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A REVIEW PAPER ON SECURE SMART PARCEL RECEIVING SYSTEM

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ABSTRACT

A system called the Secure Smart Parcel Receiving System has been developed to enhance the safety and efficiency of package deliveries through the use of advanced technologies such as IoT and automated alerts. It ensures the secure acceptance and storage of parcels and enables users to keep track of deliveries, receive notifications when packages arrive, and employ secure retrieval methods to minimize theft and unauthorized entry. The primary objective of this system is to provide proof to users in both residential and commercial settings.

Keywords— Parcel receiver, Arduino, Secure, E-Commerce

1. INTRODUCTION

As we know that the world is getting smarter in everything and busy with their work. So, the customer uses online shopping as compared to offline shopping, now customers mostly use e- commerce and online shopping but the person does not have any time to receive the parcel, so as we cannot take the delivery or due to other reason we can't [1]. As we know that, most of the receiver facing the problem of the parcel which is, if the receiver cannot receive the parcel, parcels left unattended the parcel may be subject to theft or environmental damage, parcels re-delivery will be time consuming and costly which leads to dissatisfaction to the customer. Hence, the automation of receiving the parcel will lead a new revolution & easy receiving of parcel can be possible. This is the motive behind the proposal of an approach for automation of the parcel receiving. It is an electronic delivery box with advance locking system with a keypad and fingerprint sensor Due to this system your parcel will be secure in it. The major advantage of this system is it contains of GSM module, so where ever the receiver is present in the globe can receive the information of received parcel [1].

On the basis of survey, Amazon accounted for closeto 3 million shipments per day, followed by Flipkart plus Myntra at around 2.5 million per day. All theother horizontals and verticals, including Meesho, ShopClues, and Snapdeal, accounted for about 2.5million daily shipments.[8]

So, in this box we provided a locking system which will be control by the customer which ensures the security of the box and the parcel which is inside it. Inearlier days when people used to put the simple box outside the house. The deliver may often refuse to leave parcel in this existing boxes as they do not offer true proof of delivery. Our smart parcel receiving box has the ability that issue multiple number of OTPs on each delivery. So, this can provide the proper proof ofdelivery [4].

Here's how it works:

When you buy parcels online and no one at home for receiving parcel, the parcel can first be delivered to a trusted neighbor or to the front house door. However, if neither of these options is available, our system willimplement. We will install a Smart Parcel Box outsidethe door of your house. This box will feature advanced security like a fingerprint scanner and anIoT interface. If you're not home, the delivery person can securely place the parcel in the box. The box can only be unlocked using a PIN or OTP provided by the homeowner, ensuring that only authorized access is granted to the delivery person. This system guaranteesthe safety and contact-less delivery of your parcels even when you're away.[6]

Fig a. Parcel being theft

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2. LITERATURE REVIEW

Recently, the RFID mailbox courier system wasstudied by Himalayee Saini, et al, each courier is attached with RFID tag and sends the identity number to receivers mobile. When the courier boy arrives, the RFID tag on the courier is read by RFIDreader. When the tag matches, letter box is automatically opened using geared DC motor, then it sends message to receiver about arrival of the courier. When the receiver takes the courier from letter box, an acknowledgment is sent to courierofficee.[1]

Another study about Future Parcel box was studied by Ahmad Syafiq Bin Masrilhisyam, et al, proposea solution of Future Parcel Box is a parcelcollection unit which will receive the parcel from courier person safely. This smart system will save time as it avoids rescheduling of the parcel delivery.Customer can click and receive the parcel securely through their emails. The important use of this product which user can save so much time. Finally, the stolen parcels case can be avoided by this new parcel box.[2]

