Smart Safe Secure Box using proposed security technique using Internet of Things

Suraj Rasal[1], Jainam Jain[2], Keshav Kabra[3], Nihal Kumar[4]
[1]*Assistant Professor, Bharati Vidyapeeth (Deemed to be University) College of Engineering Pune*
[2,3,4]*Student, Bharati Vidyapeeth (Deemed to be University) College of Engineering Pune*

Abstract **- Smart Safe Secure box using IOT technology keeps track of real-time public threats and provides advanced security. Smart alter sensor with night vision camera is used to capture the ongoing movement of things to prevent Crime. In today's world, we can see that daily the public crime (stolen data, evidence, government document, food packages) arises, to reduce public crime we came up with the idea of a smart safe secure box using IOT technology with encrypted OTP methodology. This is an Advanced Smart Safe Secured Box where we can put the requests(thing) into the container securely and get delivered in the absence of the client. This is paper is all about how we can detect digital crime in the indoor environment and save our valuable thing from stolen. As this technique provides advanced security by detecting unusual movement it gives a fast alert to the authorized user with images of movement.**

Index Terms **- Encryption, IOT Internet of Things, Infrared IR Night Vision Camera, Raspberry Pi, Smart alert sensor.**

I.INTRODUCTION

Nowadays everything is digitalized but not everything is safe if any physical object needs security in terms of its handling and access management such that only the owner or authorized persons are allowed to access the contents. We came up with an Idea of Smart Safe Secure Box which broadly uses IOT technology with image processing technique with hashing [1]. Whenever an important object or document is kept inside the smart safe secure box, the object would be accessible to only the desired person related to that object which would prevent from theft issues. And smart city environment also prefers internet of things technology [2]. But recent IoT trend also keen to have secured environment. Even Internet Service Provider security is also important aspect of new IoT security era [3]. If an unauthorized person tries to access the object kept inside the secure box a notification would be received to the person related to that object which would prevent the theft from happening. The process of notification works by using image processing technique inside the box, the camera fitted inside the box works with motion sensors and captures every little moment inside the box and which in turn sends an alert message to the owner that something is wrong with box, or someone has tried to access the contents of the box in malicious way this ensure safety from any kind of thefts [4]. The smart safe secure box finds its application in many day to day life activities from individuals to companies in various forms which is discussed later in the report.

II. EXISTING SYSTEM

Nowadays everything is digitalized but not everything is safe" if any physical object needs security in terms of its handling and access management such that only the owner or authorized persons are allowed to access the contents. We came up with an Idea of Smart Safe Secure Box which broadly uses IOT technology with image processing technique with hashing. Whenever an important object or document is kept inside the smart safe secure box, the object would be accessible to only the desired person related to that object which would prevent from theft issues [4]. If an unauthorized person tries to access the object kept inside the secure box a notification would be received to the person related to that object which would prevent the theft from happening. The process of notification works by using image processing technique inside the box, the camera fitted inside the box works with motion sensors and captures every little moment inside the box and which in turn sends an alert message to the owner that something is wrong with box or someone has tried to access the contents of the box in malicious way this ensure safety from any kind of thefts. The

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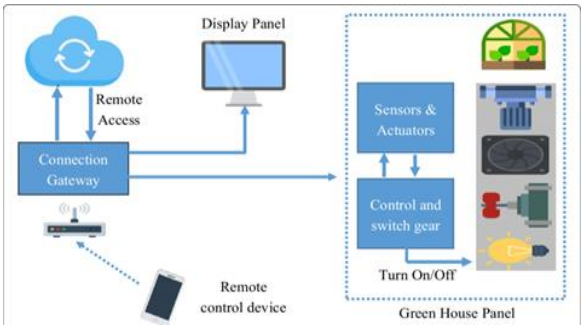

Fig.1. IoT used in Green House Project [5]

