FLOOD MONITORING SYSTEM

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
OF THE DEGREE OF

BACHELOR OF ENGINEERING

IN

INFORMATION TECHNOLOGY

BY

RAJ SHAH

MAHIPAL SUNDVESHA

MERLYN KOONAMPARAMPATH

UNDER THE GUIDANCE OF

Fr. Dr. JOHN ROSE S.J.

(Department of Information Technology)

DEPARTMENT OF INFORMATION TECHNOLOGY

XAVIER INSTITUTE OF ENGINEERING

UNIVERSITY OF MUMBAI

2021 – 2022

XAVIER INSTITUTE OF ENGINEERING

MAHIM CAUSEWAY, MAHIM, MUMBAI - 400016.

CERTIFICATE

This to certify that

Raj shah (XIEIT181947)
Mahipal Sundvesha (XIEIT181955)
Melryn Koonamparampath (XIEIT181924)

Have satisfactorily carried out the IOE MINI-PROJECT work titled **"Flood Monitoring System"** in partial fulfillment of the degree of Bachelor of Engineering as laid down by the University of Mumbai during the academic year 2021-2022.

Fr. Dr. John Rose S.J.

Internal Examiner **External Examiner**

Date:

Place: MAHIM, MUMBAI

DECLARATION

I declare that this written submission represents my ideas in my own words and where other's Ideas or words have been included, I have adequately cited and referenced the original sources.

I also declare that I have adhered to all the principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which thus have not been properly cited or from whom proper permission have not been taken when needed.

Raj shah (XIEIT181947) _____

Mahipal Sundvesha (XIEIT181955) _____

Merlyn Koonamparampath (XIEIT181924) _____

Date:

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Acknowledgement

With a deep sense of gratitude, we would like to thank the guidance of our project guide Fr. (Dr.) John Rose S.J. (Director of XIE) for providing us time-to-time assistance with such an environment to achieve goals of our project and supporting us constantly.

We express our sincere gratitude to our Honorable Principal Mr. Y. D. Venkatesh for encouragement and facilities provided to us.

We would like to place on record our deep sense of gratitude to Mrs. Meena Ugale, Head of Dept Of Information Technology, Xavier Institute of Engineering, Mahim, Mumbai, for her generous guidance help and useful suggestions.

We would also like to thank our entire Information Technology staff who have willingly cooperated with us in resolving our queries and providing us all the required facilities on time.

Raj Shah(XIEIT181947) _____

Mahipal Sundvesha(XIEIT181955) _____

Merlyn Koonamparampath(XIEIT181924) _____

XAVIER INSTITUTE OF ENGINEERING
BE (IT) SEM-VIII (AY: 2021-22)

Subject: Internet of Everything Lab (Lab code: ITL802)

LAB OBJECTIVES:

Sr. No.	Lab Objectives
The course aims:	
1	To learn different types of sensors from Motes families.
2	To design the problem solution as per the requirement analysis done using Motes sensors.
3	To study the basic concepts of programming/sensors/ emulator like cooja etc.
4	To design and implement the mini project intended solution for project based learning.
5	To build and test the mini project successfully.
6	To improve the team building, communication and management skills of the students.

Bloom's Taxonomy Levels:

1 = Remembering, 2= Understanding, 3 = Applying, 4 = Analyzing, 5 = Evaluating, 6 = Creating

LAB OUTCOMES:

On successful completion, of course, learner/student will be able to:

Co.No	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
ITL802.1	**Identify** the requirements for the real world problems.	L2
ITL802.2	**Conduct** a survey of several available literatures in the preferred field of study.	L4
ITL802.3	**Study** and **enhance** software/ hardware skills.	L2
ITL802.4	**Demonstrate** and build the project successfully by hardware/sensor requirements, coding, emulating and testing.	L4, L5, L6
ITL802.5	**Report** and present the findings of the study conducted in the preferred domain.	L4, L5
ITL802.6	**Demonstrate** an ability to work in teams and manage the conduct of the research study.	L4, L5, L6

XAVIER INSTITUTE OF ENGINEERING
Department of Information Technology
Class/ Sem/ A.Y: BE IT/ VIII/ 2021-2022
Course Name: Internet of Everything Lab

Group No/ Roll No: 19

Chapter 1: Introduction to IoE						
LO1: Identify the requirements for the real world problems.						
Rubrics For Laboratory Work						
Roll No.	**Name of the Student**	**Knowledge/ Understanding (05)**	**Contents (04)**	**Presentation (04)**	**Punctuality & lab ethics (02)**	**Total (15)**
XIEIT181947	Raj shah					
XIEIT181955	Mahipal Sundvesha					
XIEIT181924	Merlyn Koonamparampath					

Fr. Dr. John Rose S.J.

CHAPTER 01
INTRODUCTION TO IoE

The Internet of Everything (IoE) "*is bringing together people, process, data, and things to make networked connections more relevant and valuable than ever before-turning information into actions that create new capabilities, richer experiences, and unprecedented economic opportunity for businesses, individuals, and countries.".*

IoE is the intelligent connection of people, process, data and things. The Internet of Everything (IoE) describes a world where billions of objects have sensors to detect measure and assess their status; all connected over public or private networks using standard and proprietary protocols.

Technically IoE refers to billions of devices and consumer products connected to the internet in an intelligent networked environment with expanded digital features.

It is basically a philosophy in which our technology future is compromised of different types of appliances, devices, and things connected to the global internet.
As of now, the internet connection is only restricted to Phone's/Tablet's, PC's and a handful of other devices but the idea behind IoE is that in the future, Machines will become more intelligent and cognitive by having more access to data and expanded network opportunities.

In simpler terms, IoE is the intelligent connection of *people, processes, data*, *and things* that will be transforming our world in such a way that there will be billions of connected devices having sensors to detect, measure and access their status all of which will be connected over a public or private network built over standard protocols like TCP/IP.

Pillars of The Internet of Everything (IoE)

- **People**: Connecting people in more relevant, valuable ways.
- **Data:** Converting data into intelligence to make better decisions.
- **Process:** Delivering the right information to the right person (or machine) at the right time.
- **Things:** Physical devices and objects connected to the Internet and each other for intelligent decision making; often called *Internet of Things (IoT).*

The difference between IoE and IoT

The difference is the intelligent connection. IoT is mostly about physical devices and objects communicating with each other but IoE brings with it the network intelligence to bind all these concepts together into a cohesive system.
IoT has been limited to only machines thus achieving Machine to Machine Communication but IoE brings together people, processes, data, and things and adds them into the network therefore not just Phone/tablets and PCs but People. Health Fitness bands, Coffee pots, Marine Container's all become a Node in an intelligent network communicating with each other. The more expansive IoE concepts include, besides M2M communication, M2P, and technology-assisted P2P communication.

1.1 REAL WORLD PROBLEMS AND THEIR SOLUTIONS:

TRAFFIC MANAGEMENT:

Currently, our cities and urban areas are more crowded than ever before. As populations grow, the number of vehicles on roads increase as well, leading to traffic jams that pose major problems for commuters. IoT solutions that connect devices, such as smartphones, traffic signals, cameras and vehicles, can be used to create a smart transportation grid wherein information collected by each device can be used to prevent traffic jams. Data collected from devices can be used to inform drivers of congestions and monitor overall traffic patterns. A similar IoT app has been developed for the city of Vishakhapatnam in Andhra Pradesh, where devices installed in ambulances will communicate directly with traffic signals within a certain radius, to ensure quick and easy movement during emergencies.

ENERGY CONSERVATION:

With the deterioration of the environment and global warming, energy management and conservation is of vital importance. A lot of this starts within our own homes, where regulation of electricity and water consumption can save both money and resources. This is another pressing real world problem that can be solved with IoT. Smart home automation using IoT devices is an area that holds a lot of promise today. Smart meters, which are connected to lights, fans and other electrical appliances can let owners monitor energy usage. Automatic sensors and controllers that switch off lights and air-conditioners when the home is empty can help limit the usage of electricity. Products like Amazon's Alexa simplify home automation by connecting various home appliances for better functionality.

AGRICULTURAL PROBLEMS:

Farming and agriculture form the basis of economies in several developing countries and are critical areas of development for governments. Since both these activities rely heavily on natural occurrences, environments, and conditions, predictive technologies become an essential tool for planning. Agricultural IoT solutions can provide farmers with invaluable data about soil conditions, crop yields and rainfall, to help them predict and plan activities accordingly. Data collecting software can be synchronized with machines used in fields to completely automate the farming process, reducing the dependency on manual labour.

As the technology evolves, there's potential to find solutions for more real world problems with IoT, leading to a better quality of life.

1.1 APPLICATIONS OF IOE

Smart City:
Not just internet access to people in a city but to the devices in it as well – that's what smart cities are supposed to be made of. And we can proudly say that we're going towards realizing this dream. Efforts are being made to incorporate connected technology into infrastructural requirements and some vital concerns like Traffic Management, Waste Management, Water Distribution, Electricity Management, and more. All these work towards eliminating some day-to-day challenges faced by people and bring in added convenience.

Farming:
Farming is one sector that will benefit the most from the Internet of Things. With so many developments happening on tools farmers can use for agriculture, the future is sure promising. Tools are being developed for Drip Irrigation, understanding crop patterns, Water Distribution, drones for Farm Surveillance, and more. These will allow farmers to come up with a more productive yield and take care of the concerns better.

Smart Homes:
One of the best and the most practical applications of IoT, smart homes really take both, convenience and home security, to the next level. Though there are different levels at which IoT is applied for smart homes, the best is the one that blends intelligent utility systems and entertainment together. For instance, your electricity meter with an IoT device giving you insights into your everyday water usage, your set-top box that allows you to record shows from

remote, Automatic Illumination Systems, Advanced Locking Systems, Connected Surveillance Systems all fit into this concept of smart homes. As IoT evolves, we can be sure that most of the devices will become smarter, enabling enhanced home security.

