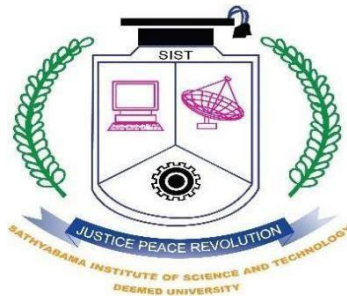


SECURE SMART ENVIRONMENT USING IOT BASED ON RFID

Submitted in Partial Fulfilment of The Requirements For
The Award Of
Bachelor of Engineering Degree in Electronics and Communication
Engineering
By

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ENGINEERING
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SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade “A” by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this project report is the bonafide work of **E.V.V.S. SAI VIVEK (38130060)** and **G. CHAITANYA PAVAN (38130071)** who carried out the project entitled "**SECURE SMART ENVIRONMENT USING IOT BASED ON RFID**" under my supervision from **November-2021** to **May-2022**.

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DECLARATION

We **E.V.V.S.SAI VIVEK (38130060)** and **G. CHAITANYA PAVAN (38130071)** hereby declare that the project entitled “**SECURE SMART ENVIRONMENT USING IOT BASED ON RFID**” done by us under the guidance of **Dr. B. RAJASEKAR B.E., M. Tech., Ph.D.**, at the Sathyabama Institute of Science and Technology, Chennai-600119 is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electronics and Communication Engineering.

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ABSTRACT

This system discusses an IoT based park environment automation system through which theme security, room air quality check, and emergency assistance can be obtained. This system can automatically provide environment safety, but the user can also control the system manually if desired. The system uses the NodeMCU module as the mainboard and has a mobile application for remote monitoring. If any unwanted incident occurs, the system will immediately turn off the home's main power connection and send the house's status in the form of a notification to the user's mobile app. Also, an essential feature of the system is that the system is able to block the entry of any unwanted person in the house.

RFID has many positives and as well as negatives when come to real time applications these kind of RFID can takes place with lesser limitations respectively. By using RFID in real time process the more kind of getting easier data's from the people through database and these kind of RFID costs very low and they can be reusable.

While the researching kind of peoples are much easier to identify the scanning and the scanner technology is much safer and makes much more easily when compare to others respectively.

This kind of Fast Ticketing process can be implemented with the help of the RFID scanner as well as the RFID tag into it. When compared to the other ticketing process these kind of fast and reliable technique is much easier to implement.

TABLE OF CONTENTS

CHAPTER NO	TITLE	PAGE NO
	ABSTRACT	v
	LIST OF FIGURES	viii
1	INTRODUCTION	1
	1.1 OVERVIEW	1
	1.2 RFID TECHNOLOGY	1
	1.3 TYPES OF RFID TAGS	2
	1.3.1 LOW-FREQUENCY TAGS	2
	1.3.2 HIGH-FREQUENCY TAGS	2
	1.3.3 ULTRA HIGH-FREQUENCY TAGS	3
	1.3.4 ACTIVE,PASSIVE & SEMI PASSIVE TAGS	3
	1.4 COMPARING RFID TAGS	4
	1.5 CHALLENGES OF RFID SYSTEM	5
	1.6 APPLICATIONS OF RFID SYSTEM	5
	1.7 IOT DEFINITION	6
	1.8 CHALLENGES IN IOT	9
	1.9 ADVANTAGES OF IOT	9
	1.10 OBJECTIVE OF IOT	10
2	LITERATURE SURVEY	11
3	AIM & SCOPE OF THE PROJECT	17
	3.1 AIM	17
	3.2 SCOPE OF THE PROJECT	17
	3.3 EXISTING SYSTM	17
	3.3.1 DRAWBACKS OF EXISTING SYSTEM	17
	3.4 PROPOSED SYSTEM	18
	3.5 ADVANTAGES OF PROPOSED SYSTEM	21
4	RESULTS AND DISCUSSIONS	22
	4.1 NODEMCU TO DHT11 SENSOR	22
	4.1 NODEMCU TO FLAME SENSOR	24

	4.1 NODEMCU TO RFID READER	25
	4.1 NODEMCU TO IR SENSOR & RELAY	27
	4.5 UBIDOTS EXPLORER	27
5	CONCLUSION	30
	REFERENCES	31
	APPENDIX	34

LIST OF FIGURES

FIGURE NO	FIGURE NAME	PAGE NO
1.1	TYPES OF RFID TAGS	4
1.2	LAYERED ARCHITECTURE OF IOT	8
3.1	WORKING OF IOT & RFID	20
3.2	BLOCK DIAGRAM	20
4.1	TEMPERATURE READING	23
4.2	HUMIDITY READING	24
4.3	FLAME SENSOR READING	25
4.4	RFID READER	26
4.5	PERSON RECORD	27
4.6	ALERT MESSAGE	28
4.7	LOCATION	28
4.8	HARDWARE PROPOSED SYSTEM	29

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

The Internet of Things (IoT) is the network of physical objects accessed through the Internet, as defined by technology analysts and visionaries. These objects contain embedded technology to interact with internal states or the external environment. In other words, when objects can sense and communicate, it changes how and where decisions are made, and who makes them. The IoT is connecting new places—such as manufacturing floors, energy grids, healthcare facilities, and transportation systems—to the Internet. When an object can represent itself digitally, it can be controlled from anywhere. This connectivity means more data, gathered from more places, with more ways to increase efficiency and improve safety and security.

Internet of Things gives objects the capacity to identify itself, perceive the surrounding data, interact with servers over the internet and make queries to change their state. These objects can be personal objects such as smart phones, digital cameras or elements in our environment.

Radio-frequency identification (RFID) is seen as prerequisite for the Internet of Things. RFID is used for sensing the objects and also for transfer of information about the object onto the network wirelessly till it reaches its destination.

1.2 RFID TECHNOLOGY

RFID is also known as the frequency identification device and which was in the form of tags these are the upcoming technologies. RFID projects and these technologies were used and they are much more efficient too.

These type of RFID tags are used to identify the radio waves automatically and in stores some kind of values into it. Generally, the RFID tag consists of the antenna which is inbuilt in the tag and which used as the reader the chip as well as possible respectively.

The RFID may consists of two main parts like the reader part and the tag. The RFID tag and reader transfers the message through electromagnetic waves and they have prior modules. This RFID system uses with the technology of embedded systems and they provide such an automated ticketing system in the railways. These type of RFID project has been implemented and they have utilized as well as possible.

Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. Data stored on RFID tags can be changed, updated and locked.

1.3 TYPES OF RFID TAGS

1.3.1 Low-frequency (LF) RFID tags: 30 KHz to 300 KHz

LF RFID tags have slower read rates and shorter read ranges than UHF or HF, but they're less susceptible to interference by liquids and metals because they have a longer wavelength. Because of this, they're often used in applications where an RFID label is affixed to a metal substrate, such as inventorying beer kegs or automobiles.

1.3.2 High-frequency (HF) RFID tags: 3 to 30 MHz

HF RFID tags have longer read range and higher memory capabilities, making them well-suited to cataloging library media or for use in tracking bracelets for theme parks. Within the HF RFID category are a common type of smart label: Near field communication (NFC) tags.

- ***NFC vs. HF RFID***

NFC tags are a subcategory of HF RFID technology. All NFC tags are HF RFID tags, but not all HF RFID tags are NFC tags. NFC operates in a very specific subset of the high-frequency range —13.56 MHz— and have very different use cases and implementation considerations from other RFID categories.

- *Key differences between NFC and other RFID categories*

One key difference is that NFC tags have a much smaller read range, often requiring the reader and tag to be no more than a few centimeters apart. And while other RFID types allow for entire pallets of tags to be read at once, NFC tags must be read one at a time. With larger memory capabilities and two-way communication capabilities, though, NFC tags are much more useful for storing and communicating large amounts of information — making them an incredibly valuable tool in promotional campaigns

- *Applications for NFC tags*

NFC technology provides secure, one-to-one coupling, making it useful for contactless payment applications such as ApplePay™. And because almost all smartphones function as NFC readers, NFC tags are popular in promotional labels and posters, and are also a good tool for personalized customer engagement. To learn how brands have leveraged NFC technology, read our articles on NFC applications in wine labels or in the healthcare industry.

1.3.3 Ultra-high-frequency (UHF) RFID tags: 300 MHz to 3GHz

UHF RFID tags are considered the “supply chain frequency” because they’re generally lower priced than the other types, while still providing good read ranges and rates. Common applications include item-level tracking, retail inventory control and driving supply chain efficiencies.

Wal-Mart, Target and the Department of Defense (DoD) mandate that their suppliers provide RFID tags with every product and pallet. This reduces the need for manual inventorying, as hundreds of tags can be read simultaneously. And it allows them to more accurately identify incoming inventory by reading entire truckloads of products at a time.

1.3.4 Active, passive and semi-passive RFID tags

Active RFID tags have a battery and periodically transmit signals, useful in location tracking applications. Because the battery in active tags can boost signal strength, they tend to have a longer read range (up to 100 meters).

Passive tags remain dormant until they receive a radio signal from a reader. The energy from the reader's signal is used to turn the tag on and reflect an information-carrying signal back to the reader.

Semi-passive (or battery-assisted) RFID tags contain a battery, but do not transmit a periodic signal like active RFID tags. Instead, the battery is only used to turn the tag on when a signal is received — this allows all energy from the reader's signal to be reflected back.

Because active tags tend to be much more expensive, they are often only used to track very high-value assets, such as equipment in the construction, automobile or healthcare industries. Passive tags —especially ultra-high frequency (UHF) and near field communication (NFC)— are the most widely used for product and pallet labels.

1.4 Comparing RFID tag types: UHF vs. HF vs. NFC vs. LF RFID

There are a variety of RFID tags on the market today, differentiated by frequency range (low, high and ultra-high). Each RFID type can be either active (powered), passive (un-powered) or semi-passive (battery-assisted).

