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Smart Parcel Box with UV based Sanitization

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Abstract - *In the modern era, everyone will prefer online shopping followed by delivery of the purchased product. Due to unavailability of the purchaser/customer, collection of the parcel/product becomes difficult and there is many people suffering from coronavirus. These virus spread rapidly through person to person, through air, objects and surfaces around the person. Sanitization is the most important way to prevent the spread of infections. We are proposed Smart Parcel Box with UV Based Sanitization which will deliver the parcel and secured documents at our place as well as it will sanitize the parcel which is available inside the box by using Ultra-Violet rays. In covid -19 situations, it will help to user to get product secured and sanitize. We are design our own app to control system, so user can click and receive the parcel securely. We used UV rays for sanitize product. User will get message as well as live streaming of process after delivery of the parcel and sanitization process. It is very helpful to prevent the spread of infections.*

Key Words: online shopping, unavailability of customer, IoT based parcel collection, click and receive parcel, UV rays, sanitize product.

1. INTRODUCTION

Now-a-days mostly everyone prefer for online shopping and the delivery boy moves from place to place to deliver the product. Due to unavailability of the purchaser/customer, collection of the parcel/product becomes difficult and there is many people suffering from coronavirus. These virus spread rapidly through person to person, through air, objects and surfaces around the person. Sanitization is the most important way to prevent the spread of infections. We propose a solution of Smart Parcel Box with UV Based Sanitization which will deliver the parcel and secured documents at our place as well as it will sanitize the parcel which is available inside the box by using Ultra-Violet rays. In covid -19 situation, it will help to user to get product secured and sanitized. We are design our own app to control system, so user can click and receive the parcel securely. We used UV rays for sanitize product. User will get message as well as live streaming of process after delivery of the parcel and sanitization process. It is very helpful to prevent the spread of infections.

2. LITERATURE SERVEY

In paper [1], IoT based Smart Delivery Box, secured delivery Box which generates OTP for every active session and notifying the customer about the systematic process flow till the session is terminated. The system performs as a secured Box with minimum operational delay. Time based One Time Password increases the authenticity of the delivery vault. Global system for mobile communication module is used to send text message since GSM network has an advantage of covering wider area of operation even during mobility of the customer. Using MQTT Broker Android application, the box can be locked/unlocked from remote location.

In paper [2] smart system letter box, in which the hardware kit is used to notify user that letter is arrived. The mobile application is used to receive the notification. Here the obstacle sensor is used to detect the object (letter). The RTC clock is used to store the time the delivery of the letter. GSM module is used to send the notification through message and the GPS detects the location at which address the letter has been received. We have used Android operating system in this system which has lot of features integrated in it. MySQL database is used to store the records. This database is easy to maintained records.[2]

In paper [3] SFB is a courier/parcel collecting box which is to be installed in our home like A/C in a place where the outsiders and insiders can be able to access it for placing and collecting the parcel respectively. It consists of barcode sensor, weight sensor loading cell and doors on both sides of the box for placing and collecting the parcel as when the customer is available. It will also contain a shifting belt where the parcel will be placed initially. After verification of the parcel it will be shifted inner ward so that the parcel will reside in a place safely until the customer is able to collect it.

In our paper we have propose this solution that i.e Smart Parcel Box with UV Based Sanitization ,which will deliver the parcel and secured documents at our place as well as it will sanitize the parcel which is available inside the box by using Ultra-Violet rays. In covid -19 situation, it will help to user to get product secured and sanitized. We are design our own app to control system, so user can click and receive the parcel securely. We used UV rays for sanitize product. User will get

message as well as live streaming of process after delivery of the parcel and sanitization process. It is very helpful to prevent the spread of infections.

2.1 Existing Systems

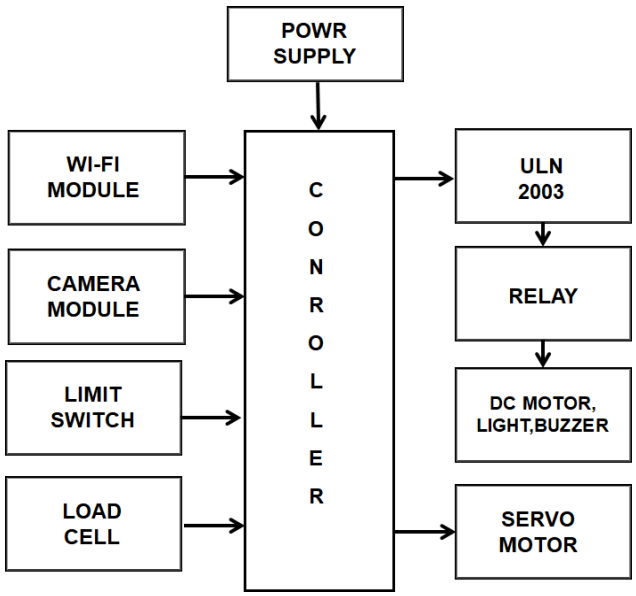
System	Elephant trunk box
Product Dimensions	16 x 17.8 x 37.2 inches
Material	Metal
Batteries Included?	No
Cost	14,429/-
Specification	Rotating drum design

System	Brize box
Product Dimensions	57.5x39x32.5cm
Material	Galvanized Steel
Batteries Included?	No
Cost	23,582/-
Specification	Rotator in front which pushes the parcel downwards.