Health:

The use of wearables or sensors connected to patients, allows doctors to monitor a patient's condition outside the hospital and in real-time. Through continuously monitoring certain metrics and automatic alerts on their vital signs, the Internet of Things helps to improve the care for patients and the prevention of lethal events in high-risk patients.
Another use is the integration of IoT technology into hospital beds, giving way to smart beds, equipped with special sensors to observe vital signs, blood pressure, oximeter and body temperature, among others.

XAVIER INSTITUTE OF ENGINEERING

Department of Information Technology

Class/ Sem/ A.Y: BE IT/ VIII/ 2021-2022

Course Name: Internet of Everything Lab

Group No/ Roll No: 19

Chapter 2: Introduction to Flood Monitoring System						
LO2: Conduct a survey of several available literatures in the preferred field of study.						
Rubrics For Laboratory Work						
Roll No.	**Name of the Student**	**Knowledge/ Understanding (05)**	**Contents (04)**	**Presentation (04)**	**Punctuality & lab ethics (02)**	**Total (15)**
XIEIT181947	Raj Shah					
XIEIT181955	Mahipal Sundvesha					
XIEIT181924	Merlyn Koonamparampath					

Fr. Dr. John Rose S.J.

CHAPTER 2

INTRODUCTION TO FLOOD MONITORING SYSTEM

2.1 PROBLEM DEFINITION

The purpose of this project is to sense the water level in river beds and check if they are in normal condition. If they reach beyond the limit, then it alerts people through LED signals with buzzer sound as well as internet applications.

2.2 AIMS & OBJECTIVES

The purpose of this project is to sense the water level in river beds and check if they are in normal condition. If they reach beyond the limit, then it alerts people through LED signals with buzzer sound as well as internet applications.

2.3 SCOPE OF PROJECT

Scope for the flood monitoring system is to monitor flooded regions and to avoid catastrophic conditions to happen. With the help of ultrasonic sensor, the system can detect the water level variation to find out the critical conditions to help evacuation services. With the help of buzzer and LED light, the people living around the water bodies can be notified about the current situations. Evacuation services and officials related to disaster relief can be notified via SOS notifications.

2.4 FEATURES OF THE PROJECT

1. It can be used for multiple purposes like for drainage, rivers, dams, sewers.
2. It has multiple LED lights and a buzzer to alert the peoples who live in the area where the system is installed.
3. It provides SOS notifications for people away from the system.
4. It has live monitoring feature which helps in understanding the water level.
5. It can show the current status of the water level using widgets available on cloud platform just like the physical LED component.

Department of Information Technology

Class/ Sem/ A.Y: BE IT/ VIII/ 2021-2022

Course Name: Internet of Everything Lab

Group No/ Roll No: 19

Chapter 3: Review of Literature						
LO2: Conduct a survey of several available literatures in the preferred field ofstudy.						
Rubrics For Laboratory Work						
Roll No.	**Name of the Student**	**Knowledge/ Understanding (05)**	**Contents (04)**	**Presentation (04)**	**Punctuality & lab ethics (02)**	**Total (15)**
XIEIT181947	Raj shah					
XIEIT181955	Mahipal Sundvesha					
XIEIT181924	Merlyn koonamparampath					

Fr. Dr. John Rose S.J.

CHAPTER 3

REVIEW OF LITERATURE

In this proposed design[1], the alerting the system by monitoring near the dams regarding the status of the floods with sensors in the main objective. The IoT based flood monitoring and detection system is done to save the lives on the people by reducing the human quick out at the emergency conditions. Here the maximum conditions are observed, and the risk alert is provided to the management.

Jana Priya, et al.[2] presents the concept and implementation of an Internet of Things (IOT)-based Flood Monitoring and Alerting system. There are three pieces to this system. The first section uses an ultrasonic distance measuring sensor to determine the water's height. The Ethernet shield is used to convey the height information to the web page in the second portion. The third part is making call to residences to alert them about flood through voice message. The call is made through the most popular mobile standard Global System for Mobile Communication (GSM) and ARP33A3 is used to play the recorded voice message.

Azid Sheikh et al.[3] shows how an SMS-based Flood Monitoring and Early Warning system is designed, implemented, and experimentally verified. SMS will be used for tools like credit top-up and maintaining contact numbers. Updates on the height of the water level would be texted upon users' request. The system provides timely information and alerts at-risk or threatened populace and relevant authorities by means of SMS when the level of water surpasses the user defined threshold value.

XAVIER INSTITUTE OF ENGINEERING

Department of Information Technology

Class/ Sem/ A.Y: BE IT/ VIII/ 2021-2022

Course Name: Internet of Everything Lab

Group No/ Roll No: 19

Chapter 4: System Description
LO3: Study and enhance software/ hardware skills. **LO4: Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.** **LO5: Report and present the findings of the study conducted in the preferreddomain.** **LO6: Demonstrate an ability to work in teams and manage the conduct of the research study.**

Rubrics For Laboratory Work

Roll No.	Name of the Student	Knowledge/ Understanding (05)	Contents (04)	Presentation (04)	Punctuality & lab ethics (02)	Total (15)
XIEIT181947	Raj shah					
XIEIT181955	Mahipal Sundvesha					
XIEIT181924	Merlyn koonamparampath					

Fr. Dr. John Rose S.J.

CHAPTER 4
SYSTEM DESCRIPTION

4.1 DESIGN

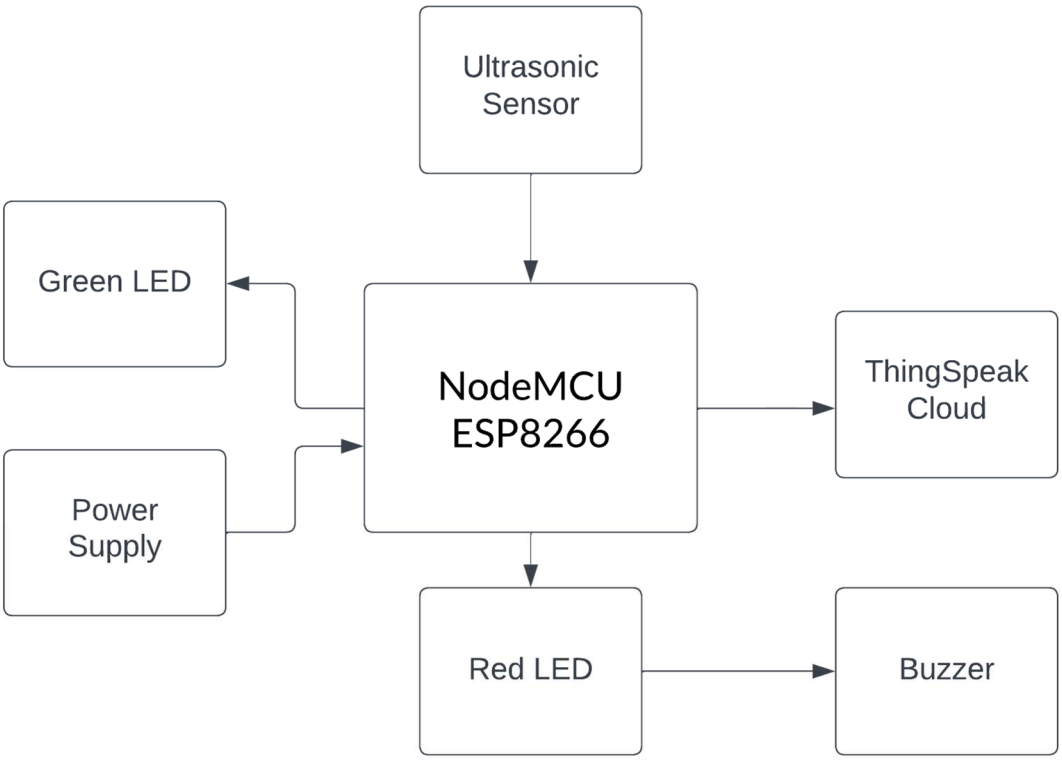


Fig. 4.1.1: Block Diagram

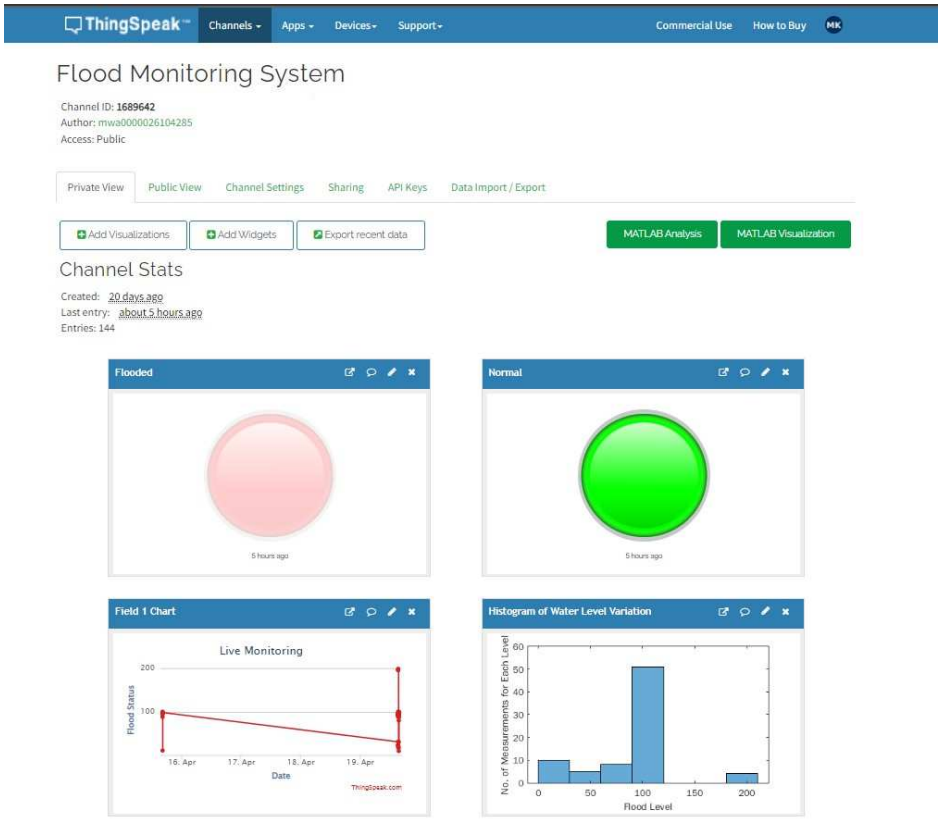


Fig. 4.1.2: ThingSpeak console

4.2 HARDWARE, SOFTWARE AND CLOUD PLATFORMS USED

Hardware's used:

Table 4.2.1: Hardware Requirements & Description

Sr. No.	Hardware	Description
1	NodeMCU	NodeMCU is a low-cost open source IoT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which was based on the ESP-12 module. Later, support for the ESP32 32-bit MCU was added.
2	Ultrasonic Sensor	Ultrasonic sensors work on the principle of ultrasound waves which are used to determine the distance for an object. An Ultrasonic sensor generates high-frequency sound waves. When this ultrasound hits the object, it reflects as the echo that the receiver sense. We can calculate the distance to the target object using the time required to reach the receiver for Echo.
3	Buzzer	A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.
4	LED	A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. In the project green and red were used.
5	Jumper Wires	RF jumper cables - Jumper cables is a smaller and more bendable corrugated cable which is used to connect antennas and other components to network cabling.
6	BreadBoard	A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode).

Software and cloud platforms used:

Table 4.2.2: Software Requirements & Description

Sr. No.	Software	Description
1	Arduino IDE	Arduino IDE (Integrated Development Environment) runs on your computer, to write and upload computer code to the physical board.
2	ThingSpeak cloud	Thingspeak is a cloud platform where we will save various values captured from sensors like ultrasonic and for various alerts.
3	IFTTT	IFTTT derives its name from the programming conditional statement "if this, then that." What the company provides is a software platform that connects apps, devices and services from different developers in order to trigger one or more automations involving those apps, devices and services.

4.3 IMPLEMENTATION METHODOLOGY

STEP 1: Analyse project requirements and collect various components required to build theproject.

STEP 2: Take one Node MCU and connect all the components to the node mcu as shown in the block diagram.

STEP 3: Verify and upload the code to the Node mcu from Arduino ide.

STEP 4: After the code is successfully uploaded on the NodeMCU, it checks and connects to the local wifi and gives the ip address of the system.

STEP 5: The ultrasonic sensor measures the distance of the water level and gives the value to the NodeMCU for performance appropriate action.

STEP 6: If the distance is less then the threshold value provided red led will glow with buzzer sound indicating that flood is about to occur or occurred. NodeMCU also uploads this data to thee thingspeak cloud for realtime monitoring and analysis. Also a SOS notification is sent along with an email to the users.

STEP 7: If the water level is at normal condition then the green led glows.

4.4 HARDWARE CIRCUIT DIAGRAM

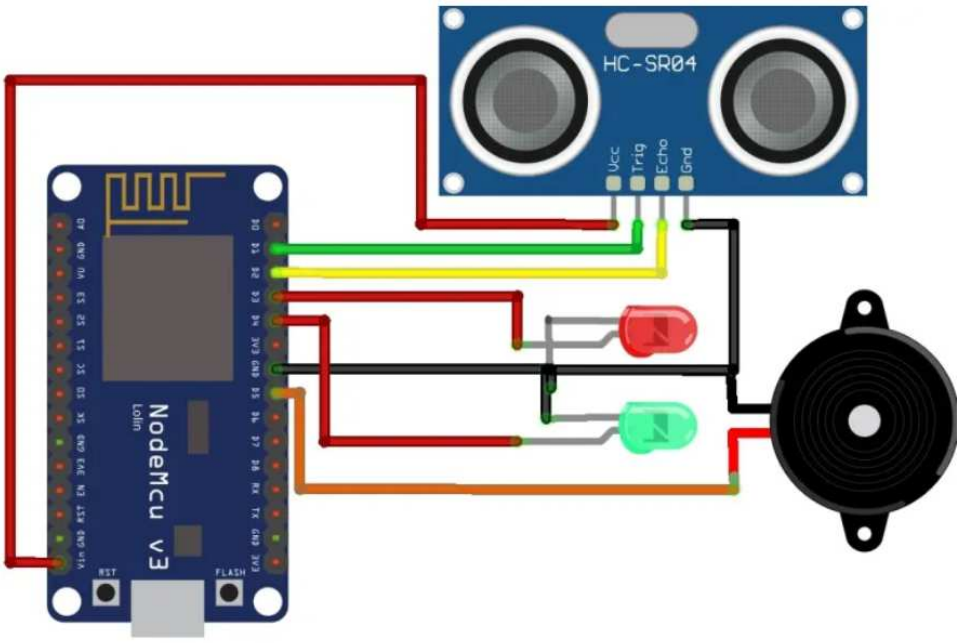


Fig. 4.4.1: Flood Monitoring System Circuit Diagram

4.5 CODE

Flood Monitoring System

```
/*
 *  This sketch is implementation of Flood monitoring system
 *
 */

#include "ThingSpeak.h"
#include <ESP8266WiFi.h>
const int trigPin1 = D5;
const int echoPin1 = D6;
#define redled D3
#define grnled D4
#define BUZZER D1 //buzzer pin
unsigned long ch_no = 1689642;//Replace with Thingspeak Channel number
const char * write_api = "27G1WLND7P44C92O";//Replace with Thingspeak write API
char auth[] = "mwa0000026104285";
char ssid[] = "bleh";
char pass[] = "mjkmjklyn";
unsigned long startMillis;
unsigned long currentMillis;
const unsigned long period = 10000;
WiFiClient  client;
long duration1;
int distance1;
void setup()
{
  pinMode(trigPin1, OUTPUT);
  pinMode(echoPin1, INPUT);
  pinMode(redled, OUTPUT);
  pinMode(grnled, OUTPUT);
  digitalWrite(redled, LOW);
  digitalWrite(grnled, LOW);
  Serial.begin(115200);
  WiFi.begin(ssid, pass);
  while (WiFi.status() != WL_CONNECTED)
  {
    delay(500);
    Serial.print(".");
  }
  Serial.println("WiFi connected");
```

```
  Serial.println(WiFi.localIP());
  ThingSpeak.begin(client);
  startMillis = millis();  //initial start time
}
void loop()
{
  digitalWrite(trigPin1, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin1, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin1, LOW);
  duration1 = pulseIn(echoPin1, HIGH);
  distance1 = duration1 * 0.034 / 2;
  Serial.println(distance1);
  if (distance1 <= 23)
  {
    digitalWrite(D3, HIGH);
    tone(BUZZER, 300);
    digitalWrite(D4, LOW);
    delay(1500);
    noTone(BUZZER);
  }
  else
  {
    digitalWrite(D4, HIGH);
    digitalWrite(D3, LOW);
  }
  currentMillis = millis();
  if (currentMillis - startMillis >= period)
  {
    ThingSpeak.setField(1, distance1);
    ThingSpeak.writeFields(ch_no, write_api);
    startMillis = currentMillis;
  }
}
```