Similar approach was taken by Indrayani Rewatkar,et al, of a Design and Implementation of SmartParcel Receiving System, A Box will be having a request key which will provide trigger to delivery driver. The delivery driver simply presses the key on the box. System is having GSM module which send the notification of new parcel to the owner's smartphone. Owner will send the OTP in response to the notification message which will be received by the system in the parcel box. System will displaythe OTP for delivery person for confirmation. Further on validation the upper lid is opened and package is to be kept by the delivery person within stipulated time after which the lid is closed. Once the upper lid is closed another confirmation is madewhether the package is placed by output of IR sensor placed inside compartment.[3]

Another project was done by Ahmad AnwarZainuddin, et al on Simulating the Effectiveness of an IoT Parcel Alert System for Enhancing Delivery Efficiency and Safety During Covid-19. In which Information about parcel details will be sent to the recipient and the recipient needs to verify the parceldetails. When the recipient wants to pick up the parcel, the recipient will show QR code and light sensors detect light and convert light energy to an electrical signal output. After detection of QR codeis successful, the recipient will receive a One-Time Password (OTP) to verify the authorized recipient only. Recipient needs to enter that password correctlyto collect their parcel from the locker.[4]

Another study by R. ReddiRani on IoT Based Bank Locker System using Finger Print and OTP, the main aim of this project is to design and implement bank locker security system based on Finger print and OTP technology.[5] This can be organized in bank, offices and homes. In this system only the authenticate person recover the documents or money from the lockers. In this security system fingerprint and OTP isused.

Lee Jia Heng studied about A prototype of smart parcel box,[6] This project develops a prototype of a smart parcel box. This project will be developed by using Raspberry Pi and configured with a computer. This project will be able to solve the parcel receiving problem faced by the deliveryman and recipient. Besides, since this project is just a prototype product of a smart parcel box, therefore it is only limited to receiving one parcel at one time, and it is also limited to one deliveryman and one recipient. The prototypeof the smart parcel box is not weather-proof.

Mohit Guptaa et al, proposed a project on Designing an Intelligent Parcel Management System using IoT& Machine Learning,[7] the aim is to save the time, detect impermissible objects inside the parcel and alsoto reduce human efforts. We have used RFID togetherwith QR code so as to reduce the chances of missing aparcel when being scanned as the QR code needs to be facing the camera for being read and RFID can be read by a RFID reader irrespective of the orientation of the parcel moreover RFID is much secure than the QR code and even holds more data.

3. PROPOSED METHODOLOGY

System Architecture:

The upper compartment is called the receivingcompartment in which the delivery driver will drop the parcel. The lower compartment is called the safetycompartment in which owner will collect it.

In the below flowchart, the delivery boy will come at box and open then the SMS will go on to the mobile number of the owner. As soon the OTP is received thedelivery boy will unlock the box after typing the OTP.The box will detect if the Parcel is received if it does not detect the parcel the SMS will be sent on the owner's number. If the box detects parcel, then the door will be locked and message will be sent on owner number.[3]

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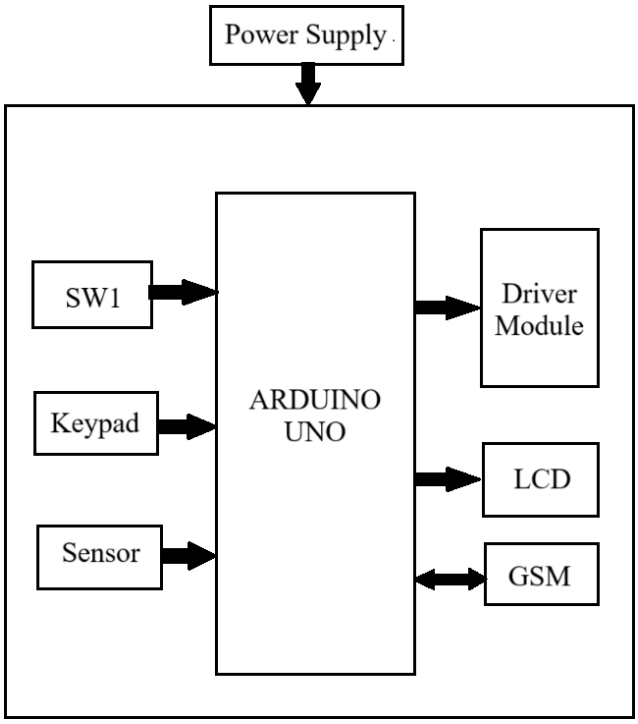

Fig b. Flowchart of Receiving component

As shown in the below figure, When the owner willcome at home to collect the parcel the safety compartment will take place**,** the owner will place his finger or password on the display screen if the password matched the door will open otherwise the door will remain close.