The concept of connected devices itself dates back to 1832 when the first electromagnetic telegraph was designed. The telegraph enabled direct communication between two machines through the transfer of electrical signals. However, true IoT history started with the invention of the internet—a very essential component—in the late 1960s, which then developed rapidly over the next decades. There exist ideas which provides security using IOT techniques like home automation, monitoring systems and there's a project by name of smart locker works on the similar lines, In the previously proposed system a motion detection camera is deployed inside the smart locker connected to Raspberry Pi, which on any theft or risk send the alert message or notification to the owner of locker which solve the problem of continuous check. But it lacks in security aspects, there is no encryption over data transmission and It is not updated with latest hardware and technologies (eg. raspberry Pi 3B can be replaced with raspberry pi 4, Power supply can be done using switch boards or using power banks) and 2-way authentication using OTP to allow only authenticated people have access to the objects inside the box [5]. It mainly works like traditional camera CCTV camera fitted in the box while Smart safe secure box comes with UI where user can interact for entering opt and getting access to box. The smart secure box will help demonstrate the image of the objects present inside the secure box with the help of certain technologies such as IOT because of IOT physical devices stay in touch with one another leading to greater efficiency and higher quality [4], [5]. It also allows full transparency.

Due to the overall wireless substructure of these smart devices, it requires little to no human involvement, being able to pretty much operate on their own. This allows for greater control and automation leading to more operating productive. Some standard research papers are studied and referred where image processing techniques are used in vehicle number plate detection [7].Whenever an important object is kept inside the secure box, the object would be accessible to only the desired person related to that object which would prevent more theft issues [4], [8].

Some sample IoT applications are studied and referred to understand the use of internet in IoT appliance usage and its access across the globe using network or internet. While developing any IoT based system, it is very important to have secure and proper IoT access structure [9], [10].

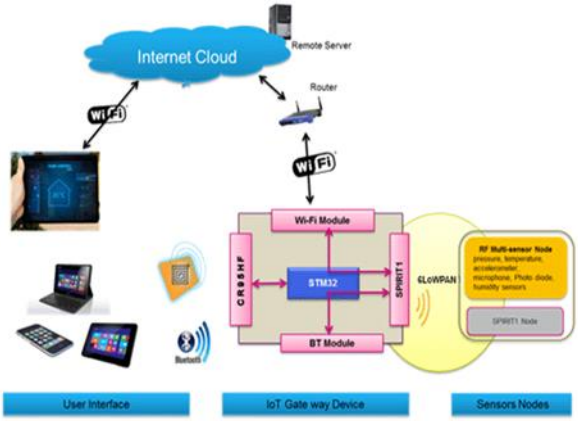

Fig.2. IoT System sample [9]

As shown in Fig.2, IoT system can have different access structure through which IoT devices can be accessed or operated. Like in the same Fig., Wifi and global internet both are used. So user should think about its access structure as well as security aspect of proposed IoT system [9]

III. PROPOSED SYSTEM

In order to overcome the limitations in the present system, we came up with a new idea of having a "Smart safe secure box" for everyone. Smart safe Secured Box is a secured box where we can place the object into the box safely and if the person is not authorized then he may not able to access it without OTP. When the order reached the delivery address, an authorized person calls the delivery boy and asks for the Encrypted password OTP to open the Secured Box. This box consists of two layers where the first layer is

used to place the Object into the box and the second layer is used to secure the online products. When the authorized person calls the delivery person, there generates a random OTP every time. OTP is given to the authorized Person that is typed through a keypad which is placed on the box. We can see an LCD display to enter the OTP. If the entered password is wrong it indicates us to type the correct OTP which has given. Then the door opens automatically so the delivery person can place the object into the box then the door closes automatically within 15-20 Secs. After sensing that the product is placed in the first layer through a smart Ultrasonic sensor, the door will open to the second layer, and the product is secured in the bottom of the layer and the door for the second layer closes which can't be seen. In this manner, the products are secured within the box. Customers can order more than one product per day. Forensics people can also use this box to stored suspected evidence securely. Finally, that secured products can be delivered to the destination.