4.6 FINAL PROTOTYPE

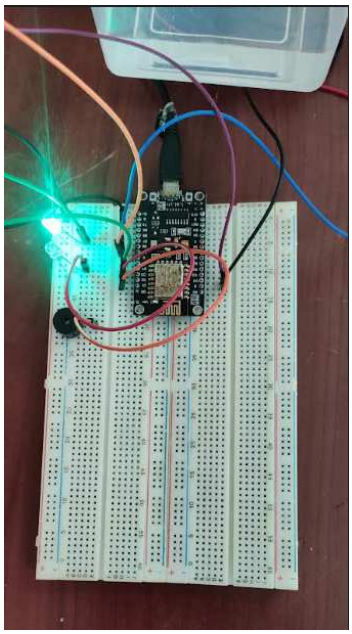


Fig. 4.6.1: Normal condition

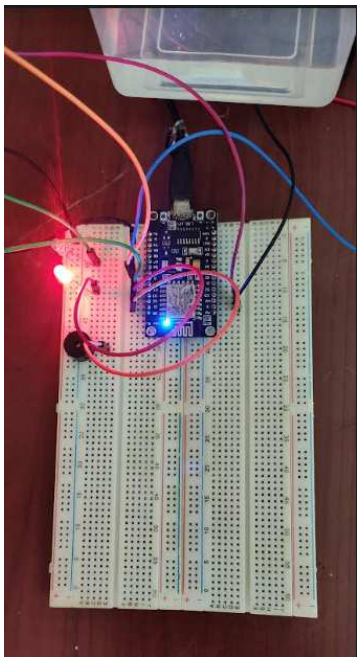


Fig. 4.6.2: Critical Condition

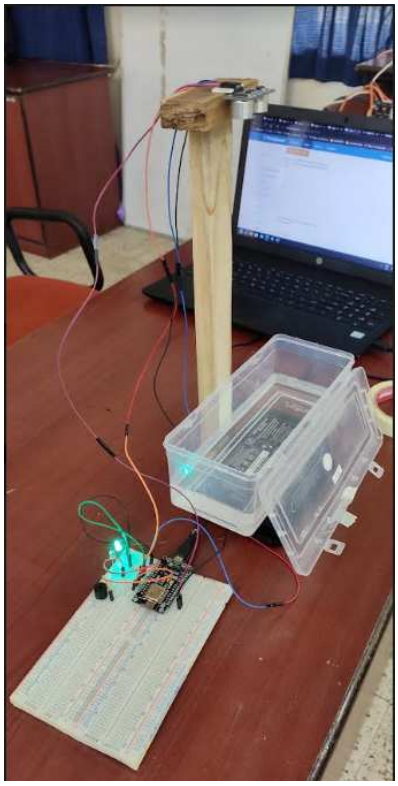


Fig. 4.6.3: Final prototype

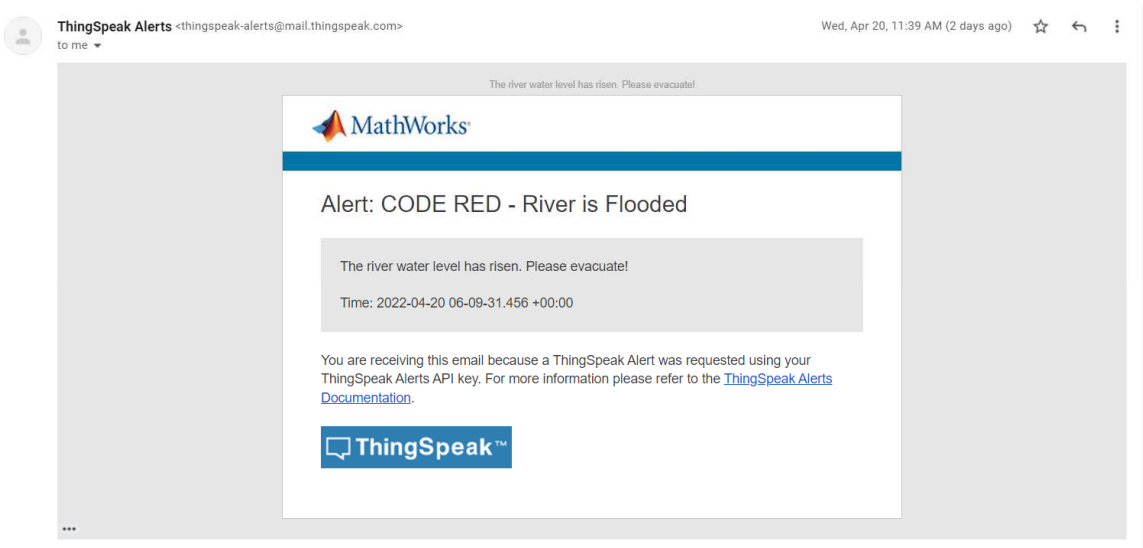


Fig. 4.6.4: SOS Email

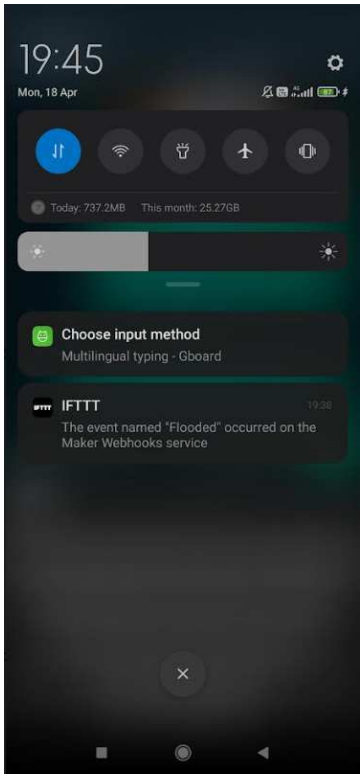


Fig. 4.6.5: SOS Notification

4.7 CONCLUSION AND FUTURE SCOPE OF PROJECT

Future scope:

Flooding can also be related to the intensity of rainfall, which can increase height of the water covering the ground over time. As a result, the creation of a rainfall predicting sensor will eventually lead to early flood detection and monitoring.

Conclusion: The Internet of Everything (IoE) is now widely used around the world. The data of the water level measured in ThingSpeak Cloud will be displayed by this system. If it continues to rain heavily, users may simply check the water level on their laptop or mobile phone from anywhere as long as they have an internet connection. This smart system can also control the alert signal and deliver evacuation notifications at the same time.

4.8 CONSTRAINTS FOR REAL TIME DEPLOYMENT

1. Good network connection is required for this to work constantly.
2. Continuous prower supply is required.
3. The cloud needs a gap of 15 seconds to update the value.
4. Other environmental hazards can damage the system.

REFERENCES

1. N. V. S. Sunny Varma, E. Esha Preethi, M. Ramesh Kumar, Ravi Kumar Tenali, "Internet of Things Based Smart Flood Monitoring & detecting system", International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7, Issue-6, March 2019

2. S. Jana Priya, S. Akshaya, E. Aruna, J. Arokiya Mary Julie," FLOOD MONITORING AND ALERTING SYSTEM", International Journal of Computer Engineering & Technology (IJCET) Volume 8, Issue 2, March-April 2017

3. Azid, **S**heikh I. And **S**harma, Bibhya n. And Raghuwaiya, Krishna and Chand, Abhinendra and Prasad, Sumeet and Jacquier, A. , Sms based Flood Monitoring and early warning system, Arpn Journal of Engineering and Applied Sciences, 2015

XAVIER INSTITUTE OF ENGINEERING

Department of Information Technology

Class/ Sem/ A.Y: BE IT/ VIII/ 2021-2022

Course Name: Internet of Everything Lab

Group No/ Roll No: 19

Assignment No. 1: RFID in IOT

LO1: Identify the requirements for the real world problems.
LO2: Conduct a survey of several available literatures in the preferred field ofstudy.
LO3: Study and enhance software/ hardware skills.
LO4: Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.
LO5: Report and present the findings of the study conducted in the preferred domain.
LO6: Demonstrate an ability to work in teams and manage the conduct of the research study.

Rubrics For Assignment Work

Roll No.	Name of the Student	Knowledge & Content (03)	Neatness and Timeline (02)	Total (05)
XIEIT181947	Raj Shah			
XIEIT181955	Mahipal Sundvesha			
XIEIT181924	Merlyn Koonamparampath			

Fr. Dr. John Rose S.J.

ASSIGNMENT NO 01
RFID in IoT

Raj Shah(XIEIT181947)

Q. Give your idea about RFID Contribution towards construction and Engineering Asset Management.

Ans: In the construction industry, materials management is critical to the project's success. Material shortages, supply delays, waste, damages, pricing changes, and a lack of storage space for materials are all issues that construction companies encounter. Many mistakes can be made if supplies are not managed properly, which might jeopardise a building project's timeliness.

A construction company can solve many of the challenges and hassles associated with controlling and tracking goods by utilising Radio Frequency Identification (RFID) technology.
Because RFID technology has various components for tracking building supplies, several organisations still employ manual ways to track and manage commodities. Even still, there are many more issues with paper-based tracking than there are with adopting a new system that automates the process.

There are tags and readers that make up the RFID system. The scanner connects with the tag to read the data stored on it, and the tag is located on the thing to be tracked. The RFID tag does not become active until it is close to the scanner. Because they contain an internal power supply, there are active tags that are always active. Active tags are also rewritable, meaning they can be programmed with fresh information. Active tags are more expensive, but they provide better noise protection than passive tags that are not always active. Radio frequency is used by the RFID reader to convey data to and from RFID tags.

The information is subsequently shared with a system where it is stored and retrieved. An RFID tag could be placed on a stack of metal roofing panels from a construction standpoint. The RFID tag says 10 panels in the stack if there are 10 panels in the stack. This is an excellent approach to check inventory and keep track of amounts. By entering the location of the panels in a warehouse or other storage facility, this technique can be taken a step further. Companies may need to employ various storage sites near a construction site at times.

Because the item was scanned and keyed in, accessing the materials management system and typing in the item being sought would give its exact position. Having numerous scanners allocated to different locations is another method to be location-specific. Before a construction project begins, checking the system for inventory amount will identify the requirement for extra inventory. The necessary products can be ordered so that the project can be started on schedule and without being slowed down by the need to order materials in the middle of it.

Overall, project planning can be greatly improved, which benefits clients. When customers have a positive experience, the word of mouth that follows goes a long way. More business means a streamlined procedure that results in a favourable client experience, which has a beneficial impact on the bottom line. The advantages go far beyond just knowing where things are and how much of them there are. Construction companies can also take advantage of:

- Data capture in real-time
- Using data to improve productivity
- Paperwork reduction
- Decreased materials-related incidents
- Better communication with clients
- Improved safety practices
- Reduction in labor costs
- Better project schedule estimates

The work of identifying and tracking materials used in construction tools, such as those used for constructing, paving, renovating, and roofing, is made easier with RFID. It can also aid in the estimation process. RFID can also be used to distinguish between various sorts of materials.
Bulk materials are bought in large quantities and produced in accordance with industry norms and codes.

Engineered materials are one-of-a-kind materials, hence they require a unique identifier to be identified throughout the project's lifecycle. For a specific project, an engineering component has been produced. Prefabricated materials are made in a shop ahead of time to certain specifications and dimensions; they may be compatible with building codes and installed on the job site. It can also make a big impact in how resources are maintained and tracked if they're identified by type. The items that were ordered but never received can be tracked by a building company. In the construction industry, RFID is a big winner.

Mahipal Sundvesha(XIEIT181955)

Q. Give your idea about RFID Contribution towards construction and Engineering Asset Management.

Ans: Materials management is important to a project's success in the construction sector. Construction companies face challenges such as material shortages, supply delays, waste, damages, pricing changes, and a lack of storage space for resources. If supplies are not managed effectively, several mistakes can be made, jeopardising the timeliness of a construction project.

