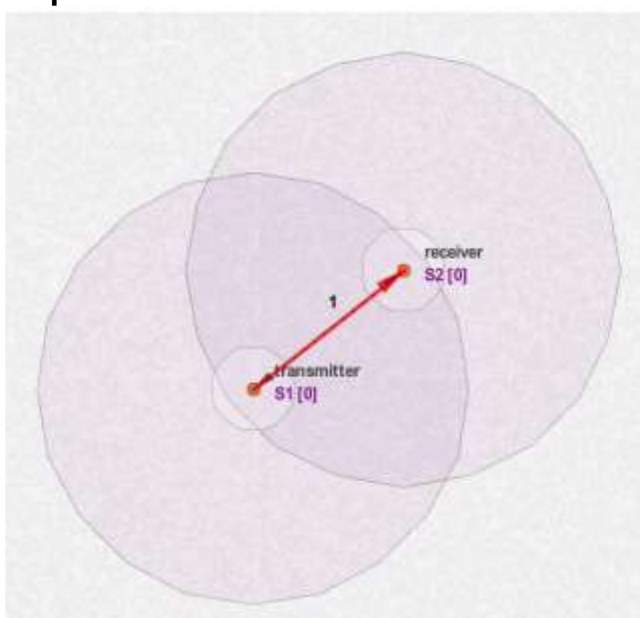
Step 4: Write Senscript code for receiver (node 2)

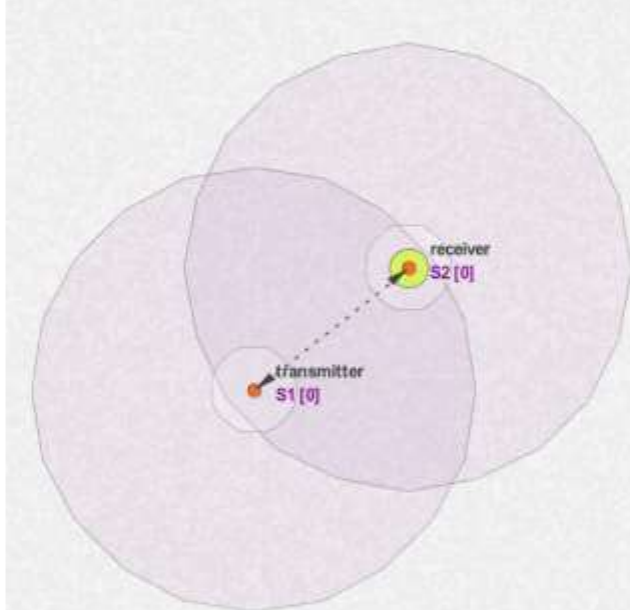


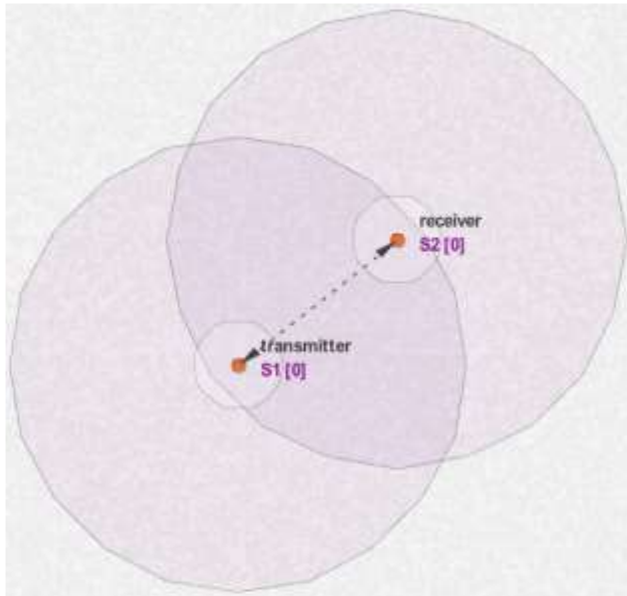
Step 5: Assign senscript code to the sensor nodes



Step 6: Run simulator





	 receiver S2 [0] transmitter S1 [0]

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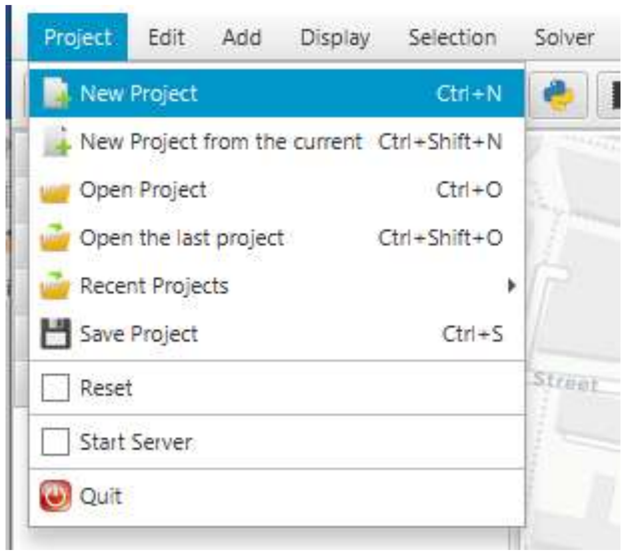

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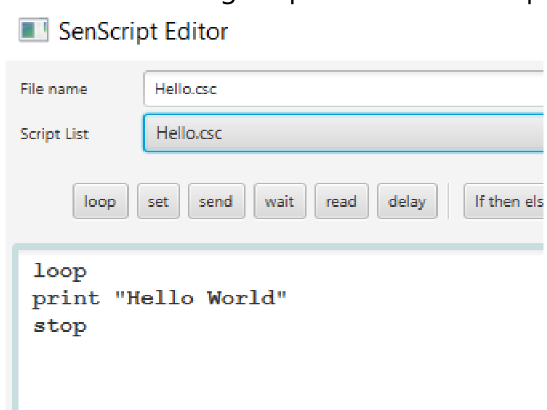

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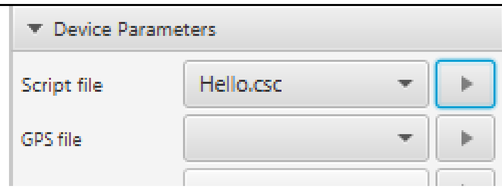
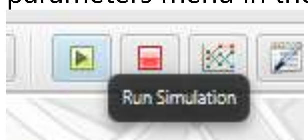
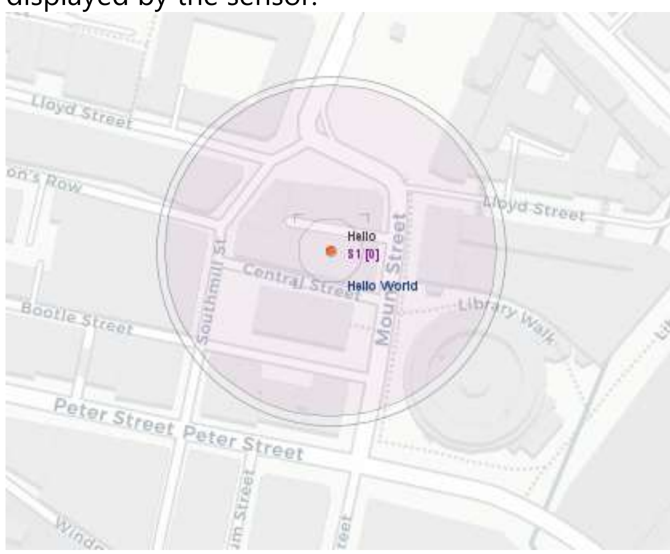


Step 6. Run the simulation:
For this example, there is no need to parameterize the simulation, just click on the run simulation. button in the toolbar or in the simulation parameters menu in the left.



Step 7. Simulation results:
In this example the simulation results shows a Hello World message displayed by the sensor.