Types of RFID tags			
	LOW-FREQUENCY (RFID)	HIGH-FREQUENCY (HF)	ULTRA-HIGH-FREQUENCY (UHF)
FREQUENCY RANGE	30 to 300 KHz	3 to 30 MHz	300 MHz to 3GHz
COMMON FREQUENCY	125 KHz or 134 KHz	13.56 MHz (NFC)	860 to 960 MHz (UHF Gen2)
RELATIVE COST	\$\$	\$\$ – \$\$\$	\$
READ RANGE	≤10 cm	≤30 cm	≤100 m
BENEFITS	More resistant to interference by liquids and metals.	Higher memory capabilities, NFC tags can function as both reader and tag.	Lower cost, with good read range and fast read rates.
COMMON APPLICATIONS	Animal tracking, automobile inventorying.	Promotional packaging and labels, contactless payment, library collections.	Inventory control, item-level tracking, supply chain visibility and efficiency.

Fig 1.1 Types of RFID tags

1.5 CHALLENGES OF RFID SYSTEM

Trouble with metals and liquids: RFID has long had a **difficult relationship working among liquids and metals**, as both make it harder to get proper reads on assets. With metal, the problem stems from the radio waves bouncing all over the place. Liquids play havoc with RFID in that it can absorb signals sent from a tag.

- The future looks bright for RFID as the industry continues to emerge. Doerfler said they are no longer the ones educating the marketplace. Now industry events and publications (like this one) are helping to spread the word.
- Despite the growth, Metalcraft and other converters will look to overcome some prevailing challenges:
- *Infrastructure*: The main challenge for customers is the investment in infrastructure, such as setting up portals and mobile readers.
- *Capacity*: Given the fact that RFID continues to emerge and grow, converters will need to find the capacity needed to support customers.
- *Variability*: Every customer has different needs. You must have the equipment and the Engineering talent and resources to deliver.

1.6 APPLICATION OF RFID TAGS

Some common uses for RFID applications include:

- pet and livestock tracking.
- inventory management.
- asset tracking and equipment tracking.
- inventory control.
- cargo and supply chain logistics.
- vehicle tracking.
- customer service and loss control.
- improved visibility and distribution in the supply chain.

1.7 IOT DEFINITION

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

A thing in the internet of things can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low or any other natural or man-made object that can be assigned an Internet Protocol (IP) address and is able to transfer data over a network.

Increasingly, organizations in a variety of industries are using IoT to operate more efficiently, better understand customers to deliver enhanced customer service, improve decision-making and increase the value of the business.

In this section, we explain some of the IoT definitions. Also, we explain the layered architecture for IoT.

Internet of Things (IoT) has increasingly gained attention in industry to interact with different types of devices. IoT can have influence on industry and society by integrating physical devices into information networks. IoT impacts can be on different perspectives, namely for private and business users. From the perspective of a private user, IoT has effect on both working and personal fields, such as smart homes and offices, e-health and assisted living. From the aspect of a business user the impacts would be in fields such as automation and industrial manufacturing, logistics, business process management, intelligent transportation of people and goods.

IoT integrates physical things into information networks. IoT covers the overall infrastructure, including software, hardware and services, which is used to support these information networks. The integrated physical things can exchange data about the physical properties and information that they sense in their

environment. To identify devices, we can use identification technologies like for example RFID, which allow each device be uniquely identified.

International Telecommunication Union (ITU)¹ defines IoT as “A global infrastructure for the Information Society, enabling advanced services by interconnecting (physical and virtual) things based on, existing and evolving, interoperable information and communication technologies”.

Internet of Things-Architecture (IoT-A) defines it as “The idea of a globally interconnected continuum of devices, objects and things in general emerged with the RFID technology, and this concept has considerably been extended to the current vision that envisages a plethora of heterogeneous objects interacting with the physical environment”.

IoT has a layered architecture designed to answer the demands of various industries, enterprises and society. Fig. 1.2 shows a generic layered architecture for IoT that consist of five layers, which are discussed.

- *Edge Technology Layer*

This is a hardware layer that consists of embedded systems, RFID tags, sensor networks and all of the other sensors in different forms. This hardware layer can perform several functions, such as collecting information from a system or an environment, processing information and supporting communication.

- *Internet System Layer*

The Internet system is responsible for analysis, processing, control and decision making of information to implement customized services ordered by users and controlling the connection between things and things.

This layer includes the internet and database (PML database)

- *Access Gateway Layer*

This layer is concerned with data handling, and is responsible for publishing and subscribing the services that are provided by the *Things*, message routing, and hovelling the communication between platforms.

- *Middleware Layer*

This layer has some critical functionalities, such as aggregating and filtering the received data from the hardware devices, performing information discovery and providing access control to the devices for applications.

- *Application Layer*

This layer is responsible for delivering various application services. These services are provided through the middleware layer to different applications and users in IoT-based systems. The application services can be used in different industries such as, logistics, retail, healthcare.

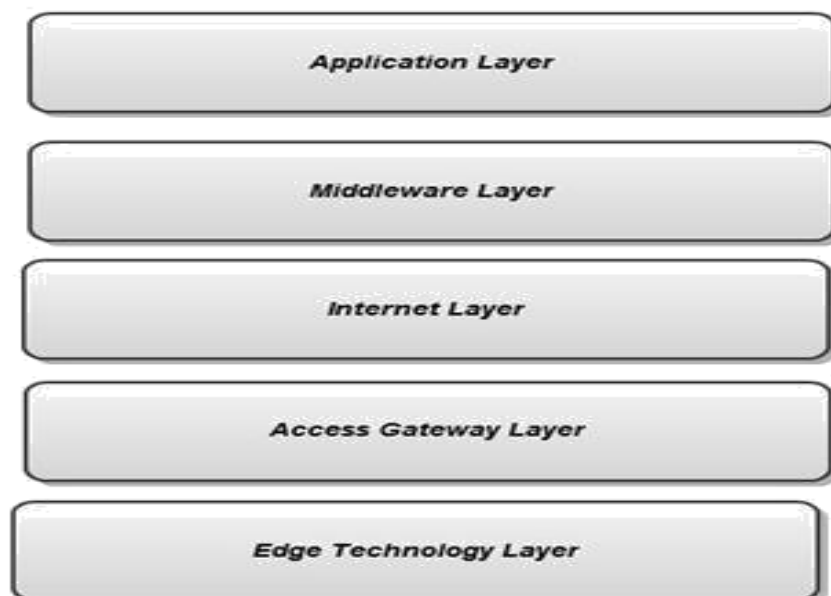


Fig 1.2 Layered architecture of the Internet of Things (IoT).

1.8 CHALLENGES IN IOT

Many companies have already embraced this technology, which makes their infrastructure more complex.

In the telecommunications sector, the IoT focus is on 5G networks that support the millions of connected devices. The idea is to meet the problem of temporary delays, high speed and low power consumption.

Public institutions such as the government also use IoT to implement numerous services, such as lighting, security, traffic...

The implementation of the Internet of Things leads to a hyper-connected world over which we must have control and in which security is a permanent challenge. For this reason, it relies on programming codes that address such a problem.

1.9 ADVANTAGES OF IOT

This technology entails new business models and, therefore, new revenue models. IoT brings incredible opportunities for companies to offer real-time sensor data and information services.

It is efficient for automating business and manufacturing processes, as well as remotely controlling operations, conserving resources and optimizing supply chains.

The Internet of Things boosts the productivity and effectiveness of the workforce in many ways because beyond automating routine tasks, it also accelerates the process of decision-making and communications.

With IoT, companies can offer an enhanced experience to customers: in addition to being useful, the products and services related to it have attractive physical and digital characteristics, and they can also be customized.

1.10 OBJECTIVE OF IOT

The Internet of Things (IoT) is aimed at **enabling the interconnection and integration of the physical world and the cyber space**. It represents the trend of future networking, and leads the third wave of the IT industry revolution.

The overall goal is to protect the entire system which represents an IoT installation. The more granular security requirements, often called security attributes, are confidentiality, availability, integrity, and privacy. The relevance of these core attributes depends on the system, the environment, the actuators and their functions. In an installation where customer data is used, confidentiality and privacy are especially important. A smart meter installation would be a perfect example. Data management, processing, and distribution are becoming increasingly important for customers who want to control and ensure their privacy. In several countries, this is already regulated by law. Technologies and procedures to protect end user's privacy are evolving. Anonymization of user data is only one approach. More advanced technologies follow an approach to conceal user identities and their network activity from surveillance and traffic analysis by separating identification and routing.

In the industrial environment, availability and integrity are high priority. Furthermore, safety cannot longer be separated from security. In some scenarios, IoT systems might be part of the critical infrastructure which even raises the bar for security. In these domains, security appliances and functions must not hinder the performance of the critical applications.

The recommended approach to identify the essential requirements is a risk-assessment of all assets that are part of the given IoT system. Depending on the outcome which is impacted by financial, safety and other consequences, requirement documentation can be compiled. In addition, requirements derived from regulations, policies and standards will complete the specification.

CHAPTER 2

LITERATURE SURVEY

Asif Ahmed, Et.Al (2019), This proposed system includes an Android application that can be employed to send notifications during entry and exit of the students using radio frequency identification (RFID) as well as Fingerprint scanner, ensuring arrival confirmation of the student by dual authentication. The system will also notify parents when the bus is a 15-min distance away from the home. The use of private vehicles intensifies the existing unbearable traffic jam and majority of the parents consider school buses to be largely unsafe for their kids. However, safe and user friendly school buses can reduce the use of private vehicles and will eventually cut back the traffic jam in cities especially in school hours. All buses can be tracked by the guardians using the proposed intelligent and secured tracking system for school buses. This proposed system includes an Android application that can be employed to send notifications during entry and exit of the students using radio frequency identification (RFID) as well as Fingerprint scanner, ensuring arrival confirmation of the student by dual authentication. The system will also notify parents when the bus is a 15-min distance away from the home. To ensure on-board safety, 'Window Signalling' will also be used. The focus of the research is to display the feasibility of a safe and intelligent school bus using secured tracking system based on dual authentication procedures. It is expected that the offshoot of this research initiative will regain the confidence and reliability of parents in school bus and reduce the use of individual transport. A smart school bus will keep the student safe, easing the tension for parents and the city will have a smooth traffic system.