A construction company can solve many of the challenges and hassles associated with controlling and tracking goods by utilising Radio Frequency Identification (RFID) technology.
Because RFID technology has various components for tracking building supplies, several organisations still employ manual ways to track and manage commodities. Even still, there are many more issues with paper-based tracking than there are with adopting a new system that automates the process.

There are tags and readers that make up the RFID system. The scanner connects with the tag to read the data stored on it, and the tag is located on the thing to be tracked. The RFID tag does not become active until it is close to the scanner. Because they contain an internal power supply, there are active tags that are always active. Active tags are also rewritable, meaning they can be programmed with fresh information. Active tags are more expensive, but they provide better noise protection than passive tags that are not always active. Radio frequency is used by the RFID reader to convey data to and from RFID tags.

The information is subsequently shared with a system where it is stored and retrieved. An RFID tag could be placed on a stack of metal roofing panels from a construction standpoint. The RFID tag says 10 panels in the stack if there are 10 panels in the stack. This is an excellent approach to check inventory and keep track of amounts. By entering the location of the panels in a warehouse or other storage facility, this technique can be taken a step further. Companies may need to employ various storage sites near a construction site at times.

Because the item was scanned and keyed in, accessing the materials management system and typing in the item being sought would give its exact position. Having numerous scanners allocated to different locations is another method to be location-specific. Before a construction project begins, checking the system for inventory amount will identify the requirement for extra inventory. The necessary products can be ordered so that the project can be started on schedule and without being slowed down by the need to order materials in the middle of it.

Overall, project planning can be greatly improved, which benefits clients. When customers have a positive experience, the word of mouth that follows goes a long way. More business means a

streamlined procedure that results in a favourable client experience, which has a beneficial impact on the bottom line. The advantages go far beyond just knowing where things are and how much of them there are. Construction companies can also take advantage of:

- Data capture in real-time
- Using data to improve productivity
- Paperwork reduction
- Decreased materials-related incidents
- Better communication with clients
- Improved safety practices
- Reduction in labor costs
- Better project schedule estimates

The work of identifying and tracking materials used in construction tools, such as those used for constructing, paving, renovating, and roofing, is made easier with RFID. It can also aid in the estimation process. RFID can also be used to distinguish between various sorts of materials.
Bulk materials are bought in large quantities and produced in accordance with industry norms and codes.

Engineered materials are one-of-a-kind materials, hence they require a unique identifier to be identified throughout the project's lifecycle. For a specific project, an engineering component has been produced. Prefabricated materials are made in a shop ahead of time to certain specifications and dimensions; they may be compatible with building codes and installed on the job site. It can also make a big impact in how resources are maintained and tracked if they're identified by type. The items that were ordered but never received can be tracked by a building company. In the construction industry, RFID is a big winner.

Merlyn Koonamparampath(XIEIT181924)

Q. Give your idea about RFID Contribution towards construction and Engineering Asset Management.

Ans: Materials management is important to a project's success in the construction sector. Construction companies face challenges such as material shortages, supply delays, waste, damages, pricing changes, and a lack of storage space for resources. If supplies are not managed effectively, several mistakes can be made, jeopardising the timeliness of a construction project.

Using Radio Frequency Identification (RFID) technology, a construction company may eliminate many of the obstacles and headaches connected with controlling and tracking materials.
Despite the fact that RFID technology provides many components for tracking building supplies, many organisations still use manual tracking and management methods. Even Nevertheless, there are many more problems with paper-based tracking than there are with switching to an automated approach.

There are tags and readers that make up the RFID system. The scanner connects with the tag to read the data stored on it, and the tag is located on the thing to be tracked. The RFID tag does not become active until it is close to the scanner. Because they contain an internal power supply, there are active tags that are always active. Active tags are also rewritable, meaning they can be programmed with fresh information. Active tags are more expensive, but they provide better noise protection than passive tags that are not always active. Radio frequency is used by the RFID reader to convey data to and from RFID tags.

The information is subsequently shared with a system where it is stored and retrieved. An RFID tag could be placed on a stack of metal roofing panels from a construction standpoint. The RFID tag says 10 panels in the stack if there are 10 panels in the stack. This is an excellent approach to check inventory and keep track of amounts. By entering the location of the panels in a warehouse or other storage facility, this technique can be taken a step further. Companies may need to employ various storage sites near a construction site at times.

Because the item was scanned and keyed in, accessing the materials management system and typing in the item being sought would give its exact position. Having numerous scanners allocated to different locations is another method to be location-specific. Before a construction project begins, checking the system for inventory amount will identify the requirement for extra inventory. The necessary products can be ordered so that the project can be started on schedule and without being slowed down by the need to order materials in the middle of it.

Overall, project planning can be greatly improved, which benefits clients. When customers have a positive experience, the word of mouth that follows goes a long way. More business means a streamlined procedure that results in a favourable client experience, which has a beneficial impact on

the bottom line. The advantages go far beyond just knowing where things are and how much of them there are. Construction companies can also take advantage of:

- Data capture in real-time
- Using data to improve productivity
- Paperwork reduction
- Decreased materials-related incidents
- Better communication with clients
- Improved safety practices
- Reduction in labor costs
- Better project schedule estimates

The work of identifying and tracking materials used in construction tools, such as those used for constructing, paving, renovating, and roofing, is made easier with RFID. It can also aid in the estimation process. RFID can also be used to distinguish between various sorts of materials.
Bulk materials are bought in large quantities and produced in accordance with industry norms and codes.

Engineered materials are one-of-a-kind materials, hence they require a unique identifier to be identified throughout the project's lifecycle. For a specific project, an engineering component has been produced. Prefabricated materials are made in a shop ahead of time to certain specifications and dimensions; they may be compatible with building codes and installed on the job site. It can also make a big impact in how resources are maintained and tracked if they're identified by type. The items that were ordered but never received can be tracked by a building company. In the construction industry, RFID is a big winner.

XAVIER INSTITUTE OF ENGINEERING

Department of Information Technology

Class/ Sem/ A.Y: BE IT/ VIII/ 2021-2022

Course Name: Internet of Everything Lab

Group No/ Roll No: 19

Assignment No. 2: Data Analytics and IoE
LO1: Identify the requirements for the real world problems. **LO2: Conduct a survey of several available literatures in the preferred field of study.** **LO3: Study and enhance software/ hardware skills.** **LO4: Demonstrate and build the project successfully by hardware/sensor requirements, coding, emulating and testing.** **LO5: Report and present the findings of the study conducted in the preferred domain.** **LO6: Demonstrate an ability to work in teams and manage the conduct of the research study.**

Rubrics For Assignment Work

Roll No.	Name of the Student	Knowledge & Content(03)	Neatness and Timeline (02)	Total (05)
XIEIT181947	Raj Shah			
XIEIT181955	Mahipal Sundvesha			
XIEIT181924	Merlyn Koonamparampath			

Fr. Dr. John Rose S.J.

ASSIGNMENT NO 02

DATA ANALYTICS AND IOE

Raj Shah(XIEIT181947)

Q. Every year students graduate. Design and develop an IoE system to track number of students graduated in a year and calculate the percentage of graduation in a year towards institute growth

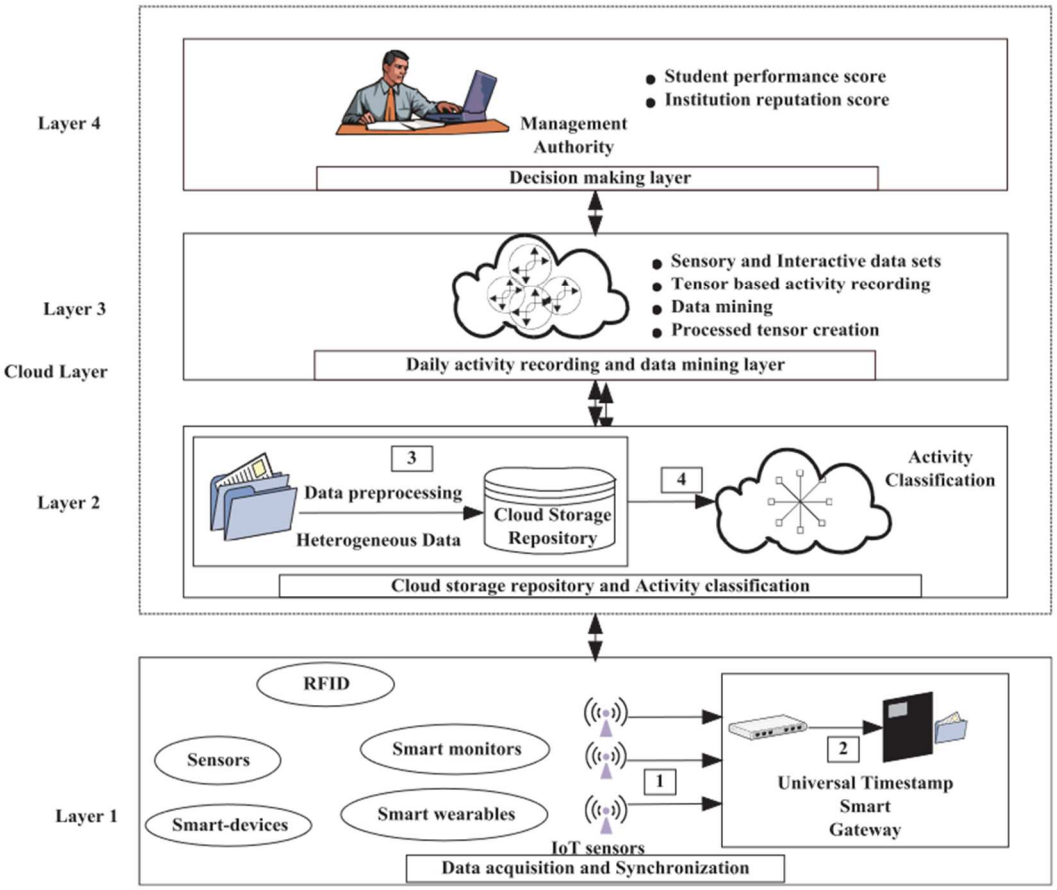
Ans:
Educational institutions are the nation builders. They provide a large variety of learning environments and learning spaces. The advancement in information and communication technology has affected educational institutions functionality significantly. The potential of ubiquitous learning is reflected in increasing access to learning content and other objects in the interaction environment supported by computers anytime and anywhere. The purpose of ubiquitous computing technology in our domain is to improve stu-dent-activity-related learning environment. It tries to adopt data from various objects in different activity con-text, which plays a significant role in generating student-related daily-activity performance score in education perspective. Despite various technological developments in educational institutions, performance evaluation of student is still manual.