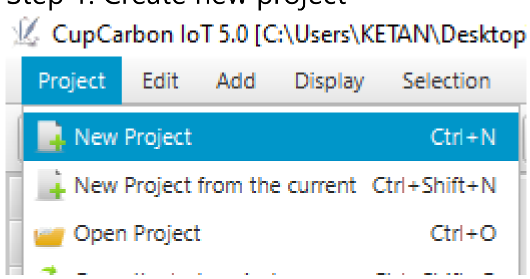
VIT Vidyalankar Institute of Technology Accredited A+ by NAAC	**Department of Information Technology**
Semester	S.E. Semester VI – Information Technology
Subject	Sensor Network Lab
Subject Professor In-charge	Prof. Vinita Bhandiwad
Assisting Teachers	Prof. Vinita Bhandiwad

Student Name	Komal Rane	
Roll Number	18101B0002	
Grade and Subject Teacher's Signature		

Experiment Number	2	
Experiment Title	Perform various arithmetic operations on a sensor and implement 2 sensors and allow them to communicate when in range	
Resources / Apparatus Required	Hardware: Computer	Software: CupCarbon
Theory	CupCarbon is a smart city and IoT wireless sensor network (WSN) simulator. It is a new platform for 2D/3D design, visualization and the simulation of radio propagation and interferences in IoT networks. It was a wide range of devices interconnected through wireless technologies that gave birth to the Internet of Things (IoT). A number of smart gadgets and machines are now monitored and controlled using IoT protocols. Across the world, devices enjoy all-time connectivity because of the IoT.	
Steps		

Perform various arithmetic operations on sensor:

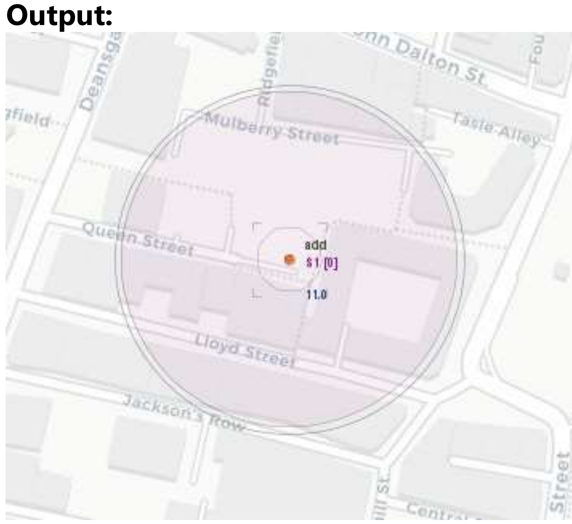
Step 1: Create new project



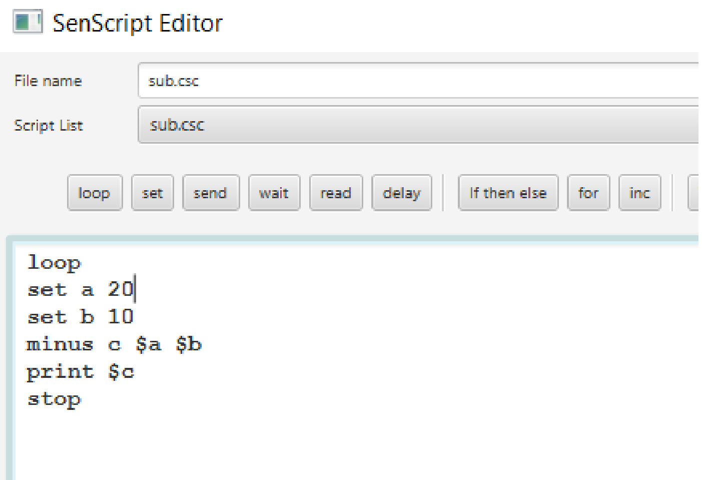
Step 2: Select sensor and mount it on map

Addition:

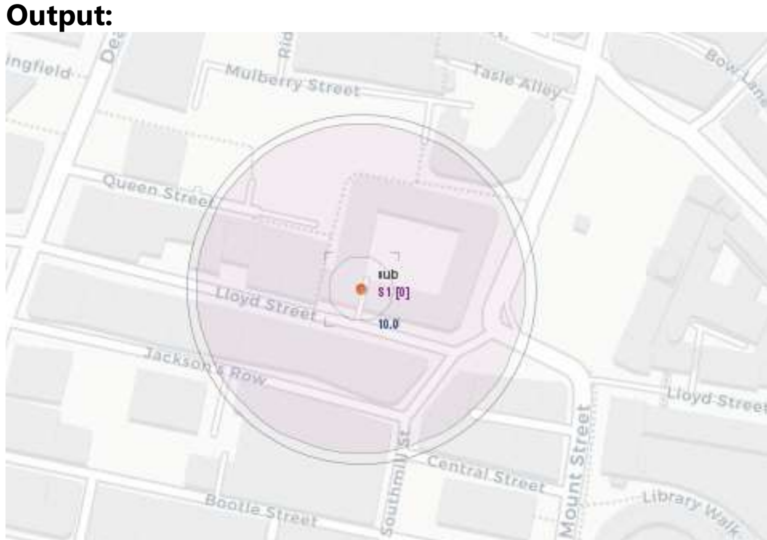
Output:



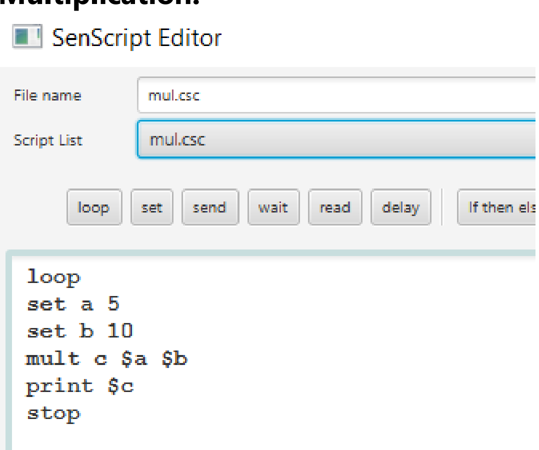
Subtraction:

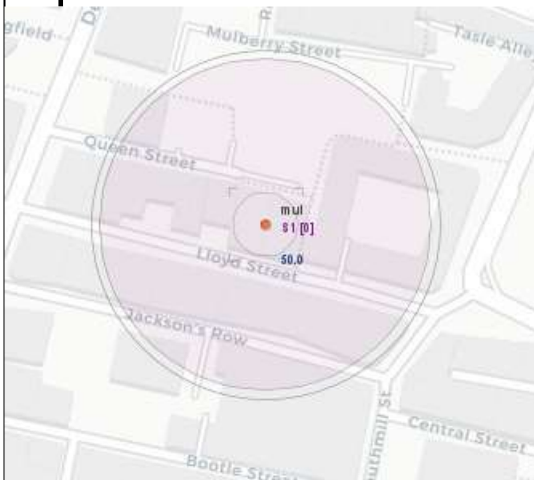
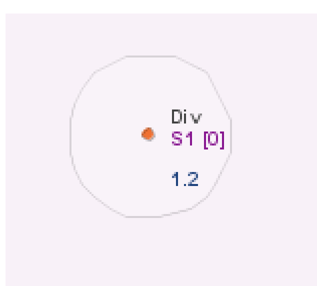


Output:



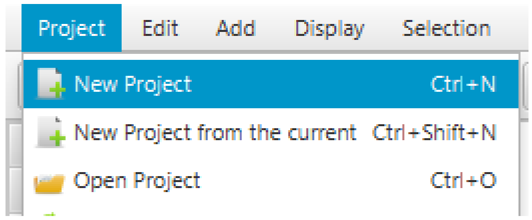
Multiplication:



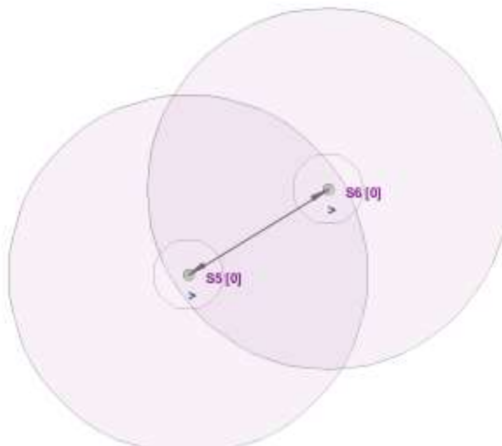
	Output: 
	