Shubham Soni, Et.Al (2021), This is an IoT-enabled RFID-based door locking gadget. This door lock system will know how long the door is open and in this door lock system, only those people who register will be able to enter using their card. It uses a servo motor that operates with the help of Arduino. The Arduino board runs with complete programming that is stored inside it. By using this gadget, an owner can track his office and the place where he wants to let the specific people in. It is also very secure. It is an IoT-based gadget designed for RFID-based door locking systems, developed with the help of Arduino. This gadget is being managed by

software programming. Let us see how this door lock system works. A 12-volt power adapter is used for the power supply and can also use a 9-volt battery instead of a power adapter. As can see on the screen, it is displaying welcome to my home, if scan any card which is unregistered it shows the wrong card, and the lock is locked. If scanning the registered card, it opens the door lock. And now scan the registered card again, the lock is locked. The use of the Arduino UNO microcontroller in this project allows design simplicity, therefore, the project can be achieved in a shorter time than other technologies previously employed. And this door lock system is also very secure and saves the information of people coming and going.

Everistus Zeluwa Orji, Et.Al (2018), Wireless security based applications have rapidly increased due to the dramatic improvement of modern technologies. Many access control systems were designed and/or implemented based on different types of wireless communication technologies by different people. Radio Frequency Identification (RFID) is a contactless technology that is widely used in several industries for tasks like access control system, book tracking in libraries, tollgate system, supply chain management, and so on. Wireless security based applications have rapidly increased due to the dramatic improvement of modern technologies. Many access control systems were designed and/or implemented based on different types of wireless communication technologies by different people. Radio Frequency Identification (RFID) is a contactless technology that is widely used in several industries for tasks like access control system, book tracking in libraries, tollgate system, supply chain management, and so on. In this paper, automatic RFID-based access control system using Arduino was designed. The system combines RFID technology and Arduino to accomplish the required task. When the RFID reader installed at the entrance detects an RFID tag, the system captures the user unique identifier (UID) and compares it with the stored UID for a match. If the user UID captured match with any of the stored UID, access is granted; otherwise access is denied. The results clearly show that the system is cheap, effective, and a reliable means of granting or denying access in a secured environment. In this paper, a prototype of automatic access control system for use in an environment is presented. The system uses radio frequency identification (RFID) with Arduino technology to differentiate between authorized and unauthorized users. The RFID reader reads RFID tag issued to the user and matches it with stored UID on the

Microcontroller. On a successful match, the microcontroller grants access or deny access if no match was found. An automatic access control system using Arduino and RFID has been prototyped and functioned as desired. The system can be installed at the entrance of a secured environment to prevent an unauthorized individual access to the environment.

Dhrubajyoti Adak, Et.Al (2017), There has been rising demand for secure system that must be dependable and quick respond for the industries and company. RFID (Radio Frequency Identification) is one of the consistent and fast means of identify the material object. In the long-ago the barcode's are more preferable as compared to RFID because of their cost but now a day's RFID are easily available and are more convenient to use. Research has made some drastic changes which makes its programming a lot shorter and easier is because of replacing microcontroller with Arduino. Arduino makes the circuit and programming a lot easier to understand. Paper is based upon security access using RFID and Arduino module. When RFID tag placed on the RFID reader as it read the data and through reader its code send to the controller which access with the controller match and receives code with store code if the code is same then the security system is authorized to use and access the data. Change the tag ID in Access Control into sketch with the ID you have noted down earlier and then connect arduino board with PC, upload the sketch into the board. After access control system the information is display on LCD and if the information is not correct the alarm will start ringing. If uploading is doing well, you will see the glowing of LED. It means the system is prepared to read the tag. Now, bring the tag near to RFID reader. If tag ID matches with the ID in the code, lock will open for five seconds. It closes manually after five seconds. Glowing of LED indicate that the lock is open. Glowing of caution LED means that you are using the wrong tag. RFID based security and access control system is more secure and fast responded as compared to the other system like biometric. The advantage of the RFID system is contact-less and works without-line-of-sight. By using arduino it is easy to access and works very quickly while burning the code it is like plug and play device. Users can change the function accordingly by using arduino. It is easier to use and accurate also. Hence this project can be useful for implementation of access control application for tracking system as well as providing the security benefits. This project can improve by raising the range of reader in which tag read.

Massimo Merenda, Et.Al (2020), Expected and unexpected events affect road infrastructure leading to several issues that require maintenance interventions or prompt actions. In order to face the issues mentioned above, specially designed platforms can be used. Despite the high number of solutions presented in the last decades, it is difficult to find real applications of systems deputed to the emergency management of the abovementioned infrastructures. This paper aims at describing an innovative platform and the results of its first application. The platform consists of a system and algorithms that allow environmental and structural monitoring and emergency management. The proposed system consists of a network of wireless sensor nodes that are self-powered by mean of photovoltaic energy harvesters. Two different types of algorithms were designed to monitor the environmental and structural condition (i.e., the vibro-acoustic signature) of different types of structures and infrastructures, and to display, thanks to a dashboard, several predefined alarms, escape routes, safe place, and gathering points. The results presented in the paper refers to the first application of the platform, here tailored for an Italian theme park in the framework of the project "SICURVIA" funded by Regione Calabria, Italy. These results, presented for the first time, show that the platform is able to extract crucial information about the conditions of the thematic park's assets, and, at the same time, this information are used to recognize an emergency, trigger the related alarm, and provide a plan to manage the extraordinary event happened.

Jebah Jaykumar, Abishlin Blessy (2014), IOT(Internet of Things) relying on exchange of information through radio frequency identification(RFID), is emerging as one of important technologies that find its use in various applications ranging from healthcare, construction, hospitality to transportation sector and many more. This paper describes about IOT, concentrating its use in improving and securing future shopping. This paper shows how RFID technology makes life easier and secure and thus helpful in the future. We propose the use of IOT which uses intelligent bar codes(RFID) that can talk to a networked system to track every product that you put in your shopping cart. IOT with RFIDs can be used in shopping malls. These RFID tags will communicate with an electronic reader that will detect every item in the cart. The reader will be connected to a large network that will send information on your products to the retailer and product manufacturers. Your bank

will then be notified and the amount of the bill will be deducted from your account. At the grocery store, you buy a carton of milk. The milk containers will have an RFID tag that stores the milk's expiration date and price. When you lift the milk from the shelf, the shelf may display the milk's specific expiration date, or the information could be wirelessly sent to your personal digital assistant or cell phone. As you exit the store, you pass through doors with an embedded tag reader.

Shailesh Kumar, Et.Al (2018), The smart city and smart infrastructure is a new concept, for managing and controlling the different infrastructure of the city by integrating it with the internet and cellular network. The integration of Internet of Thing (IoT) with the cellular network again adds more scalability and reliability to the existing system. The recent development in the Integrated Radio Frequency Identification (I-RFID) sensor more securely sends sensor data to long distances through access point (AP) and base station (BS). This transmission needs some highly secure authentication and validation methods. In this paper we have present an I-RFID based cellular IoT (C-IoT) system and given its key security issue. We have proposed some algorithm for this system and the simulation result shows that this proposed algorithm is secure from various attacks and more useful in the practical scenario for C-IoT network communication in smart infrastructure health monitoring. With the rapid growth of the world, population leads to an increase concert infrastructure, which needs a continuous monitoring and observation of this infrastructure in an intelligent way. A smart infrastructure can be pronounced as an infrastructure embedded with the sensor, actuator and some embedded digital devices. The sensor and actuators are connected through many communication protocols for real-time data acquisition and control application Cambridge Centre for the smart infrastructure defines as an infrastructure which digitally enhances, and has potential to efficient use of the available resources. The smart infrastructure combines the existing physical infrastructure such as Transport, building energy sources, waste and water with the new digital technology like sensor, IoT devices, core-networks, machine learning, big data, and GPS Smart infrastructure gives a more cost-effective solution for the end user by improving intelligence and decision making at the service level. The smart infrastructure based on a feedback loop of data, and takes a decision based on this feedback information.

Venkat Subramanian(2015), Considering today, the number of electronic gadgets are more and more every year. Gadgets dominate a major part in public's career as well as personal life. We have to manage with this growth while at the same time facing constrained budgets and increasing in energy conservation. Most of the solutions will rely on massive deployment of Information and Communication technologies (ICT) and in particular wireless ones. The fast development of information and communication technology leads to the development of Internet of things (IoT) which in turn leads to the development of smarter environment where the whole public used sensor/non sensor based objects and functioning services are smartly controlled through advanced communication technology throughout the environment. The entire objects and services in the environment will be connected to an internet through Wireless-Fidelity i.e., Internet of Things. Office, hotels, shopping malls, institutions etc. should be integrated through Wi Fi so that we can reduce time management in sharing data and managing objects effectively and efficiently with smart security system through smart management techniques in the environment to optimize the energy consumption and simultaneously they will regulate and manage the energy level. In this paper we have suggested some of the implementation practices and advantages to develop smart systems and services to improve the performance with engineering advancement in development of smart environment including objects in it along with ecofriendly and cost effective approach.

CHAPTER 3

AIM AND SCOPE OF THE PROJECT

3.1 AIM

The main aim of this system is used to monitoring the theme park automation and alerting system using IOT and RFID technologies. While the researching kind of peoples are much easier to identify the scanning and the scanner technology is much safer and makes much more easily when compare to others respectively.

3.2 SCOPE OF THE PROJECT

We propose the use of IOT which uses intelligent bar codes(RFID) that can talk to a networked system to track every person and also we use ubidots application if any emergency occurred like fire accident it sends the notification to the management. IOT with RFIDs which is used in Theme Park. These RFID tags will communicate with an electronic reader that will detect every person. The reader will be connected to a large network that will send information of person.

3.3 EXISTING SYSTEM

In existing system there is system for children tracking system in the theme park, It is done by using Arduino, GPS Tracker. While the researching kind of peoples are much easier to identify the scanning and the scanner technology is much safer and makes much more easily when compare to others respectively. The current framework incorporates a jungle gym for youngsters, exercises utilizing Arduino, and a GPS Tracker observing framework. On the off chance that the module lost a youngster, we were unable to track down the kids.