Moreover, many important parameters are usually overlooked while calculating student performance score. Personal (evaluator) views may be unfair to reflect the actual performance of each student. There-fore, the decisions taken by management authorities cannot be acceptable in the current scenario. In addition, generating student performance score based on objects (students, teachers and other objects) interactions for various activities is the need of the hour.
To eliminate human biasness and aforementioned flaws in accessing student capabilities in educational institutions, the best alternative is to shift towards automated student performance evaluation system by observing the student behaviour using iot devices. The student performance calculation in an educational institute is a continuous process and can be effectively handled by exploring the ubiquitous features of iot devices. Hence, student performance must be evaluated by considering scores from various fields such as academics, sports, behaviour and interaction activities. Students must maintain consistency between academic and other development activities so that they remain positive, encouraged, enthusiastic and ambitious. Therefore, there is a need to evaluate student performance on regular basis considering important student performance attributes. These results are useful in deciding the field, in which a student can excel.

Iot (internet of objects) is emerging as a network of interconnected uniquely identifiable objects. Its basic objective is to create smart environment/spaces and self-aware things. Smart environment encompasses a low-power, low-cost, high capacity and miniaturised sensors, wired and wireless communication network. Smartness is achieved from the interaction of a ubiquitous network of interconnected objects through sensors, actuators, rfid, gps devices and other wireless and mobile devices. Moreover, the smart objects from pervasive computing environment are paving the way to continuous monitoring of students and staff by heterogeneous iot devices. Based on aforementioned facts, this paper proposes a system that allows students to interact with each other and objects in the form of internet of objects. The student-behaviour-based activity is recognised by a student body network which is composed of behaviour sensors (iot devices, medical sensors and rfid tags and rfid readers). Each of these objects has associated devices which provides information in the form of

interactive spatial datasets.The objectives of this system are:

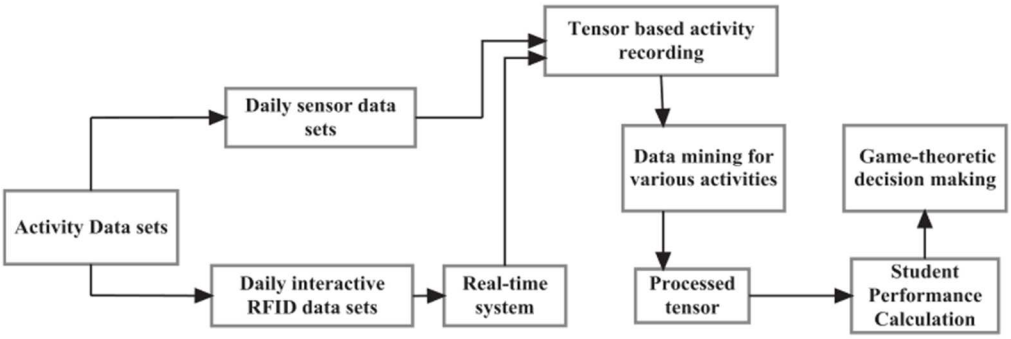
(i) to collect data related to student activities using IoT technologies,
(ii) to record the IoT-based student activity using tensor,
(iii) to evaluate the performance of each student from the web of data using different mining techniques,
(iv) to take continuous decisions using game theory from the information generated using IoT devices' interaction.



Above figure Presents the modelling of proposed system which consists of four layers:
(i) data acquisition and synchronisation layer,
(ii) cloud storage repository and activity classification,
(iii) activity recording and data mining and
(iv) decision-making layer.

Layer 1 is responsible for automated data collection from personal body sensor network and other IoT devices implanted in the school environment. The students' and teachers' physiological parameters are collected by coordinator known as Gateway, which is a portable device or smartphone. In layer 2, the interaction and location measurements are transferred to a third-party platform known as cloud storage repository. Cloud storage infrastructure is responsible for data preprocessing and classifying activities into different datasets. In layer 3, student environment dataset is bifurcated into two datasets: one forms sensory datasets and another forms interactive datasets. Based on these activity datasets, activities are recognised followed by recording various activities in

the form of tensor. In this layer, tensor-based activity record is transferred to meaningful information by creating a processed tensor using educational data mining algorithms. Layer 4 computes the student performance score and institution reputation score by exploring the results from IoT-based student activity performance and student mid-term academic performance. Lastly, game-based decision component takes automated decisions based on student performance information and reputation score.



Student-interaction-based activities are stored in the form of datasets at cloud storage repository. The interaction between nodes (RFID tag and RFID reader) can be best viewed using a real-time system. Cloud stores the time-stamped information of radio packets generated from objects, which is further relayed to real-time system for analysis purposes (Gephi 0.9.1). Real-time system aggregates received radio packets to generate real-time interaction graphs. The real-time interaction graphs are formed based on the phenomenon of spatial proximity relation described in experimental section. In this phenomenon, RFID reader, installed at experimental area and within smartphones of student and teachers, fed the received packets to a real-time system.

RFID tags plays a vital role in calculating student performance in IoT environment. In RFID environment, each student and teacher are equipped with RFID tag and RFID reader, as shown in Figure 4. The basic experimental setup for an RFID-based interaction is shown in Figure 9. The interaction is based on RFID reader reading from one student related to proximity of other student RFID tag within the range of 1–2 m. The readings are relayed to the experiment area in the school premises through wireless communication mechanism such as Wi-Fi/GPRS/CDMA. Moreover, in learning areas of school premises, objects are equipped with RFID readers and they can communicate with students by interacting with their RFID tags, as shown in Figure 9. The basic steps employed to evaluate the student performance is as follows: 1. In our experiment, student body sensor network are equipped with behaviour sensors and RFID-based interactions with environment and other objects. Moreover, active RFID tags are clipped at the chest level so that other devices can be detected in its close proximity using RFID reader such as smartphones and routers. Daily activity set for each student for calculating its daily performance.

3. Results shows that the performance score of each student was assessed using proposed methodology and manual evaluation system. The increase in student performance score reflects the effectiveness of our proposed methodology. Moreover, increase in student performance score also leads to increase in reputation score of the institution.

Mahipal Sundvesha(XIEIT181955)

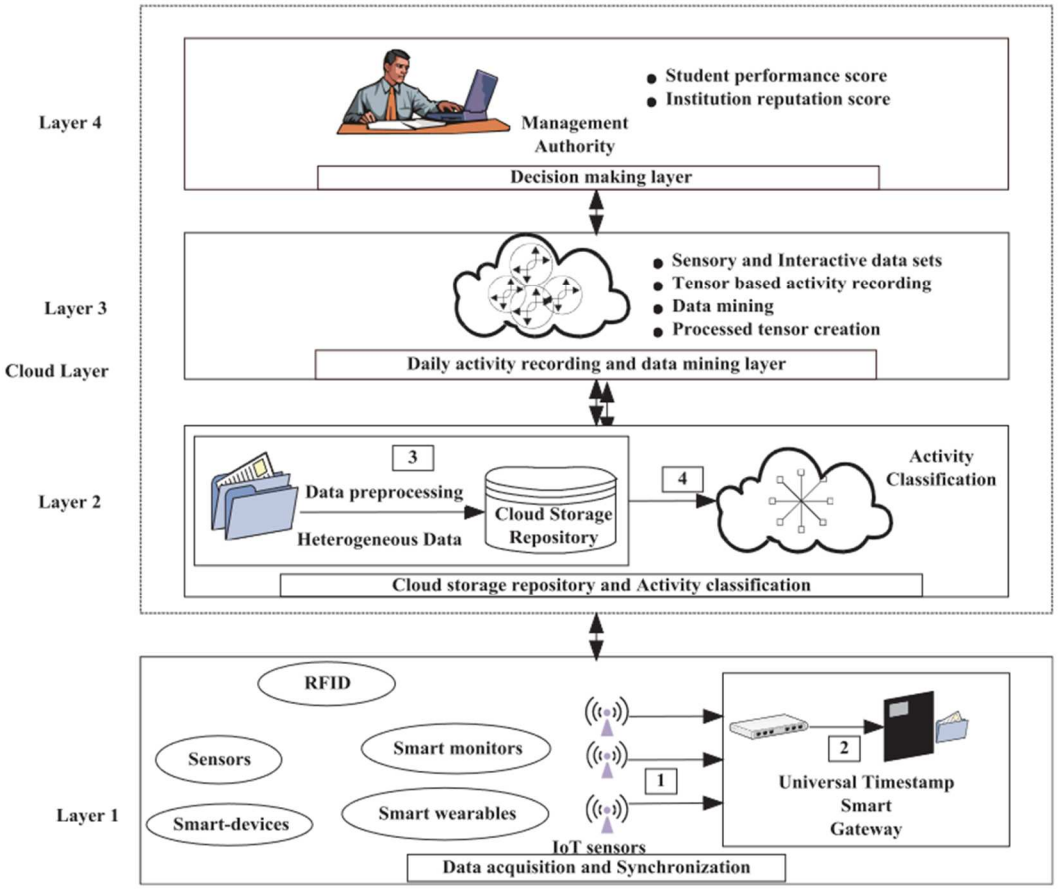
Q. Every year students graduate. Design and develop an IoE system to track number of students graduated in a year and calculate the percentage of graduation in a year towards institute growth

Ans:
Educational institutions are the foundations of a country's development. They offer a diverse range of learning environments and venues. The advent of information and communication technology has had a considerable impact on the functionality of educational institutions. Increased access to learning information and other items in the interaction environment facilitated by computers, anytime and everywhere, demonstrates the promise of ubiquitous learning. In our domain, the goal of ubiquitous computing technology is to improve the student-activity-related learning environment. It seeks to incorporate data from a variety of items in various activity contexts, which is important in establishing a student-related daily-activity performance score from an educational standpoint. Despite technological advancements in educational institutions, student performance evaluation is still done by hand.