SMART PARCEL BOX

System	Smart Parcel box
Product Dimensions	330 x 280 x 255 mm
Material	Galvanized steel with a rust resistant powder coating in dark grey
Batteries Included?	No
Cost	15194.59/-
Specification	Bar code scanner to send notification.

3. BLOCK DIAGRAM



Power Supply: In this our circuit we are use 12V power supply to control circuit.

Wi-Fi Module/Controller: NodeMCU Development board is featured with Wi-Fi capability, analog pin, digital pins and serial communication protocols. We are used NodeMCU to Control our system.

Camera Module: The ESP32-CAM is a very small camera module with the ESP32-S chip that Besides the OV2640 camera, and several GPIOs to connect peripherals, it also features a microSD card slot that can be useful to store images taken with the camera or to store files to serve to clients. We are used ESP-32 cam module for live streaming and security purpose.

Limit Switch: A limit switch is an electromechanical device that consists of an actuator mechanically linked to a set of contacts. When an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection. We are used limit switch for controlling motor.

Load Cell: Load Cell Working Principle. Load cell is a sensor or a transducer that converts a load or force acting on it into an electronic signal. When a load/force/stress is applied to the sensor, it changes its resistance. This change in resistance leads to a change in output voltage when a input voltage is applied. We are used load cell to customer get notification when packages are someone try to dropped off or picked up.

ULN2003: The ULN2003 is a 16-pin IC. It has seven Darlington Pairs inside, where each can drive loads up to 50V and 500mA. For these seven Darlington Pairs we have seven Input and Output Pins. Adding to that we can a ground and Common pin. The ground pin, as usual is grounded and the usage of Common pin is optional. This IC is commonly we used to drive Relay modules.

Relay: Relays are the switches which aim at closing and opening the circuits electronically as well as electromechanically. It controls the opening and closing of the circuit contacts of an electronic circuit. When the relay contact is open (NO), the relay isn't energizing with the open contact. We are used relay to control Dc motor, Lights, Buzzer.

Servo Motor: A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. We are used servo motor for filliping camera module.

UV Light: UV lamp used in residential water and air disinfection units. The small 16 mm diameter of the lamp allows for a small system design and design flexibility. TL Mini lamps offer almost constant UV output over their complete lifetime, for maximum security of disinfection and high system efficacy.

4. WORKING

- This system is simply connected to your home Wi-Fi.
- In our system we are using camera. The camera provides two view i.e. outer view and inner view.
- Whenever deliver man are come to deliver our parcel he will directly call to customer.
- According to deliver man information customer will verify delivery man through outer view of camera.
- Then customer will open door of drop box.
- Delivery man put parcel into that drop box. Again customer will verify our parcel through inner view of camera
- After verifying parcel customer will close door of that drop box.
- After that UV rays will starts sanitization process of parcel.
- As soon as parcel sanitization process is completed user get message.
- The customer also gets notification when packages are someone try to drop off or picked up.
- Our system provides live streaming of all process to customer.
- Our system can give acknowledgement to delivery man through signature after receiving parcel.
- We are design our own app for control this system
- The system is also having a digital lock for manual opening of the box for owner.

5. ADVANTAGES

- Smart Parcel Box with UV Based Sanitization makes delivery of the parcel easier and safe even in the absence of the customer.
- Each and every mechanism is handled by customer itself through app, so parcel is fully protected.
- Parcel Boxes secure your deliveries better than deterrents like security cameras and alarms.
- Boxes are also more convenient than delaying deliveries or having them sent to alternative locations for pickup.
- It will be useful for industrial purpose also to keep their products and important letters securely.
- These systems can be sold to people who live in bungalow, rent, industries, and high security societies.
- The important use of this product which user can get sanitized product. People will less disinfected by using this system.
- This system also having battery backup.

6. COST ANALYASIS AND BUSNIESS MODEL

Small	Medium	Large
Width:22cm	Width:33cm	Width:44cm
Dimension:18cm	Dimension:27cm	Dimension:35cm
Height:29cm	Height:39cm	Height:58cm
Cost-metal:2000	Cost-metal:2700	Cost-metal:3500
Wooden:2500	Wooden:3000	Wooden:4000

BUSNIESS MODEL: We will discuss our idea with family and friend. We will provide our product for testing purpose to initiate customer. Sending out online survey to get valuable feedback we will update the product and we will try to overcome the limitation of the existing product. Research online demand using recent trends.

7. CONCLUSION

We propose a solution of Smart Parcel Box with UV Based Sanitization is an IoT based parcel collection unit which will receive the parcel from courier person safely and also provides acknowledgement. This smart system will save time as it avoids rescheduling of the parcel delivery. Customer can

click and receive our parcel securely through our own app with live streaming. The important use of this product which user can get sanitized product. People will less disinfected by using this system.

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https://www.smartparcelbox.co.uk/how-to-use

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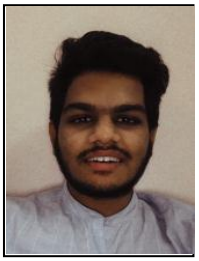

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