3.3.1 Drawbacks of Existing System

- If the module missing by the child then we couldn't find the children.
- Implementation can be difficult & time consuming

3.4 PROPOSED SYSTEM

This system is designed for considering the people of developing and underdeveloped countries. The cost was as minimum as possible while designing the system. Only necessary features that should not only facilitate home automation but also ensure a robust security system for the house. This system not only remotely notifies the user which also works perfectly even without the internet facility.

For this offline mode, the system gives notification via NodeMCU. The system is designed to work on various possible case scenarios. Therefore there are both manual and automation processes of getting notified when a hazard occurs. The user can choose notification mode depending on the user's need. In addition to this, there is an assistant robot that comes as the first line of defense. Also, there are cameras in various corners of the room to spectate the current situation of the affected area.

The main goal of this project is to ensure not only home automation but also provide home security for the house within an affordable price range of the developed and underdeveloped countries. This system is designed for considering the people of developing and underdeveloped countries. The cost was as minimum as possible while designing the system. Only necessary features that should not only facilitate home automation but also ensure a robust security system for the house. This system not only remotely notifies the user which also works perfectly even without the internet facility. For this offline mode, the system gives notification via NodeMCU. The system is designed to work on various possible case scenarios.

Therefore there are both manual and automation processes of getting notified when a hazard occurs. The user can choose notification mode depending on the user's need. In addition to this, there is an assistant robot that comes as the first line of defense. During an outbreak, the robot automatically finds the affected area and takes measurements accordingly. Also, there are cameras in various corners of the room to spectate the current situation of the affected area.

The main goal of this project is to ensure not only home automation but also provide home security for the house within an affordable price range of the developed and underdeveloped countries. This system is designed for considering the people of developing and underdeveloped countries. The cost was as minimum as possible while designing the system. Only necessary features that should not only facilitate park environment automation but also ensure a robust security system for the every theme.

This system not only remotely notifies the user which also works perfectly even without the internet facility. For this offline mode, the system gives notification via NodeMCU. The system is designed to work on various possible case scenarios. Therefore there are both manual and automation processes of getting notified when a hazard occurs.

The user can choose notification mode depending on the user's need. In addition to this, there is an assistant robot that comes as the first line of defense. During an outbreak, the robot automatically finds the affected area and takes measurements accordingly.

The main goal of this project is to ensure not only park automation but also provide park security for the park environment within an affordable price range of the developed and underdeveloped countries.

In this proposed system we going to monitor the entry and exit details of the theme park. Here we are providing a RFID tags for each person, if the person entry in to the park at the entrance he will register his details along with the RFID tag number.

Here counting and matching technique is done. How many members are entry in the theme will count using RFID tag. The IR sensor is used detect the persons and then it automatically opens the door of the theme park.

When the closing time of the theme park the maintenance dept. will check the all members are came out or not. It is impossible to check each and every theme

in park, that's why we implement this RFID technic it is help to the gate keeper to check it. If the persons inside the park the count will mismatch so he will wait for till they came out.

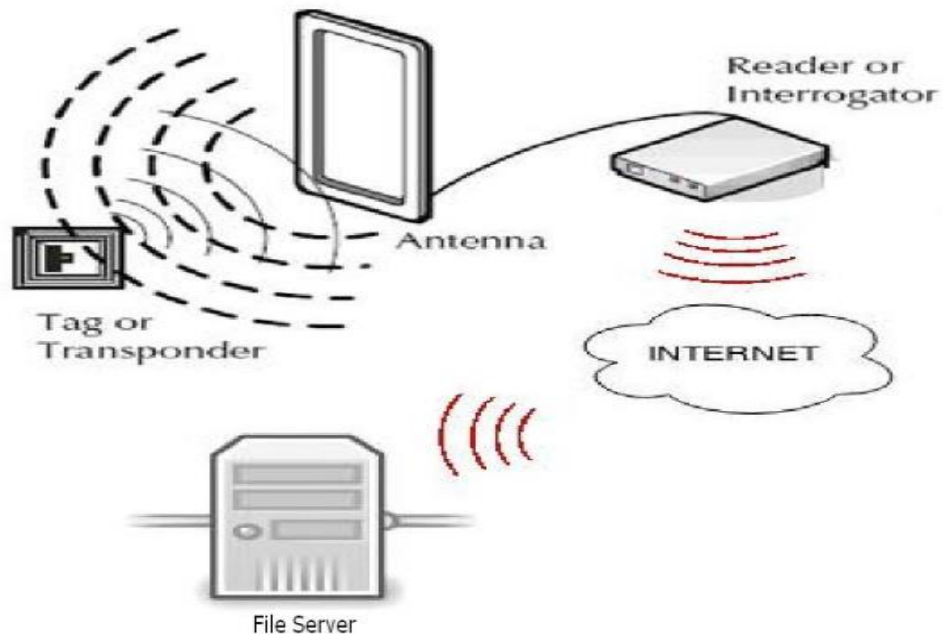


Fig 3.1 Working IOT and RFID

Through the EPC code saved in RFID tag, the reader collects data from the tag. The middleware system can find the relevant information of the object by finding the corresponding IP address on the Object Naming Server on the internet through this EPC code and the information is processed and managed by the middleware system.

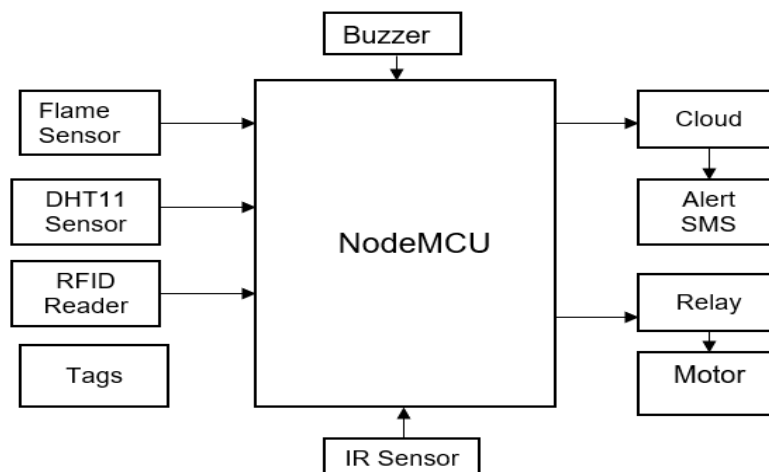


Fig 3.2 Block Diagram

The above block diagram all the input and output components which are connected to the Nodemcu and the input components are Flame sensor, IR sensor, DHT11 sensor, RFID reader and the Tags are for the scanning purpose.

The motor will work as a gate and relay is like switch and also we also use the cloud application for sending alert messages. Nodemcu is also used because it automatically gets connected to the Wi-fi.

3.5 ADVANTAGES OF PROPOSED SYSTEM

- Fast ticketing can be done.
- Details can be noted down easily by using RFID tags.
- Efficient data processing.
- Works very accurately.
- Less Time Consumption.
- This system not only remotely notifies the user which also works perfectly even without the internet facility. For this offline mode, the system gives notification via NodeMCU.
- RFID technology in IoT is to **connect objects into a network and make them create and send data.**
- RFID offers **reliable track-and-trace in tough environments.**
- This technology can easily track and provide real-time data about inventory and product location.
- Whether you are tracking large asset inventory, individual products, or batches, you can benefit from automatic real-time data collections.
- Using Ubidots' cloud software users can self-develop IoT dashboards to deliver insights from sensor data and **improve operational efficiency, economize resources, and cut costs.**

CHAPTER 4

RESULTS AND DISCUSSIONS

Nodemcu will collect the data from environments and send those data into the cloud using the internet (as per code what we chosen credential of network, when power supply is given it will automatically connect to the network and cloud). From cloud we can get the notification through Gmail as well as SMS. RFID reader will reads the tags time and date of incoming and outgoing of persons. When the object (person) is detected this system will opens the gate using relay.

At first collects the components what we required. Assembling the connection as per the block diagram.

Here we used NodeMCU as main controller, DHT11 sensor, flame sensor, RFID reader and servo motor.

Nodemcu having Wi-Fi module, so it will directly connect to the internet by using what credential are placed in the code.

4.1 NODEMCU TO DHT11 SENSOR

- DHT11 sensor measure the environmental temperature and humidity.
- DHT11 sensor data pin will connect to the Nodemcu digital pin which is D5, GND and V0 pin are Ground and 5V respectively.

Working Principle of DHT11 Sensor

DHT11 sensor consists of a capacitive humidity sensing element and a thermistor for sensing temperature. The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form. For measuring temperature this sensor uses a Negative Temperature coefficient thermistor, which causes a decrease in its resistance value with increase in

temperature. To get larger resistance value even for the smallest change in temperature, this sensor is usually made up of semiconductor ceramics or polymers.

The temperature range of DHT11 is from 0 to 50 degree Celsius with a 2-degree accuracy. Humidity range of this sensor is from 20 to 80% with 5% accuracy. The sampling rate of this sensor is 1Hz .i.e. it gives one reading for every second. DHT11 is small in size with operating voltage from 3 to 5 volts. The maximum current used while measuring is 2.5mA.

DHT11 Sensor

DHT11 sensor has four pins- VCC, GND, Data Pin and a not connected pin. A pull-up resistor of 5k to 10k ohms is provided for communication between sensor and micro-controller.