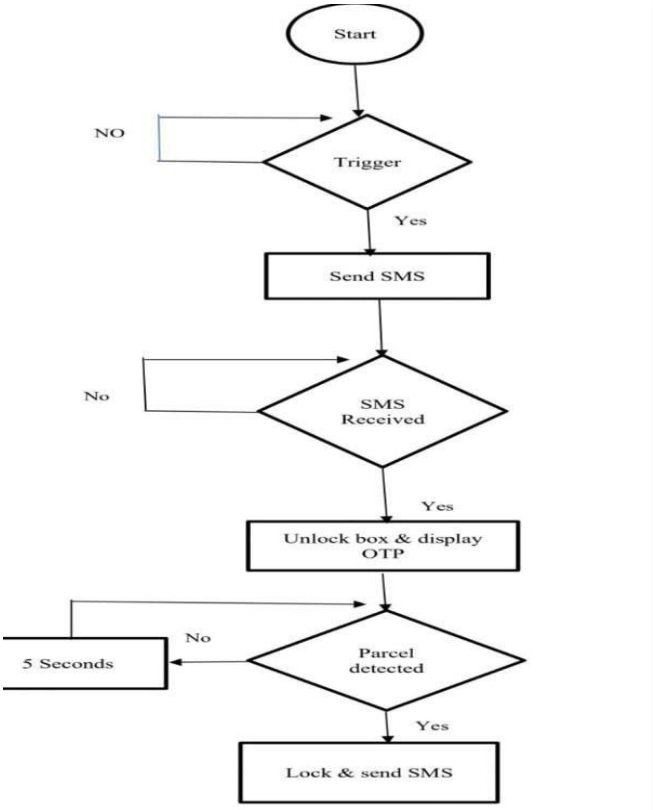

Fig c. Flowchart of safety compartment

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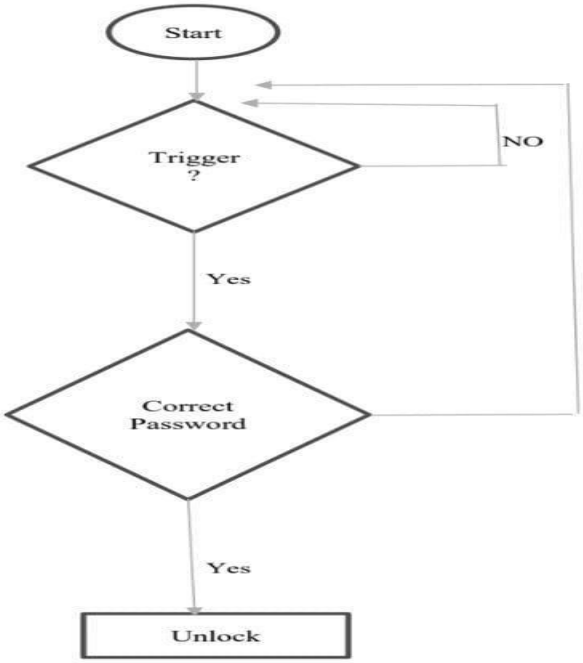
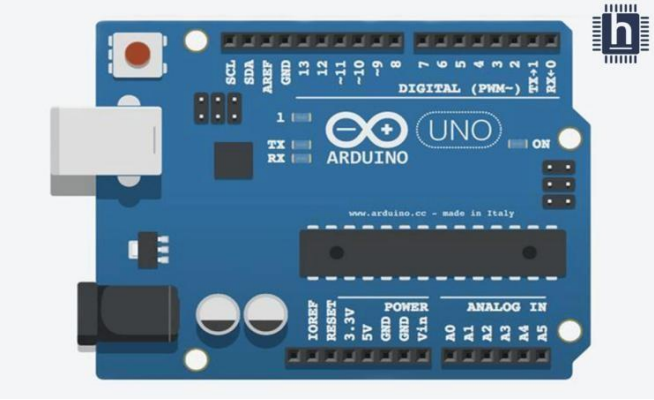