Moreover, many important parameters are usually overlooked while calculating student performance score. Personal (evaluator) views may be unfair to reflect the actual performance of each student. There-fore, the decisions taken by management authorities cannot be acceptable in the current scenario. In addition, generating student performance score based on objects (students, teachers and other objects) interactions for various activities is the need of the hour.
To eliminate human biasness and aforementioned flaws in accessing student capabilities in educational institutions, the best alternative is to shift towards automated student performance evaluation system by observing the student behaviour using iot devices. The student performance calculation in an educational institute is a continuous process and can be effectively handled by exploring the ubiquitous features of iot devices. Hence, student performance must be evaluated by considering scores from various fields such as academics, sports, behaviour and interaction activities. Students must maintain consistency between academic and other development activities so that they remain positive, encouraged, enthusiastic and ambitious. Therefore, there is a need to evaluate student performance on regular basis considering important student performance attributes. These results are useful in deciding the field, in which a student can excel.

Iot (internet of objects) is emerging as a network of interconnected uniquely identifiable objects. Its basic objective is to create smart environment/spaces and self-aware things. Smart environment encompasses a low-power, low-cost, high capacity and miniaturised sensors, wired and wireless communication network. Smartness is achieved from the interaction of a ubiquitous network of interconnected objects through sensors, actuators, rfid, gps devices and other wireless and mobile devices. Moreover, the smart objects from pervasive computing environment are paving the way to continuous monitoring of students and staff by heterogeneous iot devices. Based on aforementioned facts, this paper proposes a system that allows students to interact with each other and objects in the form of internet of objects. The student-behaviour-based activity is recognised by a student body network which is composed of behaviour sensors (iot devices, medical sensors and rfid tags and rfid readers). Each of these objects has associated devices which provides information in the form of interactive spatial datasets.The objectives of this system are:

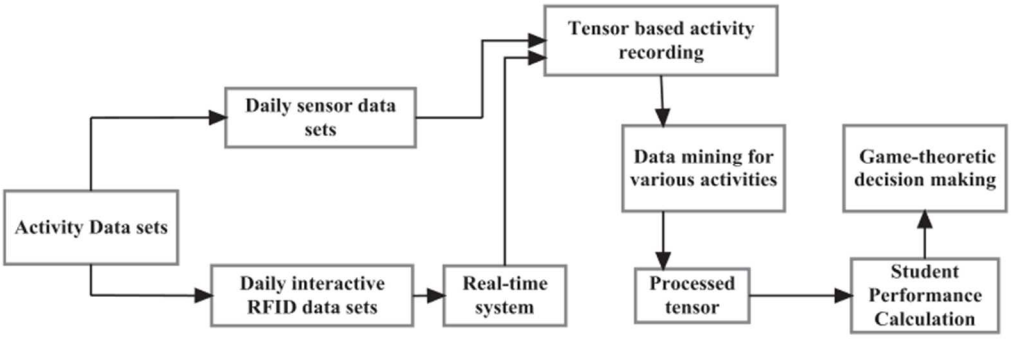
(i) to collect data related to student activities using IoT technologies,
(ii) to record the IoT-based student activity using tensor,
(iii) to evaluate the performance of each student from the web of data using different mining techniques,
(iv) to take continuous decisions using game theory from the information generated using IoT devices' interaction.



Above figure Presents the modelling of proposed system which consists of four layers:
(i) data acquisition and synchronisation layer,
(ii) cloud storage repository and activity classification,
(iii) activity recording and data mining and
(iv) decision-making layer.

Layer 1 is responsible for automated data collection from personal body sensor network and other IoT devices implanted in the school environment. The students' and teachers' physiological parameters are collected by coordinator known as Gateway, which is a portable device or smartphone. In layer 2, the interaction and location measurements are transferred to a third-party platform known as cloud storage repository. Cloud storage infrastructure is responsible for data preprocessing and classifying activities into different datasets. In layer 3, student environment dataset is bifurcated into two datasets: one forms sensory datasets and another forms interactive datasets. Based on these activity datasets, activities are recognised followed by recording various activities in the form of tensor. In this layer, tensor-based activity record is transferred to meaningful information

by creating a processed tensor using educational data mining algorithms. Layer 4 computes the student performance score and institution reputation score by exploring the results from IoT-based student activity performance and student mid-term academic performance. Lastly, game-based decision component takes automated decisions based on student performance information and reputation score.



Student-interaction-based activities are stored in the form of datasets at cloud storage repository. The interaction between nodes (RFID tag and RFID reader) can be best viewed using a real-time system. Cloud stores the time-stamped information of radio packets generated from objects, which is further relayed to real-time system for analysis purposes (Gephi 0.9.1). Real-time system aggregates received radio packets to generate real-time interaction graphs. The real-time interaction graphs are formed based on the phenomenon of spatial proximity relation described in experimental section. In this phenomenon, RFID reader, installed at experimental area and within smartphones of student and teachers, fed the received packets to a real-time system.

RFID tags plays a vital role in calculating student performance in IoT environment. In RFID environment, each student and teacher are equipped with RFID tag and RFID reader, as shown in Figure 4. The basic experimental setup for an RFID-based interaction is shown in Figure 9. The interaction is based on RFID reader reading from one student related to proximity of other student RFID tag within the range of 1–2 m. The readings are relayed to the experiment area in the school premises through wireless communication mechanism such as Wi-Fi/GPRS/CDMA. Moreover, in learning areas of school premises, objects are equipped with RFID readers and they can communicate with students by interacting with their RFID tags, as shown in Figure 9. The basic steps employed to evaluate the student performance is as follows: 1. In our experiment, student body sensor network are equipped with behaviour sensors and RFID-based interactions with environment and other objects. Moreover, active RFID tags are clipped at the chest level so that other devices can be detected in its close proximity using RFID reader such as smartphones and routers. Daily activity set for each student for calculating its daily performance.

3. Results shows that the performance score of each student was assessed using proposed methodology and manual evaluation system. The increase in student performance score reflects the effectiveness of our proposed methodology. Moreover, increase in student performance score also leads to increase in reputation score of the institution.

Merlyn Koonamparampath(XIEIT181924)

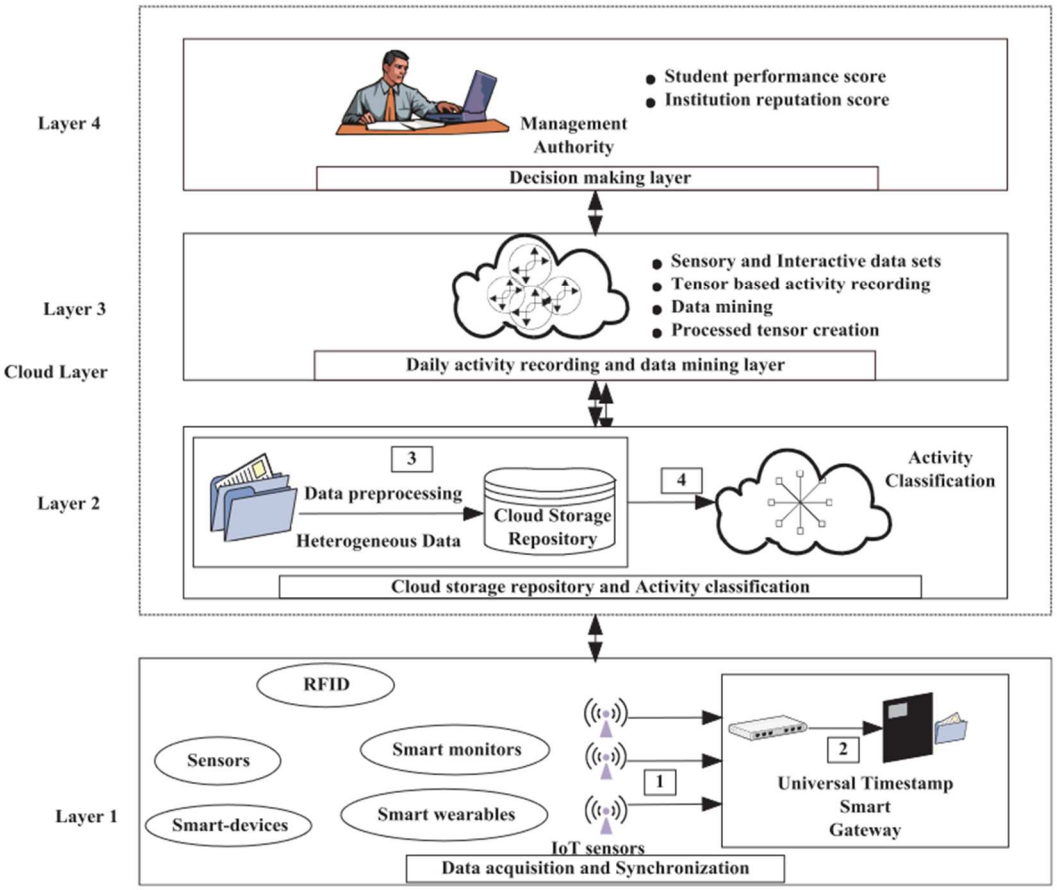
Q. Every year students graduate. Design and develop an IoE system to track number of students graduated in a year and calculate the percentage of graduation in a year towards institute growth

Ans:
Educational institutions are the foundations of a country's development. They offer a diverse range of learning environments and venues. The advent of information and communication technology has had a considerable impact on the functionality of educational institutions. Increased access to learning information and other items in the interaction environment facilitated by computers, anytime and everywhere, demonstrates the promise of ubiquitous learning. In our domain, the goal of ubiquitous computing technology is to improve the student-activity-related learning environment. It seeks to incorporate data from a variety of items in various activity contexts, which is important in establishing a student-related daily-activity performance score from an educational standpoint. Despite technological advancements in educational institutions, student performance evaluation is still done by hand.