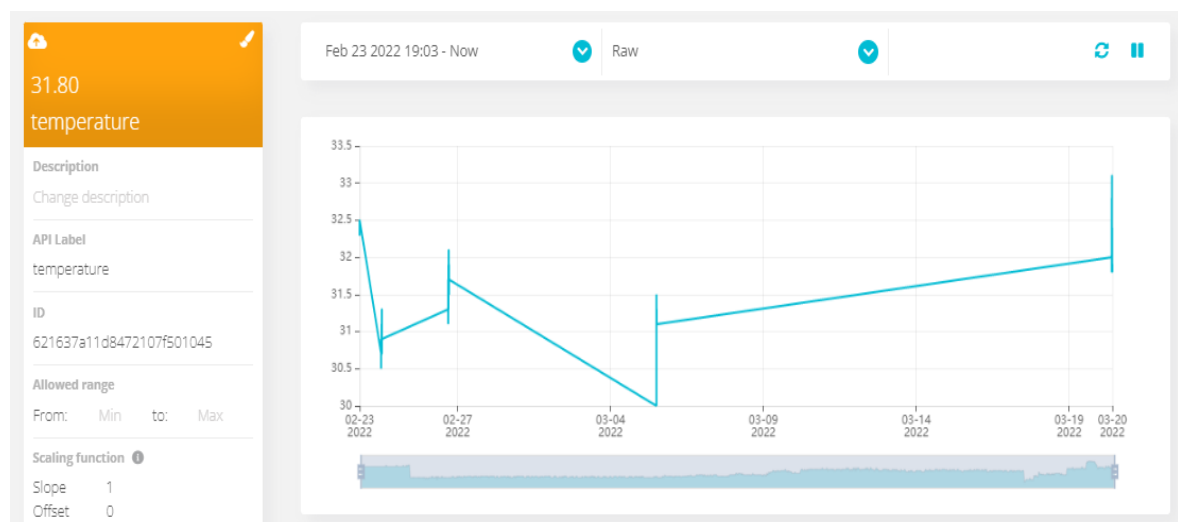


Fig 4.1 Temperature Readings

These are the values of temperature which gets detected by the DHT11 sensor which automatically gets stored in Ubidots application which is a cloud software where all the graph reading gets stored in it which can be monitored by the management so that they come to know the temperature inside the theme park.

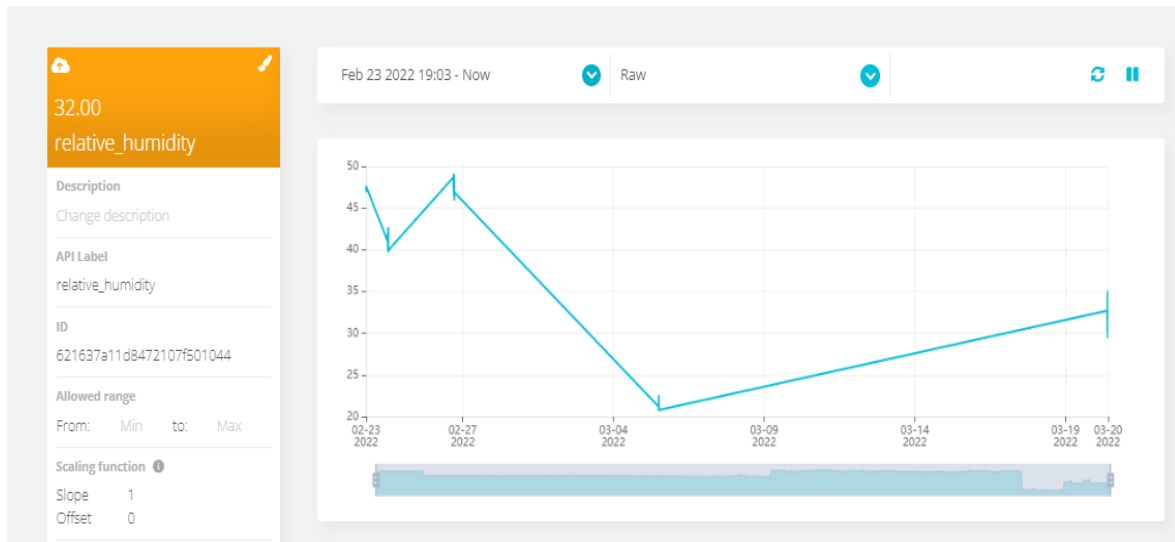


Fig 4.2 Humidity Readings

And these are the values of the Humidity which gets detected by the same DHT11 sensor as DHT11 sensor can measure both temperature and humidity these are the graph values from Ubidots application.

4.2 NODEMCU TO FLAME SENSOR

Flame sensor measures the fire or flame at the theme park, flame sensor will connect to the D3, Ground and 5V also.

Working Principle of Flame Sensor

This sensor/detector can be built with an electronic circuit using a receiver like electromagnetic radiation. This sensor uses the infrared flame flash method, which allows the sensor to work through a coating of oil, dust, water vapor, otherwise ice. Flame Sensor Module

The pin configuration of this sensor is shown below. It includes four pins which include the following. When this module works with a microcontroller unit then the pins are

Flame-sensor

- Pin1 (VCC pin): Voltage supply ranges from 3.3V to 5.3V
- Pin2 (GND): This is a ground pin
- Pin3 (AOUT): This is an analog output pin (MCU.IO)

- Pin4 (DOUT): This is a digital output pin (MCU.IO)

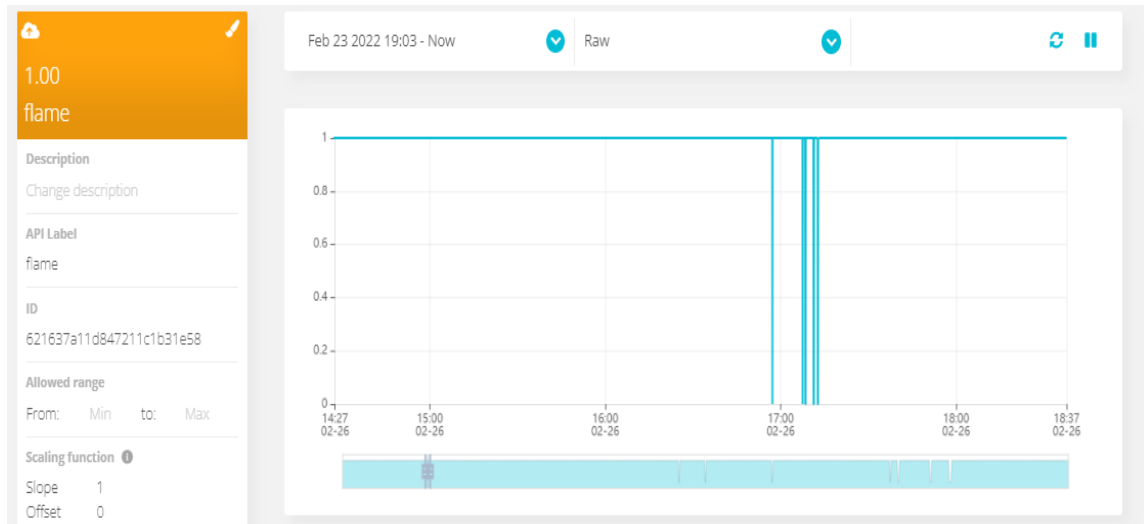


Fig 4.3 Flame Sensor Readings

These are the reading of flame if flame gets detected it also sends the alert messages to the management so that they will get alert and rescue the people from the incident.

4.3 NODEMCU TO RFID READER

RFID reader is connected to the TX and RX pins of the Nodemcu here we used 12 and 13 pins are TX and RX respectively, GND and 5V also.

Working Principle of RFID

RFID depends on the frequency of operation for low frequency and high frequency operation based on the inductive coupling (near field coupling)

While in case of UHF tags working is based on the electromagnetic coupling (far field coupling)

Low frequency and high frequency (Inductive coupling)

RFID reader continuously sends radio waves at a particular frequency. The radio waves which is send by the reader is of three purposes.

- It includes enough power into tag
- It provide synchronization clock tag to passive tag
- Acts as a carrier for return data from tag

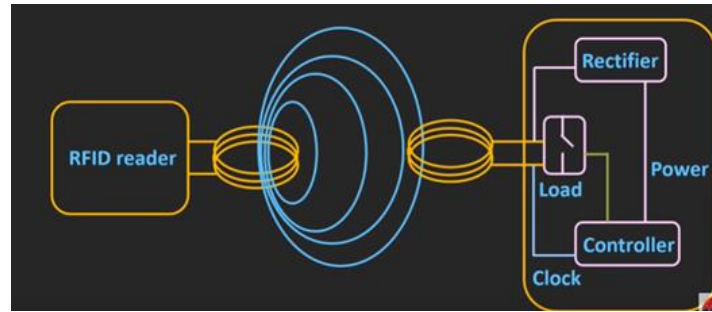


Fig 4.4 RFID Reader

The low and high frequency operation the RFID reader and tag are very close to each other. So working principle is based on the inductive coupling just like transformer action. The field which is generated by RFID reader is used to couple with the antenna of a RFID tag, because of the mutual coupling voltage will get induced across the coil of the RFID tag. Some portion of voltage is rectified uses a power supply for the controller and memory elements.

RFID reader sending radio waves of a particular frequency so that voltage will be induced across the coil at a particular frequency. This induced voltage is used to synchronizing the clock of the controller. Suppose if we connect load across the coil, the current will start flowing through the connected load. If we change the impedance of load, simultaneously the current flowing through load will also change (Ohms Law), suppose if we switch ON/OFF load current will also ON/OFF. The switching of current the rate of change of current also generates the voltage in as RFID reader. The switching ON/OFF the load is known as the load modulation.

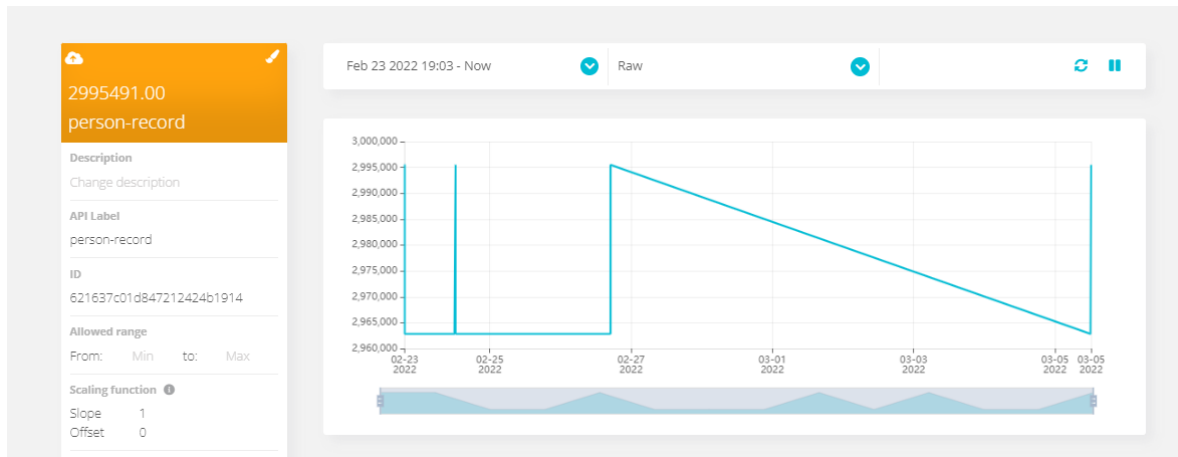


Fig 4.5 Person Record

These are the details of person when did he entered and at what time did he entered all details will get noted by the ubidots application and how many times did he entered to the same place will also gets noted.