In this project we mainly uses Night vision infrared camera to capture the motion object placed in secure layer, it any unusual activity occurs then it will immediately capture the images of the motion of object & we have also used smart alert sensor which are capable to capture the movement of the object which is placed inside the secured layer 2 if any unusual activity happens then ultrasonic smart sensor will work and at that time motion captured image of that object will send to the authorized person and also the company owner from where the object is placed inside the box.

Along with smart safe secure box There are main two Night vision camera and smart alert sensor equipment embedded with the raspberry pi and also have the LCD display which allow or give the right to the person to enter the OTP.

A) Proposed architecture

So here we explained the working of the project that how it will communicate with the user. First when the object is placed inside the box that time person who is doing packaging having OTP with him from the company owner and once the object place inside the smart safe secure box door immediately locked and within 15-20 sec password is expired.

Now how it will work once the box is delivered in the absence of the client and when the client came that time client has to make the request from the delivery boy and the delivery boy will send an encrypted OTP to the authorized person as the person authorized he will be able to decrypt the OTP and as he decrypted he will be able to get an OTP (there is an option while ordering any item that you have to choose you to want encrypted OTP security or normal OTP security) as he enters the OTP doors get unlocked and person is able to take out his product safely. Once the product (object) is taken out then immediately the OTP will go to expire within 15-20 min.

So this type of user can easily save their product from theft and also forensic people can send evidence securely from crime scene to destination.

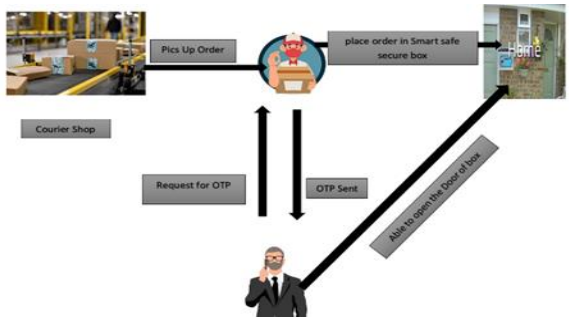

Fig.3. Proposed IoT System for smart safe box

Daily use working, Courier packed from the company and delivery boy packed to order and when the delivery boy reached home that time client is not present so in that case in absence of client the there is one smart safe secure box outside the home delivery boy will requesting for the OTP to the client and placed box successfully inside it and after some time when a client came that time client will be going to use the OTP for open the door.

For official use, Now in another case, if the product is valuable or any evidence so in that case person will place the object inside the box, and after that, they will send the box to a destination now to open the box client have sent the request to the person who sends the box so that person will send an encrypted OTP to the authorized user and user can able to open the box .so in this case if the box is stolen or anyhow OTP is bypass than also box cannot be open because OTP is in encrypted Form.

B) Status Request-:

The purpose of Smart secure Box is to reduce the cost and time taken by the executives to allow the product to be delivered to the desired location or to the desired user. In order to improve the efficiency the accessibility of the box is made much more efficient

and easier to use for the customers. To access the desired object the user has to enter the correct otp generated randomly.

Once the user will enter the correct otp the object present inside the box would be accessible to the user but if the otp generated randomly is entered wrong by the user then in that case the object would be inaccessible to the user and after some trials a message would be delivered to the user related with the box that some malicious activity have been detected inside the box and an unauthorized user is trying to access the object. The main purpose of the smart secure box is to prevent the object present inside the box from any malicious attack and inform the user so that immediate actions can be taken on time to prevent the theft.

C)Applications of proposed work

- Now days everything is going to be digitalized but not everything is safe so if any operation or any documentation which is highly valuable could be transferred by using this smart box.
- Digital Forensics Investigator can use this to secure suspicious evidence.
- Food Delivery Company can use this to provide food securely.
- Government or private information handling devices can be placed in this.

IV. CONCLUSION

Smart Safe Secured box provides high security for the product with a locking system. These secured boxes are ensuring the safety of the content inside it. Which can be easily access by a authorized person using OTP's, when a malicious person tries to open the box the cameras sensors get active and using image processing, immediately send alert notification to the owner and hence maintain the confidentiality of the object some of it's application where this box can be useful are food delivery, personal belongings, parcel holder and forensic evidences.

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