Furthermore, when determining a student's performance score, several critical elements are sometimes omitted. Personal (evaluator) opinions may be inaccurate in reflecting each student's actual performance. As a result, given the current situation, managerial decisions cannot be considered appropriate. Furthermore, providing student performance scores based on object interactions (students, teachers, and other objects) for diverse activities is a pressing necessity.
To minimise human bias and the aforementioned weaknesses in accessing student capacities in educational institutions, the best option is to move to an automated student performance evaluation system that monitors student behaviour with internet of things devices. In an educational establishment, calculating student performance is a continual process that can be successfully handled by utilising the omnipresent capabilities of IoT devices. Hence, student performance must be evaluated by considering scores from various fields such as academics, sports, behaviour and interaction activities. Students must maintain consistency between academic and other development activities so that they remain positive, encouraged, enthusiastic and ambitious. Therefore, there is a need to evaluate student performance on regular basis considering important student performance attributes. These results are useful in deciding the field, in which a student can excel.

Iot (internet of objects) is emerging as a network of interconnected uniquely identifiable objects. Its basic objective is to create smart environment/spaces and self-aware things. Smart environment encompasses a low-power, low-cost, high capacity and miniaturised sensors, wired and wireless communication network. Smartness is achieved from the interaction of a ubiquitous network of interconnected objects through sensors, actuators, rfid, gps devices and other wireless and mobile devices. Moreover, the smart objects from pervasive computing environment are paving the way to continuous monitoring of students and staff by heterogeneous iot devices. Based on aforementioned facts, this paper proposes a system that allows students to interact with each other and objects in the form of internet of objects. The student-behaviour-based activity is recognised by a student body network which is composed of behaviour sensors (iot devices, medical sensors and rfid tags and rfid readers). Each of these objects has associated devices which provides information in the form of interactive spatial datasets.The objectives of this system are:

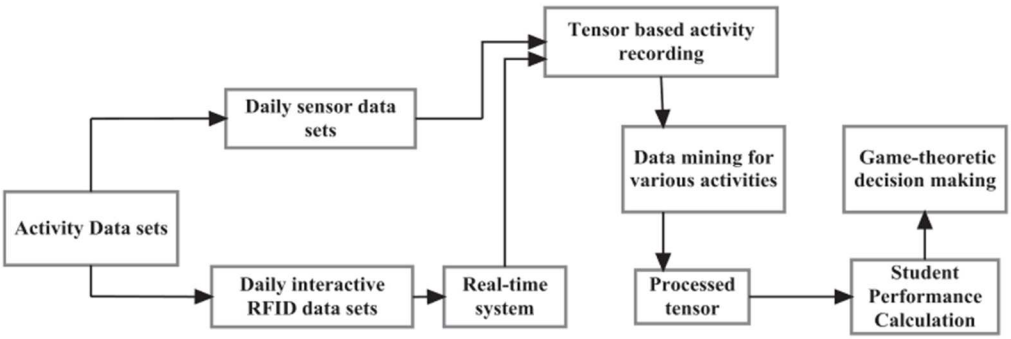
(i) to collect data related to student activities using IoT technologies,
(ii) to record the IoT-based student activity using tensor,
(iii) to evaluate the performance of each student from the web of data using different mining techniques,
(iv) to take continuous decisions using game theory from the information generated using IoT devices' interaction.



Above figure Presents the modelling of proposed system which consists of four layers:
(i) data acquisition and synchronisation layer,
(ii) cloud storage repository and activity classification,
(iii) activity recording and data mining and
(iv) decision-making layer.

Layer 1 is responsible for automated data collection from personal body sensor network and other IoT devices implanted in the school environment. The students' and teachers' physiological parameters are collected by coordinator known as Gateway, which is a portable device or smartphone. In layer 2, the interaction and location measurements are transferred to a third-party platform known as cloud storage repository. Cloud storage infrastructure is responsible for data preprocessing and classifying activities into different datasets. In layer 3, student environment dataset is bifurcated into two datasets: one forms sensory datasets and another forms interactive datasets. Based on these activity datasets, activities are recognised followed by recording various activities in the form of tensor. In this layer, tensor-based activity record is transferred to meaningful information by creating a processed tensor using educational data mining algorithms. Layer 4 computes the

student performance score and institution reputation score by exploring the results from IoT-based student activity performance and student mid-term academic performance. Lastly, game-based decision component takes automated decisions based on student performance information and reputation score.



Student-interaction-based activities are stored in the form of datasets at cloud storage repository. The interaction between nodes (RFID tag and RFID reader) can be best viewed using a real-time system. Cloud stores the time-stamped information of radio packets generated from objects, which is further relayed to real-time system for analysis purposes (Gephi 0.9.1). Real-time system aggregates received radio packets to generate real-time interaction graphs. The real-time interaction graphs are formed based on the phenomenon of spatial proximity relation described in experimental section. In this phenomenon, RFID reader, installed at experimental area and within smartphones of student and teachers, fed the received packets to a real-time system.

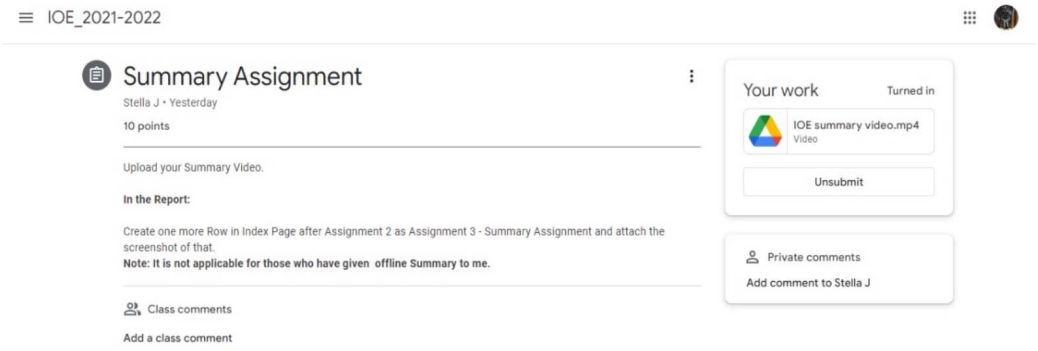
RFID tags plays a vital role in calculating student performance in IoT environment. In RFID environment, each student and teacher are equipped with RFID tag and RFID reader, as shown in Figure 4. The basic experimental setup for an RFID-based interaction is shown in Figure 9. The interaction is based on RFID reader reading from one student related to proximity of other student RFID tag within the range of 1–2 m. The readings are relayed to the experiment area in the school premises through wireless communication mechanism such as Wi-Fi/GPRS/CDMA. Moreover, in learning areas of school premises, objects are equipped with RFID readers and they can communicate with students by interacting with their RFID tags, as shown in Figure 9. The basic steps employed to evaluate the student performance is as follows: 1. In our experiment, student body sensor network are equipped with behaviour sensors and RFID-based interactions with environment and other objects. Moreover, active RFID tags are clipped at the chest level so that other devices can be detected in its close proximity using RFID reader such as smartphones and routers. Daily activity set for each student for calculating its daily performance.

3. Results shows that the performance score of each student was assessed using proposed methodology and manual evaluation system. The increase in student performance score reflects the effectiveness of our proposed methodology. Moreover, increase in student performance score also leads to increase in reputation score of the institution.

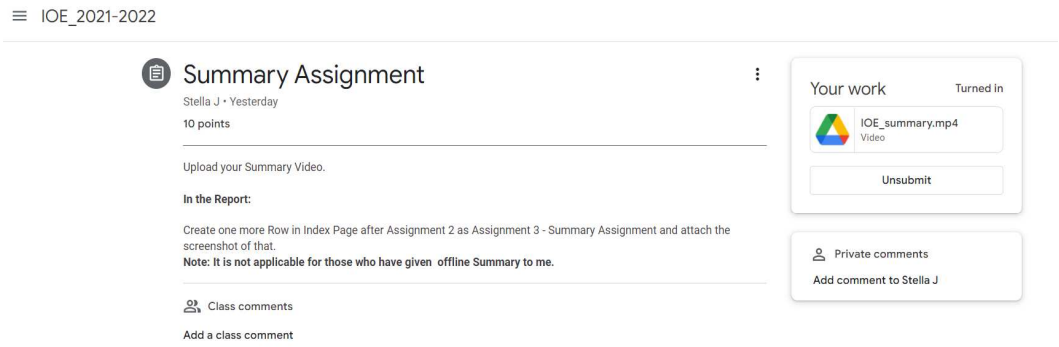
ASSIGNMENT NO 03

SUMMARY ASSIGNMENT

Raj Shah(XIEIT181947)



Mahipal Sundvesha(XIEIT181955)



Merlyn Koonamparampath(XIEIT181924)