	Division:
	SenScript Editor
	File name Div.csc
	Script List Div.csc
	loop set send wait
	`loop`
	`set x 6`
	`set y 5`
	`div z $x $y`
	`print $z`
	`stop`
	Output:
	

Communicate two sensors in range:

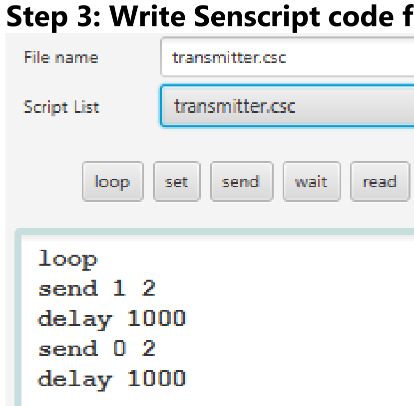
Step 1: Create new project:



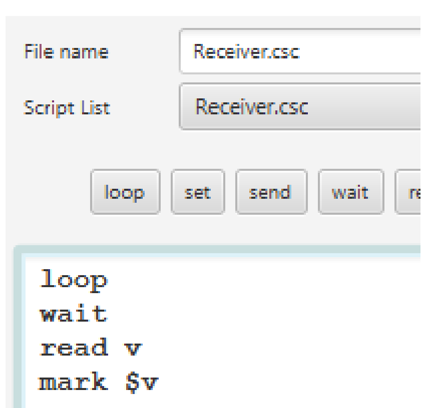
Step 2: Add two sensors nodes on map



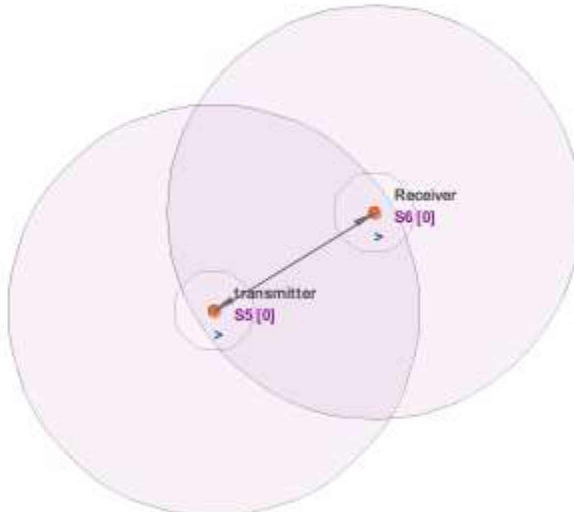
Step 3: Write Senscript code for transmitter (node 1)



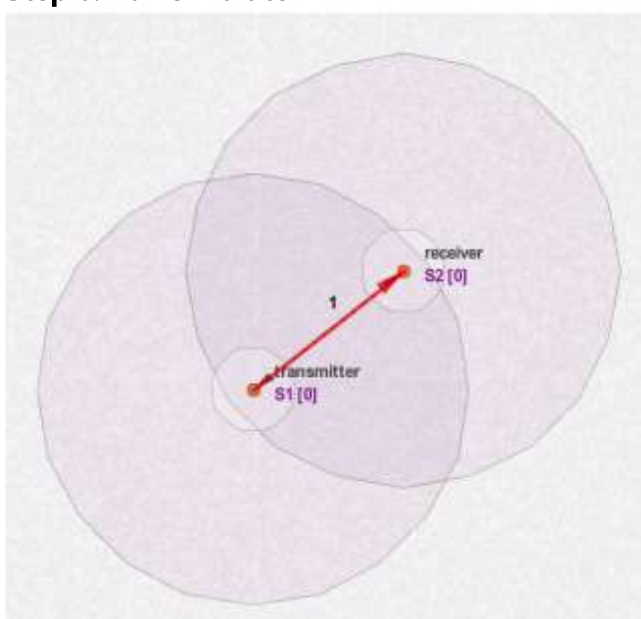
Step 4: Write Senscript code for receiver (node 2)

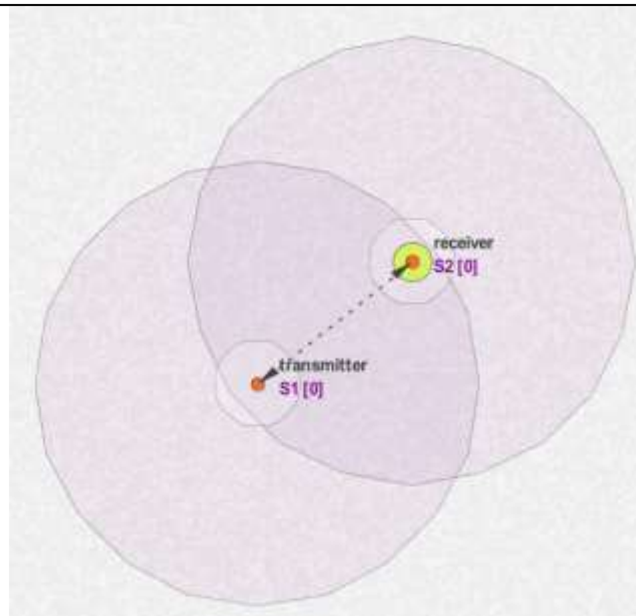


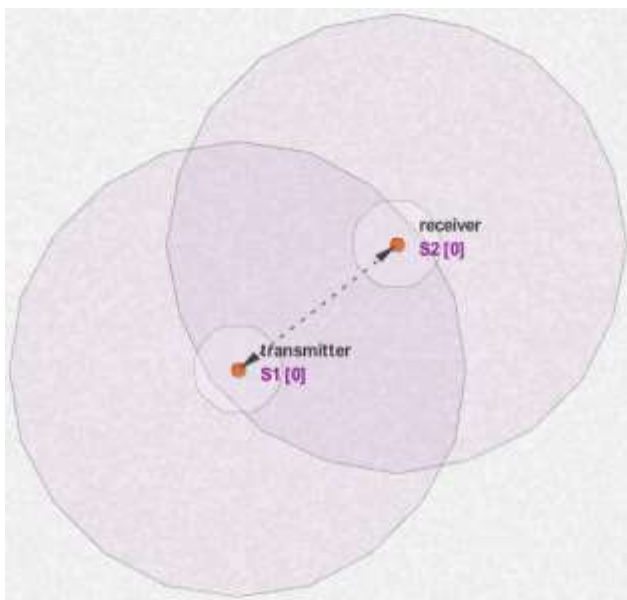
Step 5: Assign senscript code to the sensor nodes



Step 6: Run simulator




receiver
S2 [0]
transmitter
S1 [0]

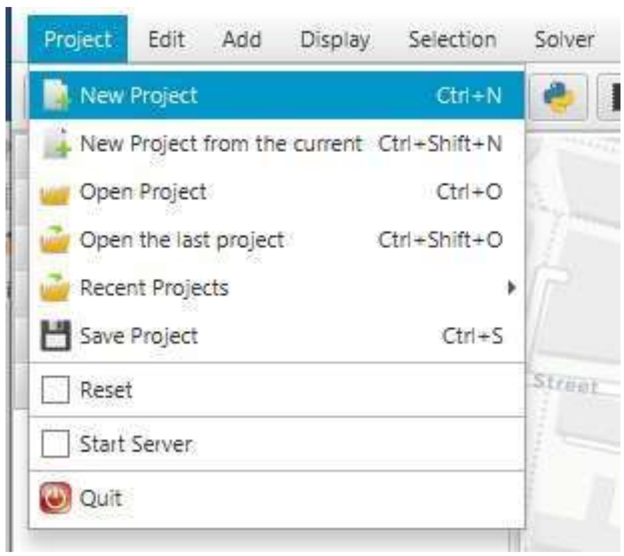

receiver
S2 [0]
transmitter
S1 [0]

VIT Vidyalankar Institute of Technology Accredited A+ by NAAC	**Department of Information Technology**
Semester	S.E. Semester VI – Information Technology
Subject	Sensor Network Lab
Subject Professor In-charge	Prof. Vinita Bhandiwad
Assisting Teachers	Prof. Vinita Bhandiwad