4.4 NODEMCU TO IR SENSOR AND RELAY

IR sensor is used to detect the objects It is connects to D2 pin of the NodeMCU as well as ground and 5V. And Relay is connected to D0.

Relay is used to automatic switch.

4.5 UBIDOTS EXPLORER:

- Ubidots explorer is cloud storage device.
- At first we are going to sign up in to the ubidots cloud.
- It will provide an API token, user name and password.
- Ubidots provides a secure and easy way to build IoT solutions for students, makers and researchers. It is used for sending data from any Internet-enabled device to the cloud, triggering actions and alerts based on that data, and visualizing it.
- By using this ubidots explorer we can also send alert notifications to any persons gmail or phone by using this application so that they will get alert of this incident through this system and it also very useful to make awareness to the people of the incident.

flame alert! Inbox x



Notifications Ubidots <service@ubidots.com>

to me ▾

Hey there, flame was 0.0 at 2022-02-26 17:12:41 +0530.

↩ Reply

➡ Forward

Fig 4.6 Alert Message

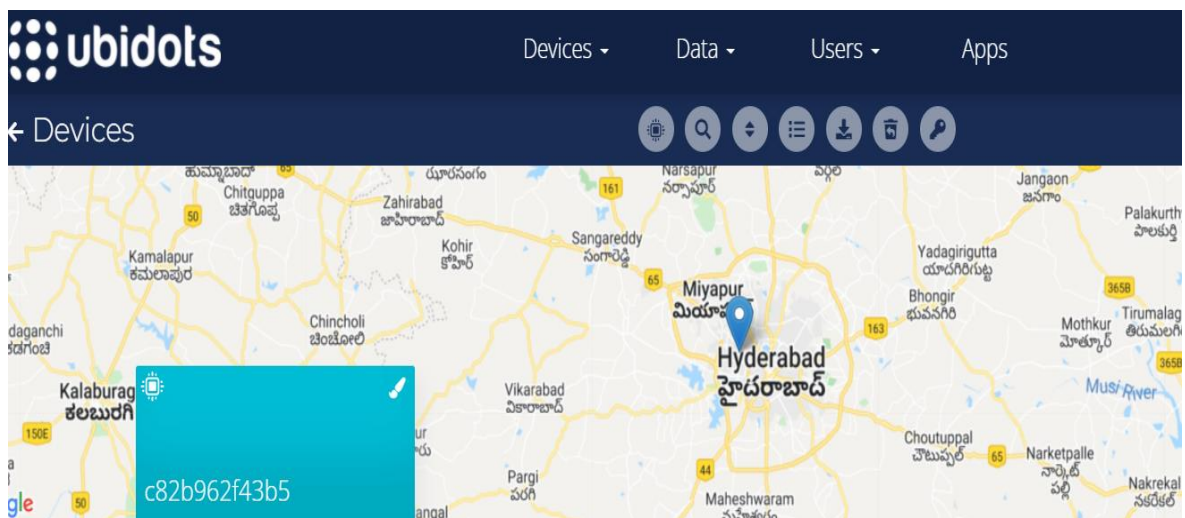


Fig 4.7 Location

In this we also have location tracking which is helpful in tracking the location of the particular tag when we open the application it asks the location access to locate the location.

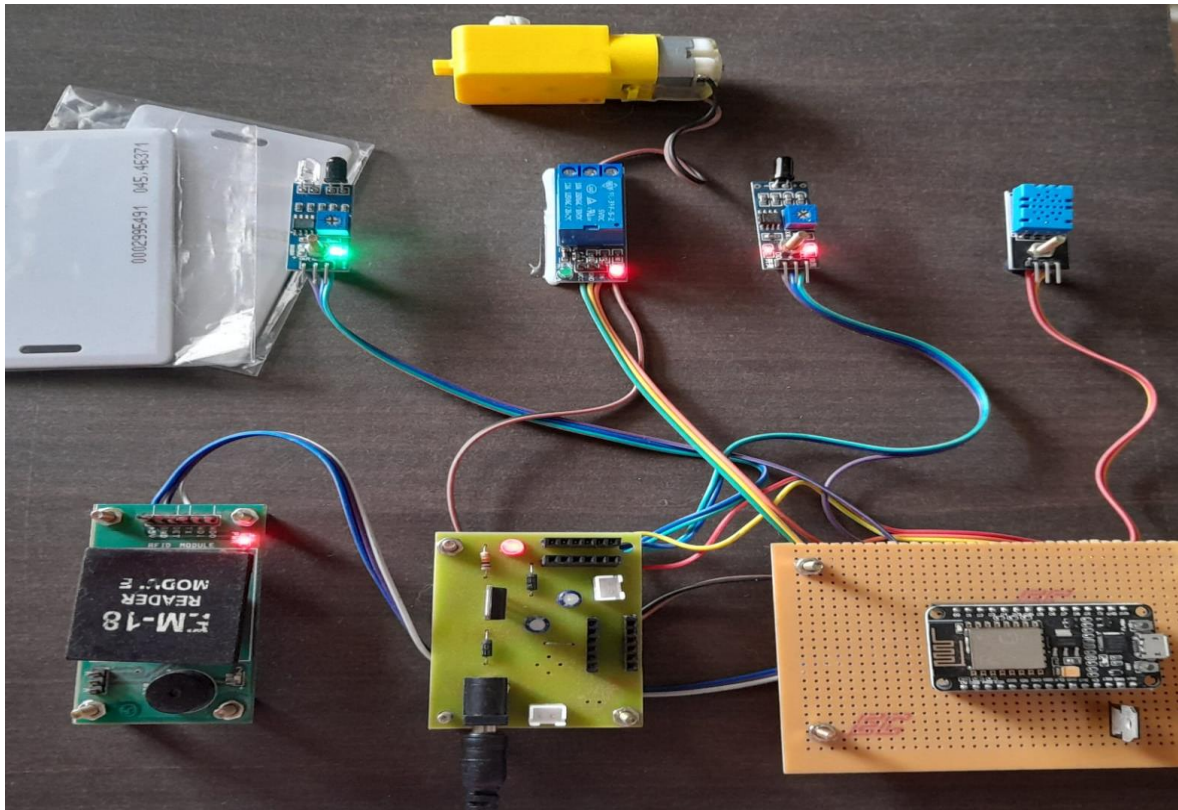


Fig 4.8 Hardware Proposed System

This is the whole connections given for implementing the whole hardware for the “Secure Smart Environment Using IOT Based On RFID” and also the components are also shown in the above Fig 4.8 which are RFID reader and tags, NodeMCU, DHT11 sensor, IR sensor, Relay, Flame sensor, DC motor and also supply.

We also used Arduino IDE for uploading Code to the NodeMCU and the Code which we have used is EMBEDDED C using this we have uploaded the code to the NodeMCU as NodeMCU as Wi-fi modularity it automatically gets connected to the internet and also do the functionality of which we assign it through the code to the NodeMCU Using Arduino IDE. Since we have used Ubidots we have to insert the authentication token into the code so that it will get connected the Ubidots application and also it will get all the reading of sensors into it.

CHAPTER 5

CONCLUSION

Utilizing RFID-based IoT, Smart Secure Environment is a task that can be carried out in a recreation area climate, safeguarding the climate like fire, hotness, and human data, so things can be effortlessly controlled. in the recreation area. We can likewise follow where an individual purposes.

Smart Secure environment using IOT BASED on RFID this is the project to implement it in theme park environment and to maintain safe surrounding inside the theme park like monitor the flame, temperature ,humidity and also the person details so that management can easily monitor the conditions inside the theme park And also we can track the location of the particular person by using ubidots application.

Nodemcu will collect the data from environments and send those data into the cloud using the internet (as per code what we chosen credential of network, when power supply is given it will automatically connect to the network and cloud). From cloud we can get the notification through Gmail as well as SMS. RFID reader will reads the tags time and date of incoming and outgoing of persons. When the object (person) is detected this system will opens the gate using relay.