Fig d. Block Diagram of Parcel receiver

The above block diagram consists of Smart Secure Parcel Receiver System which contains Arduino uno, in which all other components are connected as input output ports i.e. Switch/push-buttons, LCD display, GSM Modem, Fingerprint Sensor, Keypad, Driver module.

Description of Components

Arduino Uno



The Arduino Uno is one kind of microcontroller board based on ATmega328, and Uno is an Italian term which means one. Arduino Uno is named for marking the upcoming release of microcontroller board namely Arduino Uno Board 1.0. This board includes digital I/O pins-14, a power jack, analog I/ps-6, ceramic resonator-A16 MHz, a USBconnection, an RST button, and an ICSP header. All these can support the microcontroller for further operation by connecting this board to the computer. The power supply of this board can be done with the help of an AC to DC adapter, a USB cable, otherwise a battery. This article discusses what is an Arduino Uno microcontroller, pin configuration, Arduino Uno specifications or features, and applications.[7]

Pushbuttons

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A push-button or simply button is a simple switch mechanism to control some aspect of a machine ora process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed orpushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing,slapping, hitting, and punching.[7]

GSM

GSM is a mobile communication modem; it isstand for global system for mobile communication (GSM). A GSM digitizes and reduces the data,then sends it down through a channel with two different streams of client data, each in its own particular time slot. Basically, GSM was built to aid 2g connectivity in mobile phones. Earlier, the network incorporated a circuit switching network but with time and need, it had to collaborate with GPRS, implementing the packet switching protocol. The frequency of operation of the GSM network falls within the range of 900-1800 MHz

LCD Display

The LCD (Liquid Crystal Display) used in the Smart Parcel Receiving System is a 16x2 character display,which means it can show two rows of up to 16 characters each. This type of display is popular forits low power consumption and ease of use withmicrocontrollers like Arduino. It allows for the display of essential information, such as parcel delivery notifications and OTP codes for secure access.

Fingerprint Sensor

This is the fingerprint sensor MSF500 is used which will detect the owner's fingerprint by scanning and will open the door.

As we become more advanced and IoT keepsgrowing, accurate data collection via sensorsbecomes more important.

Smartphones are the best example on how sensors are quickly changing theway we go about our days. After all, it was only a few years ago that phones didn't have touchscreen or fingerprint applications on them.

4. CONCLUSION

This system ensures that parcels are securely stored until the recipient is available to collect them. This innovative approach addresses several key challenges in the current delivery system: Reduction of Missed Deliveries: The smart parcel locker allows delivery personnel to deposit packages without requiring the recipient's presence, to reduce and minimizing missed delivery attempts.Enhanced Security: With biometric access and secure locking mechanisms, the risk of theft or loss is greatly reduced. This is more effective in urban areas where package theft is common. Convenience and Flexibility: Recipients can access their parcelsat their convenience, eliminating the need torearrange their schedules around delivery windows. This flexible option IS FOR those with busy lifestyles. personnel from potential health risks associated with direct interactions. Automated Notifications and Access Control: The system provides real-time notifications to recipients when their parcels are delivered, along with OTP/PIN for secure delivery. This ensures that users are always informed and in control of their deliveries. In summary, the Smart Secure Parcel Locker System not only streamlines the parcel receiving processbut also enhances security and convenience for users. As e-commerce continues to grow, such systems will play a crucial role in modern logistics and delivery solutions, making them an essential addition to any smart home ecosystem.

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