Student Name	Tanaya Desai	
Roll Number	18101B0059	
Grade and Subject Teacher's Signature		

Experiment Number	1	
Experiment Title	Installation of cupcarbon and display Hello message on sensor node.	
Resources / Apparatus Required	Hardware: Computer	Software: CupCarbon
Theory	**CUP CARBON** CupCarbon is a smart city and IoT wireless sensor network (WSN) simulator. It is a new platform for 2D/3D design, visualization and the simulation of radio propagation and interferences in IoT networks. It was a wide range of devices interconnected through wireless technologies that gave birth to the Internet of Things (IoT). A number of smart gadgets and machines are now monitored and controlled using IoT protocols. Across the world, devices enjoy all-time connectivity because of the IoT.	
Steps	**INSTALLATION STEPS FOR CUP CARBON** 1. Installed the lastest version of Java from www.java.com 2. Download CupCarbon IoT 5.0 from https://cupcarbon.com/ 3. Unzip the downloaded cupcarbon.zip file 4. To execute CupCarbon, double click on extracted cupcarbon.jar. If it does not work, you can use the command: java -jar cupcarbon.jar **TO DISPLAY HELLO MESSAGE ON SENSOR NODE** **STEP 1: Create a new project** This can be done either by clicking on the "New project" icon of the toolbar or on the menu Project > New project. Choose the name (example: helloworld) and the place where you want to save your project. The project will create a new folder with the given project name. Inside this folder, 1 file (helloworld.cup) and 8 other directories will be created. The content of each directory is given in the following:	

a. config: it contains the simulation parameters file, the building list file, the marker list file and two other directories (sensor and sensor_radios) that contains the list of sensor nodes (one file by sensor node) and the list of the radio modules of each sensor.
b. gps: it contains the list of routes
c. logs: it contains the log file
d. results: it contains the simulation results (a csv file)
e. scripts: it contains the SenScript files of the project
f. netevents: it contains the natural event files
g. tmp, network: are used by the simulator



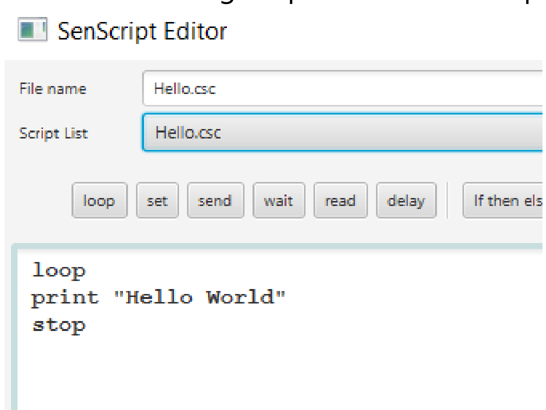
STEP 2: Add a new sensor node on the map
Click either on the Add Sensor icon of the toolbar or from the menu bar (Add à Add Sensor Node).Then, click on the map where you want to add the sensor node. Another click will lead to another new sensor node and so on. To stop adding sensor nodes, just click on the right button of the mouse or type on the escape [esc] button of the keyboard.

STEP 3: Open the SenScript Window

The SenScript window can be opened by clicking on the icon of the toolbar or from the menu Simulation à SenScript Window.

STEP 4: Write the script

Add the following script in the text area part of the SenScript window:

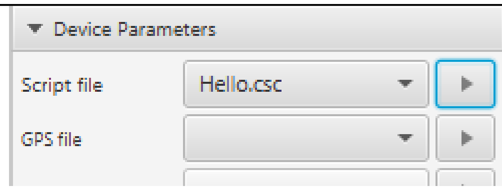


Add the name hello of this script in the File name field, then click on the Save button just in the left part of this field. This will create a file hello.csc in the directory scripts. Finally, close the SenScript Window.

STEP 5: Assign the SenScript file to the sensor node

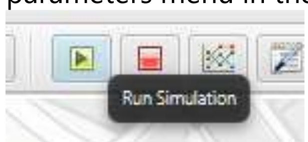
Select the sensor node on the map. Go to Device Parameters in the left part of the main window. Then, select the hello.csc file in the field Script file. And then, click on the apply button just in the right.

Note that once the script is assigned to a sensor, the center will be colored in orange. This can help to detect graphically sensors without scripts.



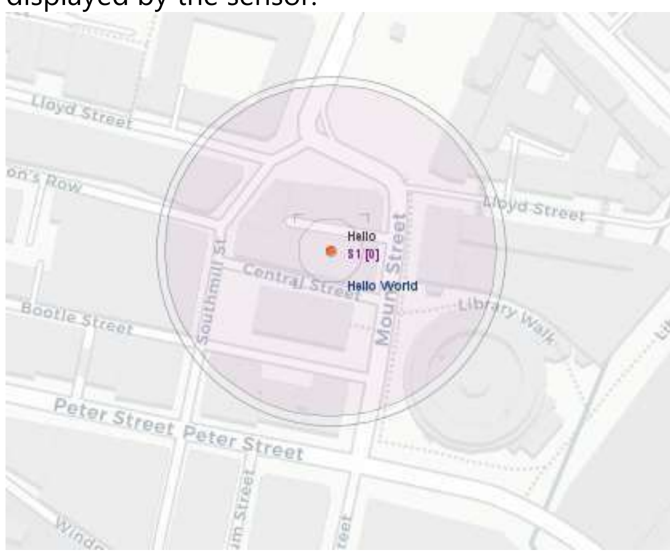
STEP 6: Run the simulation:

For this example, there is no need to parameterize the simulation, just click on the run simulation. button in the toolbar or in the simulation parameters menu in the left.



STEP 7: Simulation results

In this example the simulation results shows a Hello World message displayed by the sensor.



VIT Vidyalankar Institute of Technology Accredited A+ by NAAC	**Department of Information Technology**
Semester	S.E. Semester VI – Information Technology
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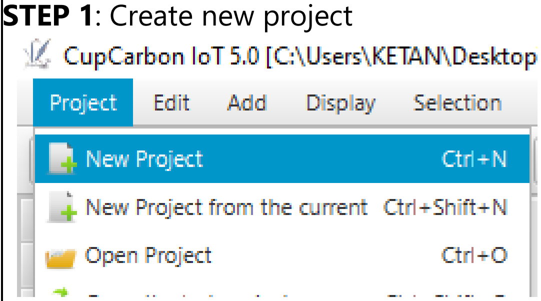
Subject Professor In-charge	Prof. Vinita Bhandiwad
Assisting Teachers	Prof. Vinita Bhandiwad

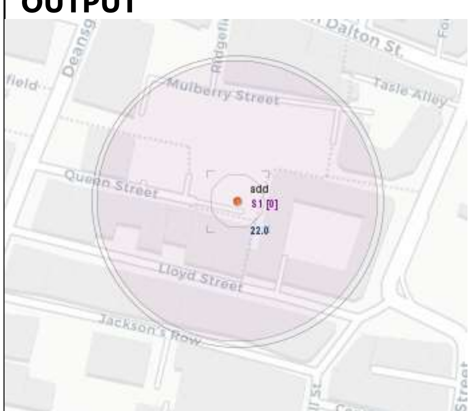
Student Name	Tanaya Desai	
Roll Number	18101B0059	
Grade and Subject Teacher's Signature		

Experiment Number	2	
Experiment Title	Perform various arithmetic operations on a sensor and implement 2 sensors and allow them to communicate when in range	
Resources / Apparatus Required	Hardware: Computer	Software: CupCarbon
Theory	**CUP CARBON** CupCarbon is a smart city and IoT wireless sensor network (WSN) simulator. It is a new platform for 2D/3D design, visualization and the simulation of radio propagation and interferences in IoT networks. It was a wide range of devices interconnected through wireless technologies that gave birth to the Internet of Things (IoT). A number of smart gadgets and machines are now monitored and controlled using IoT protocols. Across the world, devices enjoy all-time connectivity because of the IoT.	
Steps	**STEPS TO PERFORM VARIOUS ARITHMETIC OPERATIONS ON SENSORS** **STEP 1**: Create new project 	