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APPENDIX

A. SOURCE CODE

```
#include <SoftwareSerial.h>
//$0002995491
//$0002962839
int j=0;
int i=0;
SoftwareSerial mySerial(12,13);
#include "Ubidots.h"
#include <Adafruit_Sensor.h>
#include <DHT.h>
#include <DHT_U.h>
#define DHTPIN D5
#define DHTTYPE DHT11
DHT_Unified dht(DHTPIN, DHTTYPE);
void ICACHE_RAM_ATTR change();
uint32_t delayMS;
const char* UBIDOTS_TOKEN = "BBFF-
2F55KQF5BqUOdBuyacborRWvAWpzni"; // Put here your
Ubidots TOKEN
const char* WIFI_SSID = "environment"; // Put here your
Wi-Fi SSID
const char* WIFI_PASS = "12345678"; // Put here your
Wi-Fi password
const char* DEVICE_LABEL_TO_RETRIEVE_VALUES_FROM =
"98f4abd0890e"; // Replace with your device label
const char* VARIABLE_LABEL_TO_RETRIEVE_VALUES_FROM1 =
"39002D540545"; // Replace with your variable label
const char* VARIABLE_LABEL_TO_RETRIEVE_VALUES_FROM2 =
"39002DACCD75";
Ubidots ubidots(UBIDOTS_TOKEN, UBI_HTTP);
```

```

void setup() {
  Serial.begin(9600);
  mySerial.begin(9600);
  dht.begin();
  Serial.println(F("DHTxx Unified Sensor Example"));
  // Print temperature sensor details.
  sensor_t sensor;
  dht.temperature().getSensor(&sensor);
  Serial.println(F("-----"));
  Serial.println(F("Temperature Sensor"));
  Serial.print (F("Sensor Type: ")); Serial.println(sensor.name);
  Serial.print (F("Driver Ver: ")); Serial.println(sensor.version);
  Serial.print (F("Unique ID: ")); Serial.println(sensor.sensor_id);
  Serial.print (F("Max Value: ")); Serial.print(sensor.max_value);
  Serial.println(F("°C"));
  Serial.print (F("Min Value: ")); Serial.print(sensor.min_value);
  Serial.println(F("°C"));
  Serial.print (F("Resolution: ")); Serial.print(sensor.resolution);
  Serial.println(F("°C"));
  Serial.println(F("-----"));
  // Print humidity sensor details.
  dht.humidity().getSensor(&sensor);
  Serial.println(F("Humidity Sensor"));
  Serial.print (F("Sensor Type: ")); Serial.println(sensor.name);
  Serial.print (F("Driver Ver: ")); Serial.println(sensor.version);
  Serial.print (F("Unique ID: ")); Serial.println(sensor.sensor_id);
  Serial.print (F("Max Value: ")); Serial.print(sensor.max_value);
  Serial.println(F("%"));
  Serial.print (F("Min Value: ")); Serial.print(sensor.min_value);
  Serial.println(F("%"));
  Serial.print (F("Resolution: ")); Serial.print(sensor.resolution);
  Serial.println(F("%"));
  Serial.println(F("-----"));

```

```

// Set delay between sensor readings based on sensor details.
delayMS = sensor.min_delay / 1000;
pinMode(D0,OUTPUT); //relay
digitalWrite(D0,HIGH);
pinMode(D3,INPUT); //flame
pinMode(D2,INPUT); //PROXIMITY
attachInterrupt(digitalPinToInterrupt(D2), change, CHANGE);
ubidots.wifiConnect(WIFI_SSID, WIFI_PASS);
}

void loop()
{
    int flame = digitalRead(D3);
    ubidots.add("flame", flame);
    sensors_event_t event;
    dht.temperature().getEvent(&event);
    if (isnan(event.temperature)) {
        Serial.println(F("Error reading temperature!"));
    }
    else {
        Serial.print(F("Temperature: "));
        Serial.print(event.temperature);
        ubidots.add("Temperature", event.temperature);
        Serial.println(F("°C"));
    }
    // Get humidity event and print its value.
    dht.humidity().getEvent(&event);
    if (isnan(event.relative_humidity)) {
        Serial.println(F("Error reading humidity!"));
    }
    else {
        Serial.print(F("Humidity: "));
        Serial.print(event.relative_humidity);
        ubidots.add("Relative_humidity", event.relative_humidity);
        Serial.println(F("%"));
    }
}

```

```

}
if (mySerial.available() > 0)
{
    String a = mySerial.readString();
    Serial.println(a);
    if (a.indexOf("0002995491") != -1)
    {
        i=2995491;
        ubidots.add("Person Record", i);
        bool bufferSent = false;
        bufferSent = ubidots.send(); // Will send data to a device label that
matches the device Id

        if (bufferSent) {
            Serial.println("Values sent by the device");
        }
    }

    else if (a.indexOf("0002962839") != -1)
    {
        i=2962839;
        ubidots.add("Person Record", i);
        bool bufferSent = false;
        bufferSent = ubidots.send(); // Will send data to a device label that matches
the device Id

        if (bufferSent) {
            Serial.println("Values sent by the device");
        }
    }
}

bool bufferSent = false;
    bufferSent = ubidots.send(); // Will send data to a device label that
matches the device Id

```

```
        if (bufferSent) {  
            Serial.println("Values sent by the device");  
        }  
        digitalWrite(D0,HIGH);  
    }  
    void change() {  
        //Serial.println("Proximity");  
        digitalWrite(D0,LOW);  
    }  
}
```

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SECURE SMART ENVIRONMENT USING IOT BASED ON RFID

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Abstract:

While applying for this kind of RFID, RFID enjoys many benefits and inconveniences, and it faces various difficulties. Ongoing utilization of RFID for simple admittance to data through chronicles is extremely modest and usable. Human-type research is exceptionally simple to distinguish, and filtering innovation is more secure and simpler to use than others. This sort of speed ticket can be made utilizing a RFID scanner and a RFID tag. Contrasted with different types of giving tickets, this sort of fast and dependable structure is more straightforward to execute.

Keywords- Smart Environment, IoT, RFID, NodeMCU, Security purposes

Introduction:

RFID is a purported time-slacking gadget that was as a name and is presently an arising innovation. RFID and innovation projects are utilized and function admirably. This sort of RFID tag is utilized to consequently recognize the kind of radio line and the worth inside it. Normally, a RFID label comprises of any introduced address and is utilized as a chip reader whenever the situation allows. RFID can comprise of two principle parts: a reader and a name. It has a RFID logo and messages to readers and has a pre-introduced module. The RFID framework utilizes and coordinates inserted framework innovation to give a train ticket framework. This sort of RFID project has been executed and utilized however much as could be expected.

Related works

Shaaban K, Bekkali A, Hamida EB, Kadri A [1] The framework incorporates an Android application that permits understudies to send and get warnings utilizing radio ID (RFID) and unique finger impression scanners. understudy. affirm both. The framework will tell guardians

when the transport shows up from home in 15 minutes or less.

Shubham Soni, Rajni Soni, Akhilesh A. Wao [8] expressed that an IoT gadget utilizes RFID in view of family locks. The entryway locking framework distinguishes that the entryway is open, and just enrolled clients can get to the

entryway locking framework utilizing the card. It utilizes a servo engine controlled by an Arduino. Arduino Management works with a completely incorporated program. With the assistance of the apparatus, the proprietor has some control over his weight and where certain individuals need to be permitted. It is additionally exceptionally protected

S Al-Lawati A, Al-Jahdhami S, Al-Belushi A, Al-Adavi D, Awadalla M, Al-Abri D. Most control frameworks are planned and/or executed in light of various correspondence advancements without various individuals. Radio Frequency Recognition is an extraordinary innovation that is generally utilized in a wide scope of utilizations, including framework reconnaissance, library observation, charging frameworks, and obtainment the executives.

Saifuzzaman M, Khan AH, Moon NN, Nur FN [7] expressed that the necessities of a dependable framework ought to be depended upon and that the business and the organization would benefit rapidly. RFID (Radio Frequency Detection) is quite possibly the most well-known and quick method for distinguishing this. Previously, standardized tags were more well-known than RFID as far as cost, yet presently day RFID is accessible and simple to utilize. The review rolled out significant improvements to make the framework more limited and more straightforward by supplanting microcontrollers with Arduino. The Arduino makes music and programming straightforward. Security documentation utilizing RFID and Arduino modules.

Existing system:

The current framework incorporates a jungle gym for youngsters, exercises utilizing Arduino, and a GPS Tracker observing framework. On the off chance that the module lost a youngster, we were unable to track down the kids.

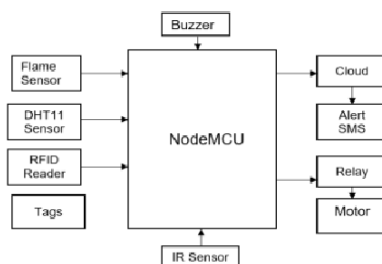
Proposed system:

In this framework, we will control the info and result of the recreation area. Here we issue a RFID declaration to everybody, and in the event that somebody enters the recreation area, they record their subtleties and RFID number.

Computations and specialized courses of action are being made here. The RFID label will be utilized to appraise the number of individuals will visit a subject. An IR sensor is utilized to recognize individuals and quickly open the primary access to the recreation area.

Whenever now is the right time to wrap up safeguarding the amusement park. He will verify whether all individuals are out. Since it is absurd to expect to control each subject in the recreation area, we are presenting a RFID strategy that assists with controlling the watchman.

Block diagram:



SYSTEM DESIGN

IOT:

The objective of things to come of the Internet is to make foundation for admittance to data about the world and its assets. Reasonable components can be utilized in an assortment of uses, for example, e-wellbeing and capacity the executives. Every product program can have various kinds of common sense apparatuses.

Each useful apparatus can have its own attributes, which should be utilized to impart. Getting to the fate of the Internet requires a degree of course to make it simpler to get to data. The Internet of Things (IoT) is a dream to associate this present reality to this present reality of data through documented instruments.

The expression "Web of Things" comprises of two words: the Internet and things. The Internet is an expansive, complex, and available worldwide organization in light of conventional conventions. Objects are substantial articles, materials, or unmistakable items, materials, and data that utilizations highlights, substantial articles, exceptional articles, and licensed innovation. For instance, an item that addresses a theoretical hub sensor, can recognize a hub sensor that contains metadata. Hence, IoT alludes to things that can be dirtied from the climate through the web.

The product connection point is the distance between the equipment and programming point of interaction for correspondence and information the executives [2]. The job of the focal arrangement is to distinguish how to send off an asset combination program. In the product it is liable for concealing different issues and dispersion we experience while working with gadgets [3].

METHODOLOGY:

In the first place, we gather the vital parts. The connection is collected by the outline.

Here we involved NodeMCU as the regulator, DHT11 sensor, fire sensor, RFID peruser, and servo engine.

Nodemcu has a Wi-Fi module, so you can associate with the Internet involving the code in the code.

NODE MCU

NodeMCU is an open source IoT stage. [4] Includes ESP8266 Wi-Fi SoC programming from the Espressif System and gear in light of the ESP-12 module. [6] Say "NodeMCU"



As a matter of course, this implies programming rather than improvement instruments. An application that utilizes the Lua language. It depends on the eLua project and is based on the Espressif SDK without the ESP8266 working framework. It utilizes many open undertakings, for example, lua-cjson [8] and SPIFFS. NodeMCU was supported not long after the arrival of ESP8266. The ESP8266 is a Wi-Fi SoC viable with the Tensilica Xtensa LX106 center, which is generally utilized for IoT applications.