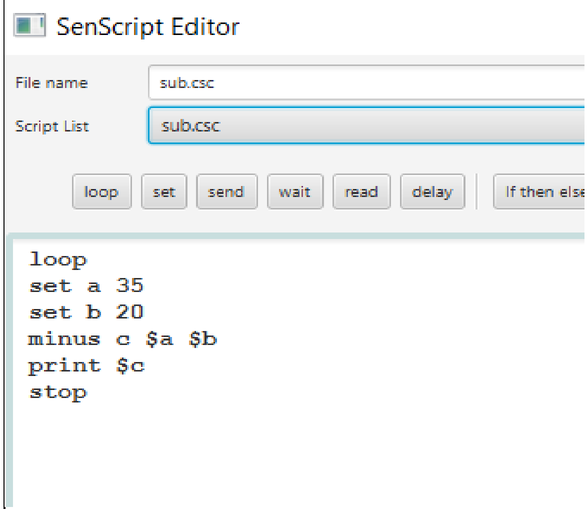
STEP 2: Select sensor and mount it on map

ADDITION

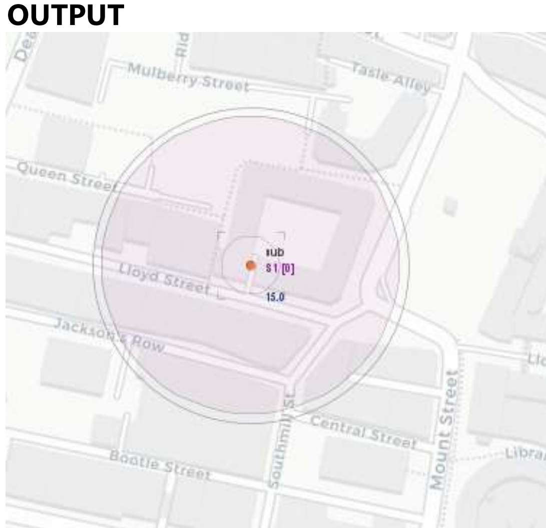
OUTPUT



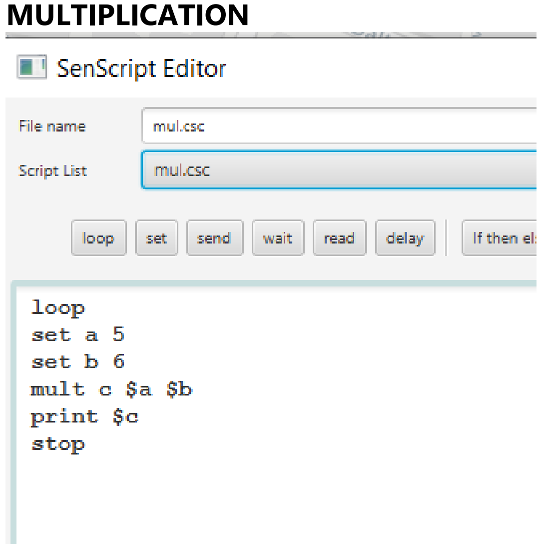
SUBTRACTION



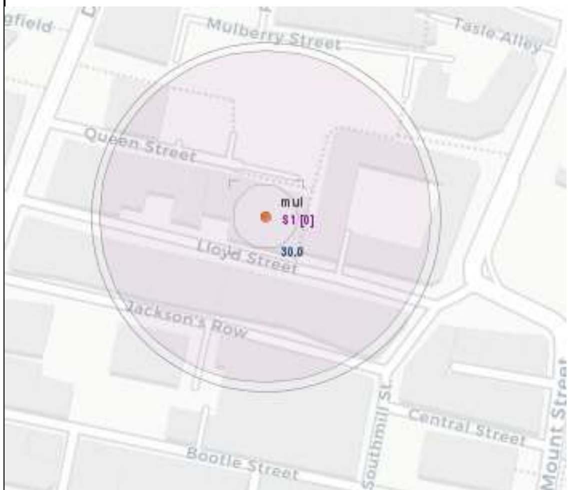
OUTPUT



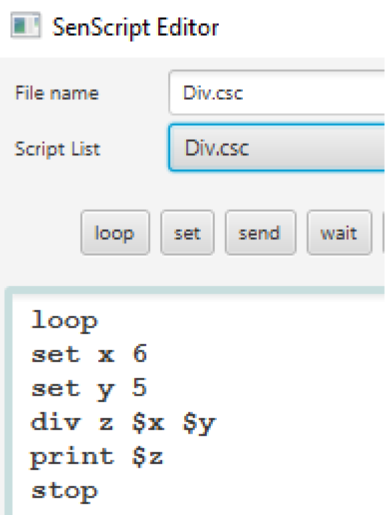
MULTIPLICATION



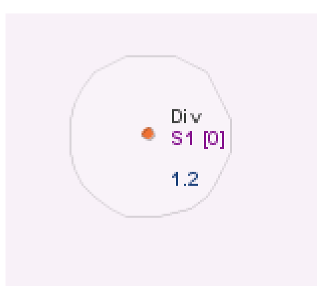
OUTPUT



DIVISION

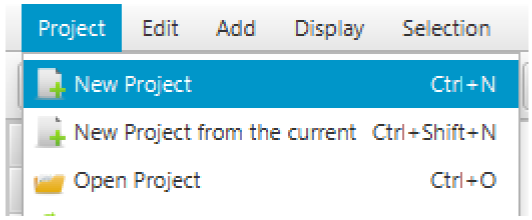


OUTPUT

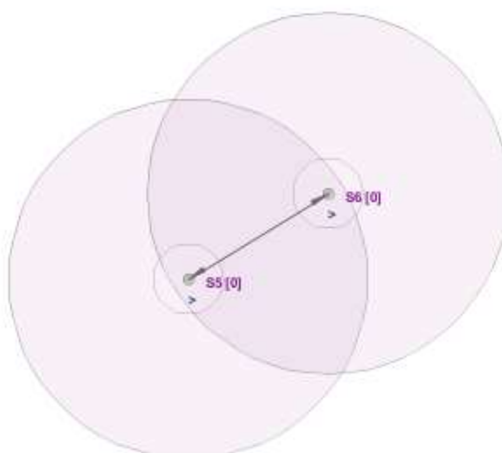


STEPS TO COMMUNICATE TWO SENSORS IN RANGE

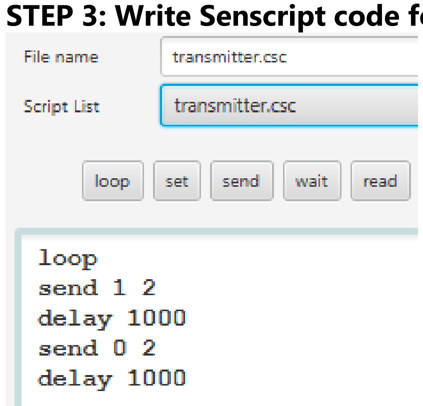
STEP 1 : Create new project



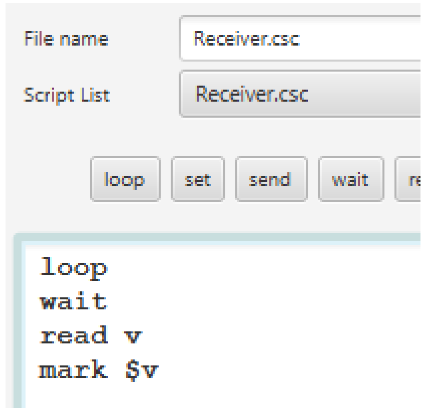
STEP 2: Add two sensors nodes on map



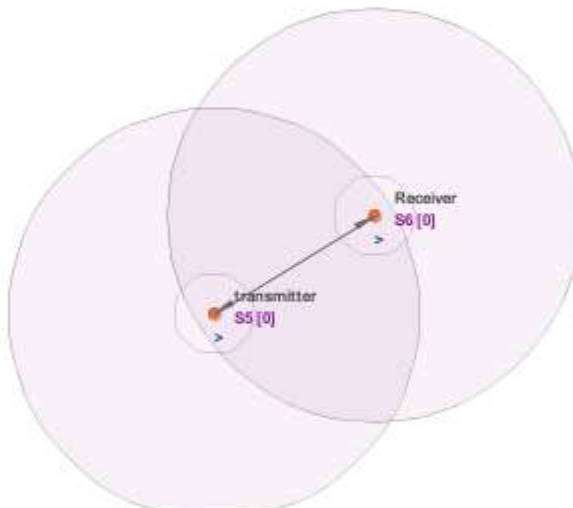
STEP 3: Write Senscript code for transmitter (node 1)



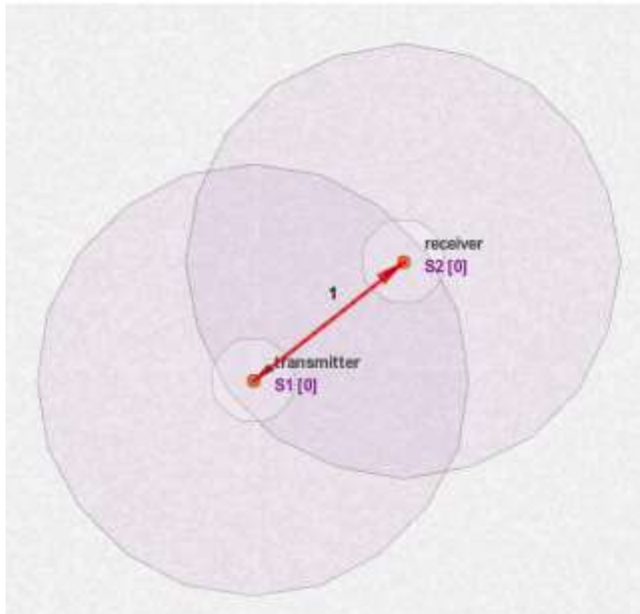
STEP 4: Write Senscript code for receiver (node 2)

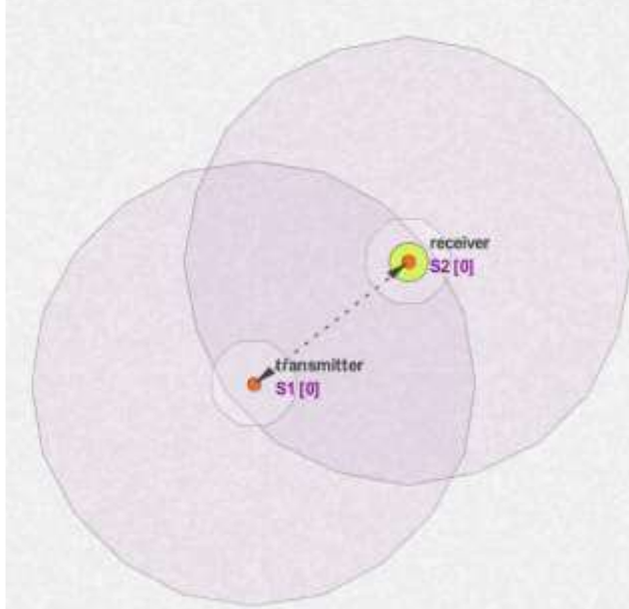


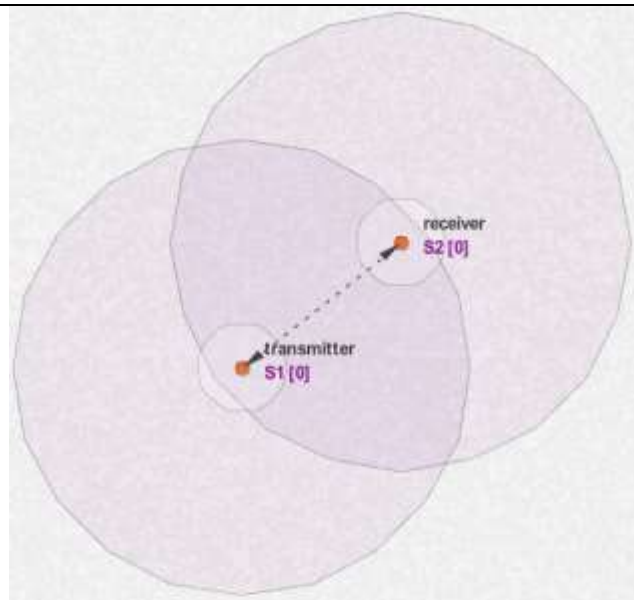
STEP 5: Assign senscript code to the sensor nodes



STEP 6: Run simulator





	receiver S2 [0] transmitter S1 [0]

Patient Room Monitoring System

Tanaya Desai, Komal Rane, Saish Khade

(Department of Information Technology, Mumbai University)

Abstract— In the current scenario of technological developments the healthcare infrastructure is still underdeveloped and facing a lot of issues.It is estimated that 2.4% of the deaths in the country are incurred due to improper hygiene and non-monitored medical facilities.The main goal of the project is to built a working system which can help monitor the environment of the patient's room.
The system is aimed at monitoring the temperature, air quality, humidity and light intensity in the room of the patient. The major aim is to provide a monitored facility to avoid chances of any mishaps and to enhance our existing infrastructure.

INTRODUCTION

Continued deterioration of public health resources and poor environmental conditions is a major public health concern in developed and developing countries. It is estimated that the pollutants responsible for poor air quality cause nearly 2.5 million premature deaths per year world-wide. Significantly, around 1.5 million of these deaths are due to polluted indoor air, and it is suggested that poor indoor air quality may pose a significant health risk to more than half of the world's population. Due to its link with industrialization, societal health problems associated with poor air quality disproportionately affects developed and developing nations – it is estimated that improper environmental conditions in the room of the patient may account for premature deaths. Remedial action is needed to improve the existing infrastructure and our idea of project is focusing in helping to overcome the existing problems.

I. OBJECTIVE

The main objectives of the model are described and mentioned as the following :

1. To develop an integrated system for patient room monitoring.
2. To build a cost effective solution model.
3. To measure and display the temperature and humidity level of the environment.
4. To combine advanced detection technologies to produce an air quality sensing system with advanced capabilities to provide low cost comprehensive monitoring.
5. To display the sensed data in user friendly format.

II. SYSTEM HARDWARE AND SOFTWARE COMPONENTS

Node MCU ESP8266

NodeMCU is an open-source LUA based firmware developed for the ESP8266 wifi chip. By exploring functionality with the ESP8266 chip, NodeMCU firmware comes with the ESP8266 Development board/kit i.e. NodeMCU Development board.

DHT11 Sensor

The DHT11 is a basic, digital temperature and humidity sensor. It detects temperature, humidity, heat index and other related parameters. DHT11 reads it data in small scale and the read data is processed in two second intervals.

MQ135 Sensor

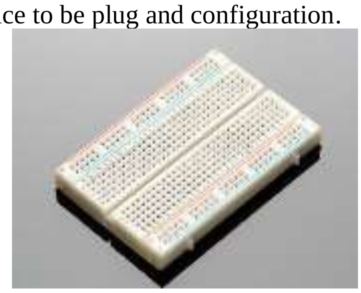
MQ-135 is gas sensor that senses gases like ammonia nitrogen, oxygen, alcohols, carbon die-oxide aromatic compounds, sulfide and smoke. MQ135 operate within 2.5 to 5.0 voltages. In this project sensor has been used to detect carbon die-oxide level of particular environment, the level has been detected in PPM (part per million).

LDR Sensor

In order to detect the intensity of light or darkness, we use a sensor called an LDR (light dependent resistor). The LDR is a special type of resistor that allows higher voltages to pass through it (low resistance) whenever there is a high intensity of light, and passes a low voltage (high resistance) whenever it is dark.

BredBoard

Arduino Uno breadboard is a board that enables ground connection i.e. circuit to be designed using male and female jumpers wires, it allows different sensors, LED and other required device to be plug and configuration.