IR (Infrared) Sensor

An infrared sensor is an electronic gadget that utters a sound to hear a portion of the things around us. As well as estimating the temperature of an article, an IR sensor can decide its heading. This sort of sensor just measures radiation as opposed to giving an IR visa. Ordinarily in infrared mode, everything appears to be identical as a fire. This kind of radiation is absent in our eyes and is distinguished by infrared sensors. The mark is for just IR (light discharging diodes) and the indicator is the main IR photograph that identifies IR light of a similar length as the IR LED. At the point when an IR light falls on a photodiode, the obstruction and result voltage rely upon how much IR light got.

IR sensor ground breaking strategy and working guideline

Infrared radiation is quite possibly the most significant and normal sensors in electronic gadget. Contrasted with human vision, this sensor can be utilized to recognize hindrances and is quite possibly the most well-known ongoing sensor. This circle comprises of the accompanying parts LM358 IC 2 IR appropriation and gathering Kilo Ohm level is battling.

Variable resistors.

LED (Light Emitting Diode).

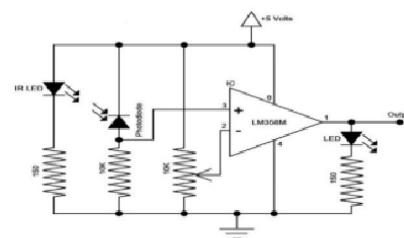
In this task, the transmitter contains an IR sensor that communicates IR radiation and the beneficiary keeps on getting the IR module. The got IR outflow signal changes as it gets IR radiation. Since this distinction can't be examined thusly, the result can be generally taken care of. The LM 339's working intensifier (operation amp) is utilized here as a circuit. On the off chance that the IR recipient doesn't get the sign, the information capacitance surpasses the capacitance of the exceptional information IC (LM339). In this manner, the sign result will diminish however the LED won't turn on. The IR module gets a potential information signal. Consequently, the sign result (LM 339) increments and the LED streaks.

IR Sensor circuit

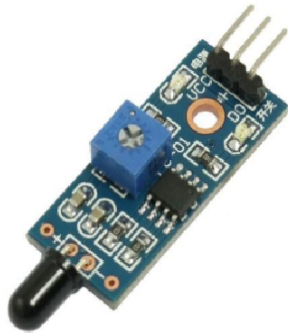
Fig. IR Sensor Circuit diagram

Flame sensor

A fire sensor is a sensor intended to recognize



or answer light or fire, which makes it conceivable to identify light. The known fire reaction relies upon the establishment, yet incorporates clamor, fuel line suspension (like propane or gaseous petrol), and the establishment of a fire douser. Whenever utilized in ovens, for example, modern ovens, their job is to guarantee that the oven is working appropriately; In these cases, there is no genuine activity other than to illuminate the framework and screen the framework. Alarms can answer more rapidly and proficiently than smoke or hotness exchangers, contingent upon the technique for fire recognition.



Relay:

The course is power that utilizes power. The current in the transfer curl pulls the switch and makes an attractive field that changes the connection. The curl cylinder can be turned on or off with the goal that the transfer has two moves and is twofold (factor). The bars permit one circle to pivot the subsequent circle, which might be totally unique in relation to the first. For instance, a battery circuit can utilize a transfer to change over a 230 V AC circuit. There is no electrical cable inside the hand-off between the two lines; The association is attractive and mechanical.

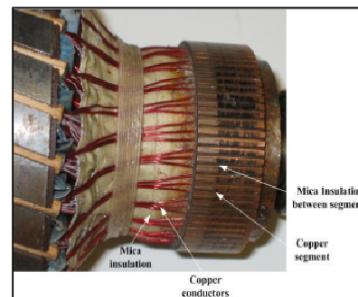
Hand-off coins are fueled by an exceptionally enormous power supply, generally 30 mA on a 12V line, however can depend on 100 mA on a low electrical cable. Most ICs (chips) are unequipped for leading current, and thyristors are utilized to join the force of little ICs for the extreme price expected for the windings. The greatest result of the 555 clock is 200 mA, so these gadgets can supply pointless hand-off gadgets.



DC MOTORS

DC engines are utilized to drive vehicles. In this research facility, the DC power supply machine supplies the heap. The engine load is changed by fluctuating the generator power. By keeping up with the DC power supply, the heap on the

DC engine increments, which thus builds the armature. As a general rule, DC engines are described by high velocity revolution as displayed in Figure. Different qualities of DC engines ought to be utilized, as shaft force checks are not accessible in the research facility. One way is to change the speed and force from the force () to what might be compared to the steady region provided to the armature and the engine. Shaft speed is additionally a component of the field in a DC engine while keeping a steady armature force () The field relates to the stream pivot created by the machine.



Radio frequency identification (RFID) is a remote correspondence framework that utilizes a radio line to distinguish and follow an article. RFID presents the idea of bar coding and carries it into the cutting-edge world, permitting the accompanying.

Attempt to zero in on something more extraordinary than simply the item

The RFID framework has a radio peruser and a name. RFID highlights are tiny and require almost no power, so you don't require a battery to store data or offer data with perusers. It's simple and economical to record all those individuals need to know or follow.

RFID innovation can possibly improve and safeguard the existences of customers and alter the manner in which organizations work. In auto high innovation, RFID can be utilized to track and screen the actual world productively and successfully.

Since RFID lets you know it, where it is, and the way that it will be, it is a model for fostering the Internet-World of Things, which permits you to consequently change the actual world into a data framework. share occasions, data, and answer.



DHT11 sensor

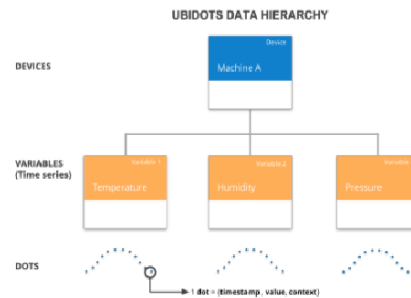
The DHT11 sensor accompanies a solitary 4-pin line and is controlled by 3.5 to 5.5V. It tends to be estimated from 0-50 ° C to ± 2 ° C, with a normal temperature of 20-95% and an exactness of $\pm 5\%$. Rukuruzi gives total mathematical data on two aspects. Since it has an extraordinary 1-wire convention, it is preposterous to expect to impart straightforwardly or in a roundabout way between the sensor and the microcontroller. The convention should be carried out in the MCU programming at the specific time expected by the sensor.



UBIDOTS EXPLORER:

Here you can talk about how to send and recuperate information to your equipment utilizing HTTP, MQTT and TCP/UDP conventions. The reason for this part is to assist you with getting what is happening in the background when you converse with Ubidots so you can copy it on your gadget. That is the reason we try not to utilize models from the library. This is done each time the gadget

refreshes the sensor as a variable, an informative element, or a "point". Ubidots stores focuses from your gadget's inner factors, and the saved focuses make some set memories:



Connections

Nodemcu to DHT11 sensor

DHT11 sensor measure the environmental temperature and humidity.

DHT11 sensor data pin will connect to the Nodemcu digital pin which is D5, GND and V0 pin are Ground and 5V respectively.

Nodemcu to Flame sensor

Flame sensor measure the fire or flame at the theme park, flame sensor will connects to the D3, Ground and 5V also.

Nodemcu to RFID reader

RFID reader is connected to the TX and RX pins of the Nodemcu here we used 12 and 13 pins are TX and RX respectively, GND and 5V also.

Nodemcu to IR sensor and Relay

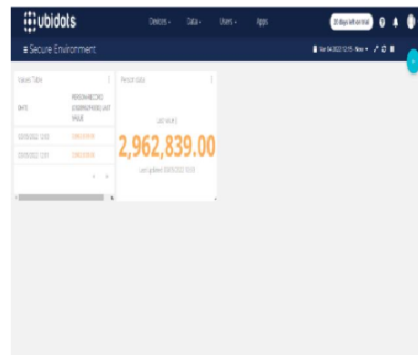
IR sensor is used to detect the objects It is connects to D2 pin of the NodeMCU as well as ground and 5V. And Relay is connected to D0. Relay is used to automatic switch.

Result & Discussion:

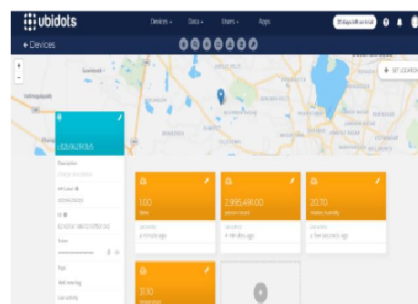
Nodemcu will gather data from the climate and send that data to the cloud through the Internet (as per the organization prerequisites, the power supply will be straightforwardly associated with the cloud network as per the code we have picked). From Cloud, we can get

warnings through Gmail and SMS. The RFID reader will peruse the mark while entering and leaving. Whenever an item (individual) is recognized, the framework will open the entryway utilizing a transfer.

Screenshots:



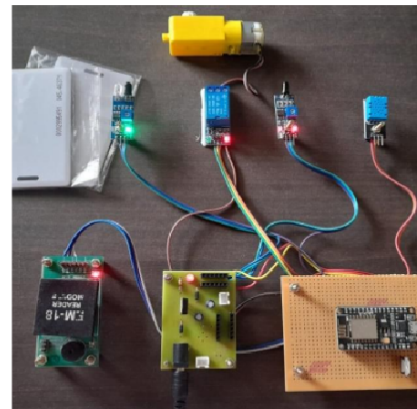
Tag details



Sensor reading and location



Flame detection graph



Hardware Proposed System

Conclusion:

Utilizing RFID-based IoT, Smart Secure Environment is a task that can be carried out in a recreation area climate, safeguarding the climate like fire, hotness, hotness, and human data, so things can be effortlessly controlled. in the recreation area. We can likewise follow where an individual purposes.

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