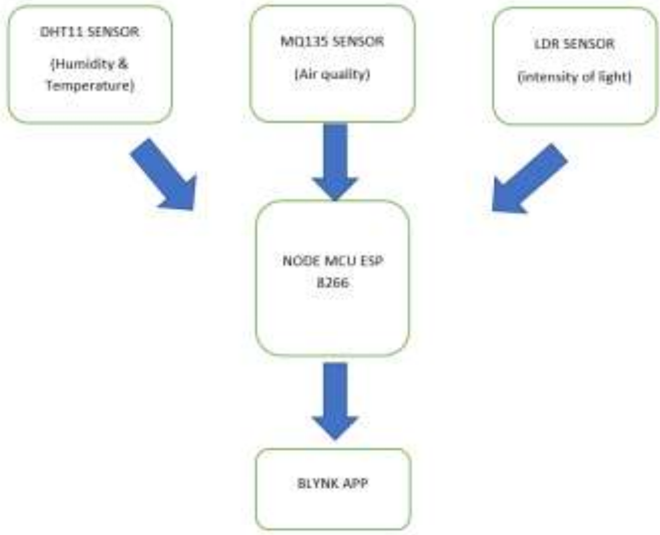


Jumper Wires

Jumper wire, also known DuPont wire is an electrical cable for connecting of components of bread board and testing of some made prototypes and circuit. Jumper wires are of two categories, there are male and female jumper wire. And each jumper wire has either pin or connector at the end.

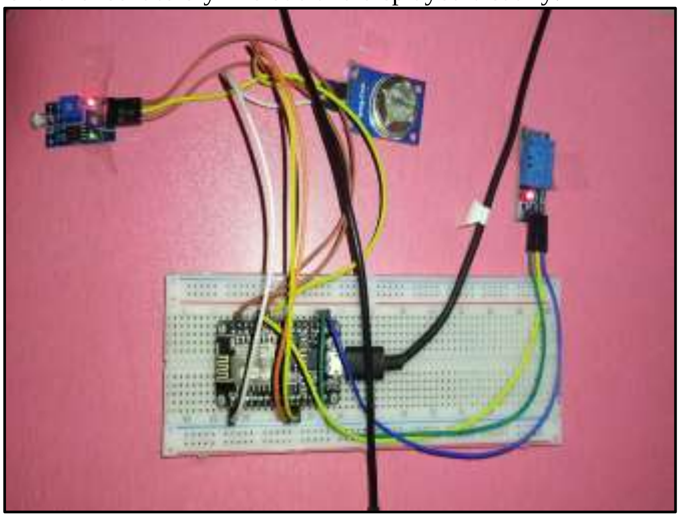
SYSTEM BLOCK DIAGRAM

A simple block diagram of the system is shown below where each block represents a foremost component of the system.



SYSTEM IMPLEMENTATION

The model is assembled according to the connections required by the sensors. After the connections are successfully made, the NodeMCU is interfaced with the sensors and the Blynk application.
The connection with the Blynk application is made by providing a authentication code. The sensors take up the necessary parameters and send the data to NodeMCU which is further sent to blynk cloud and displayed visually.



CONCLUSION

In this project, a patient room monitoring system is developed that allows patients to be mobile in their social areas. The system is intended to help monitor the room conditions of the patient like the air quality, room temperature and light intensity. The main purpose of the device is to make sure that they get medical aid as soon as possible, in case of a possible discomfort. So there will be an increased chance of survival of patients.
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1. S. M. Riazul islam, Daehan kwak, MD. Humaun kabir, Mahmud hossain, and Kyung-sup kwak," The Internet of Things for Health Care:A Comprehensive Survey" , DOI 10.1109/TDSC.2015.240699, IEEE Transactions.

2. Junaid Mohammed, Abhinav Thakral, Adrian Filip Ocneanu, Colin Jones, Chung-Horng Lung, Andy Adler," Internet of Things: Remote Patient Monitoring Using Web Services and Cloud Computing", 2014 IEEE International Conference on Internet of Things (iThings 2014), Green Computing and Communications (GreenCom2014), and CyberPhysical- pp 256-263, 2014

3. Mohammad S. Jassas, Abdullah A. Qasem, Qusay H. Mahmoud," A Smart System Connecting e-Health Sensors and the Cloud A Smart System Connecting eHealth Sensors and the Cloud" Proceeding of the IEEE 28th Canadian Conferencon Electrical and Computer Engineering Halifax, Canada, pp 712-716,May 3-6, 2015.

4. Hasmah Mansor, Muhammad Helmy Abdul Shukor, Siti Sarah Meskam, Nur Quraisyia Aqilah Mohd Rusli, Nasiha Sakinah Zamery," Body Temperature Measurement for Remote Health Monitoring System" IEEE International Conference on Smart Instrumentation, Measurement a

Vidyalankar Institute of Technology

Sensor Network Project Poster

Smart Patient Room Monitoring System

By Komal Rane, Tanaya Desai and Saish Khade Under the guidance of Prof. Vinita Bhandiwad

1. Abstract

In the current scenario of technological developments the healthcare infrastructure is still underdeveloped and facing a lot of issues. It is estimated that 2.4% of the deaths in the country are incurred due to improper hygiene and non-monitored medical facilities. The main goal of the project is to built a working system which can help monitor the environment of the patient's room. The system is aimed at monitoring the temperature, air quality, humidity and light intensity in the room of the patient. The major aim is to provide a monitored facility to avoid chances of any mishaps and to enhance our existing infrastructure.

2. Introduction

- Continued deterioration of public health resources and poor environmental conditions is a major public health concern in developed and developing countries.
- It is estimated that the pollutants responsible for poor air quality cause nearly 2.5 million premature deaths per year world-wide.
- Significantly, around 1.5 million of these deaths are due to polluted indoor air, and it is suggested that poor indoor air quality may pose a significant health risk to more than half of the world's population.
- Due to its link with industrialization, societal health problems associated with poor air quality disproportionately affects developed and developing nations – it is estimated that improper environmental conditions in the room of the patient may account for premature deaths.
- Remedial action is needed to improve the existing infrastructure and our idea of project is focusing in helping to overcome the existing problems.

3. Problem Statement

- The main aim is to develop a simple but robust model which can efficiently detect the room temperature, humidity, air quality and light intensity.
- The main objectives of the model are described and mentioned as the following :
- To develop an integrated system for patient room monitoring
- To build a cost effective solution model
- To measure and display the temperature and humidity level of the environment.
- To combine advanced detection technologies to produce an air quality sensing system with advanced capabilities to provide low cost comprehensive monitoring.
- To display the sensed data in user friendly format.
- This project provides a combination of process of sensing several gas levels in the air and also the ambient temperature and humidity along with light intensity, thus sensing the quality of the air and intensity of light.
- The levels of the gases and the temperature is displayed on the Blynk panel which continuously shows the real time output values of the gas sensors, temperature and humidity sensor and LDR sensor.

4. Proposed Methodology

- According to the requirement, we place the model in the patient's room.
- DHT11 will take the Temperature and Humidity and MQ – 135 will take the parameter of Air Quality, LDR will sense the light intensity.
- We use blynk for monitoring the value.
- The node MCU which connected to internet connection will send the Temperature, humidity and air quality and light data to blynk cloud and the cloud will send the data to our app.

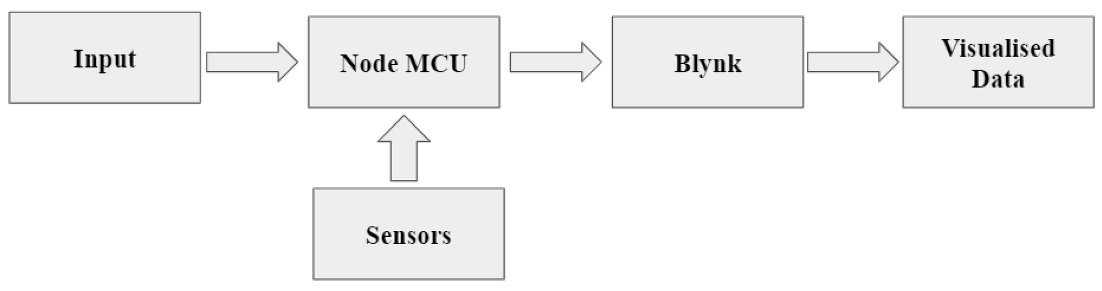

Figure.1. Proposed method

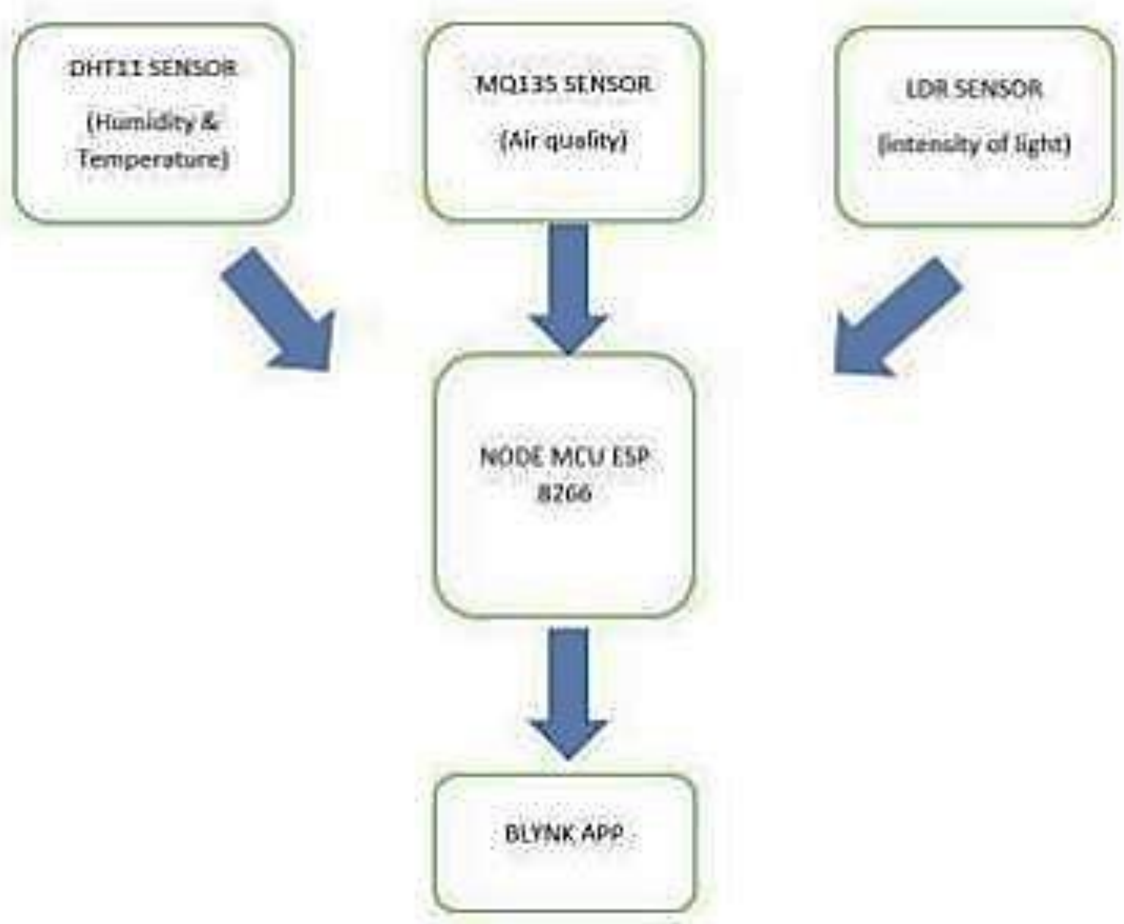

Figure.2. Block Diagram

4. Overview & Flowchart

- The model is assembled according to the connections required by the sensors.
- After the connections are successfully made, the Node MCU is interfaced with the sensors and the Blynk application.
- The connection with the Blynk application is made by providing an authentication code.
- The sensors take up the necessary parameters and send the data to Node MCU which is further sent to blynk cloud and displayed visually.

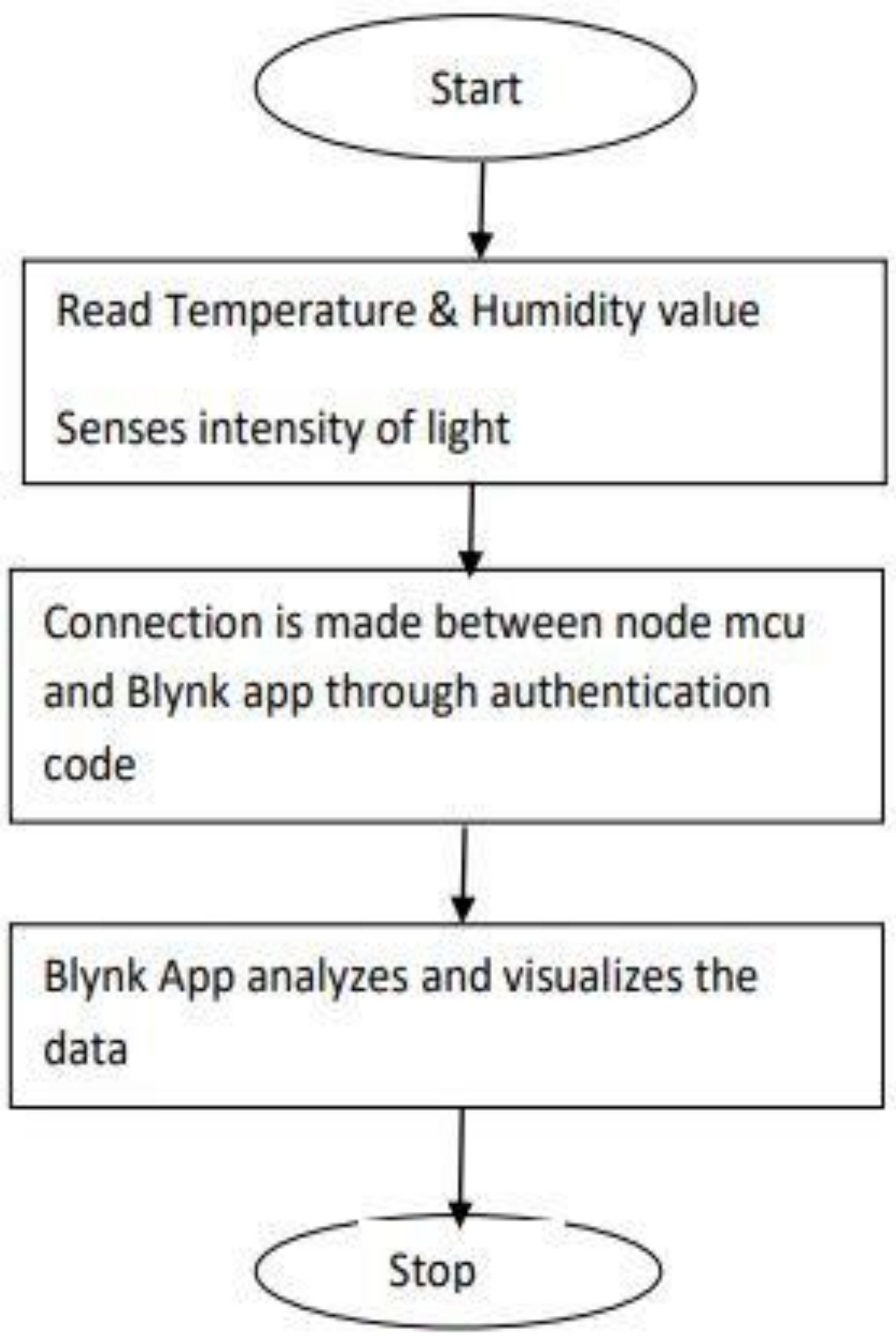

Figure.3. Flow Chart

5. Advantages of the system

- For the purpose of air quality of the patient's room, we can measure the temperature and humidity very easily.
- We can sense the light intensity of the patient's room and monitor it accordingly.
- We use Blynk Cloud for monitoring the values.
- The data collected across all the sensors can be sent to our app through internet connection via Blynk Cloud.

6. Conclusion

- In this project, a patient room monitoring system is developed that allows patients to be mobile in their social areas.
- The system is intended to help monitor the room conditions of the patient like the air quality, room temperature and light intensity.
- The main purpose of the device is to make sure that they get medical aid as soon as possible, in case of a possible discomfort.
- So there will be an increased chance of survival of patients.

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