Smart Dustbin

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Abstract

Supermarkets are places where people get their daily necessities. We can see huge crowds in these places on holidays and weekends. People purchase different items and put them in trollies. Alternative ways of modern purchase of groceries are Dunzo, amazon fresh, Swiggy mart, etc. The project IOT smart dustbin is a smart system which will help to meet the customer needs and help them save time and effort henceforth modernizing the shopping experience and bringing a revolution in the shopping industry. People have continuously developed ingenuity to meet their desires from the beginning of civilization. The success of creativity may be attributed to more independence, which also helps to improve assignments every day and make them simpler and smaller. One essential activity that requires people to expend the most energy is shopping. People may purchase their daily necessities in the shopping center, including food, clothing, electrical goods, and other things. Most of the time, customers struggle with the vague descriptions of the item discounted and the misuse of the counters' extra time. As a result, we created this smart dustbin to assist in finding a solution and make shopping hassle-free and simple. The objective of this project is to make a bin smart using IOT applications. Once the user disposes an article into the smart dustbin, it automatically adds to cart the product in an amazon like shopping website. Also, it has an ultrasonic sensor which helps detect the level of dustbin occupancy.

Keywords: *NodeMCU, Ultrasonic Sensor, Arduino, Database, Barcode Scanner, Website.*

1. Introduction

Since the dawn of civilization, people have continually produced creativity to support their demands. More independence can be the underlying explanation for success of creativity and this contributes to developing assignments and making them smaller and easier on a daily basis. Shopping is one crucial activity for individuals to expend the highest measure of energy. The shopping center is a place where people get their everyday needs from food supplies, clothes, electrical equipment and so on. Most of the time clients have difficulties with the unspecific details concerning the object marked down and the abuse of the counters

superfluous time. Hence, we have made this smart dustbin which will help in resolving this issue and make shopping hassle free and easy. People have constantly generated innovation to support their ideas from the start of civilization. More freedom may be the underlying rationale for creativity's success, and this aids in the development of missions by making them smaller and simpler to manage on a daily basis. For people who want to expend as much energy as possible, shopping is a must-do activity. The mall is a place where people go to obtain their everyday requirements, such as food, clothing, and electrical equipment. Clients frequently complain about a lack of specific information about the marked-down item and the exploitation of the counters' idle time. As a consequence, we developed this smart dustbin to help solve this problem and make shopping more convenient.

1.1. Problem definition

The grocery delivery industry has undergone many changes and updates since its inception and people are opting in for more technologically advanced services. As purchasing the same thing every month requires time hence, we have thought to make it very simple. As the customer does not need to add to cart the product every time, he or she is running short of it. Hence, we have opted for the smart dustbin. This leaves the conventional and traditional method of purchasing grocery in a state of void. So, we have planned to construct a project which saves time and effort and shall bring a revolution in the grocery shopping industry. In today's world, when a customer runs short of a grocery product, and chooses to purchase in online mode, he has to search for the same product and add that product multiple times. So, we have tried to reduce the efforts of the customer by constructing this project. This improves the customer service as they will save upon time and effort and can utilize the same for something better. What we have constructed is that when a user will dispose of the product in the smart dustbin, the smart dustbin will read the barcode using the barcode scanner and using Internet of Things technology and its application. This data will be sent to the shopping website so that the customer will just make the payment to purchase the product. The goal of this project is to use IOT apps to make a bin intelligent. When a customer places anything in the smart trash can, the merchandise is added.

2. Proposed method

On extensive study it was found that a barcode reader (or barcode scanner) is an electronic device for reading printed barcodes [2]. It consists of a light sensor translating optical impulses into electrical ones. NodeMCU is an open source IoT platform and used to connect to Wi-Fi [13]. This is used to make TCP/IP connections. The ultrasonic sensor helps to get ultrasonic pulses [3]. The Arduino and USB Host Shield is also used [7].

2.1. Existing system

Since its start, the grocery delivery sector has seen several modifications and upgrades, and consumers are increasingly choosing for technologically advanced services. Because buying the same product every month takes time, we decided to make it as easy as possible. Because

the client does not have to add the goods to the cart every time, he or she is running out. As a result, we chose the smart dustbin. This renders the conventional and traditional manner of supermarket shopping obsolete. As a result, we've devised a strategy to build a project that will save time and effort while revolutionizing the grocery shopping sector. In today's society, when a client runs out of a food item, he or she opts to buy it online. Dunzo is an Indian firm that distributes groceries, household items, fruits and vegetables, meat, pet supplies, cuisine, and pharmaceuticals to major cities. It also offers a service for picking up and delivering packages inside the same city. Bangalore, Delhi, Gurgaon, Pune, Chennai, Jaipur, Mumbai, and Hyderabad are among the eight Indian cities where Dunzo now provides delivery services.

2.2. Limitations of existing system

People go to supermarkets to buy their daily necessities. On holidays and weekends, we may expect to see large people in these areas. People buy various products and load them into trolley. Dunzo, Amazon Fresh, Swiggy Mart, and more alternatives to traditional grocery shopping exist. The main issue here is that the customer must waste time purchasing the same thing again and over as they type and add to cart the content. To address this issue, we created a smart dustbin. This smart trashcan detects the goods put in the garbage and instantly adds it to the shopping website, saving time and effort in the process. The consumer only needs to pay and make a purchase. The automatic dustbin is a great invention.

2.3. Proposed system

The supermarket delivery industry has seen several changes and improvements since its inception, and consumers are increasingly opting for technologically advanced services. We wanted to make it as simple as possible because buying the same goods every month consumes time. The client is running out of items since he or she does not have to add them to the cart every time. As a result, we went with the smart trash can. The classic and traditional way of buying in supermarkets becomes outdated as a result of this. As a consequence, we've established a plan to create a project that saves time and effort while revolutionizing the grocery shopping industry.

3. Implementation

The barcode scanner scans the ID of the product, then decoded by the NodeMCU. After that, the product ID and product name is stored in the database and website. There is a garbage detection system using ultrasonic sensors. We have used this code snippet that processes the data and gives us the needed results:
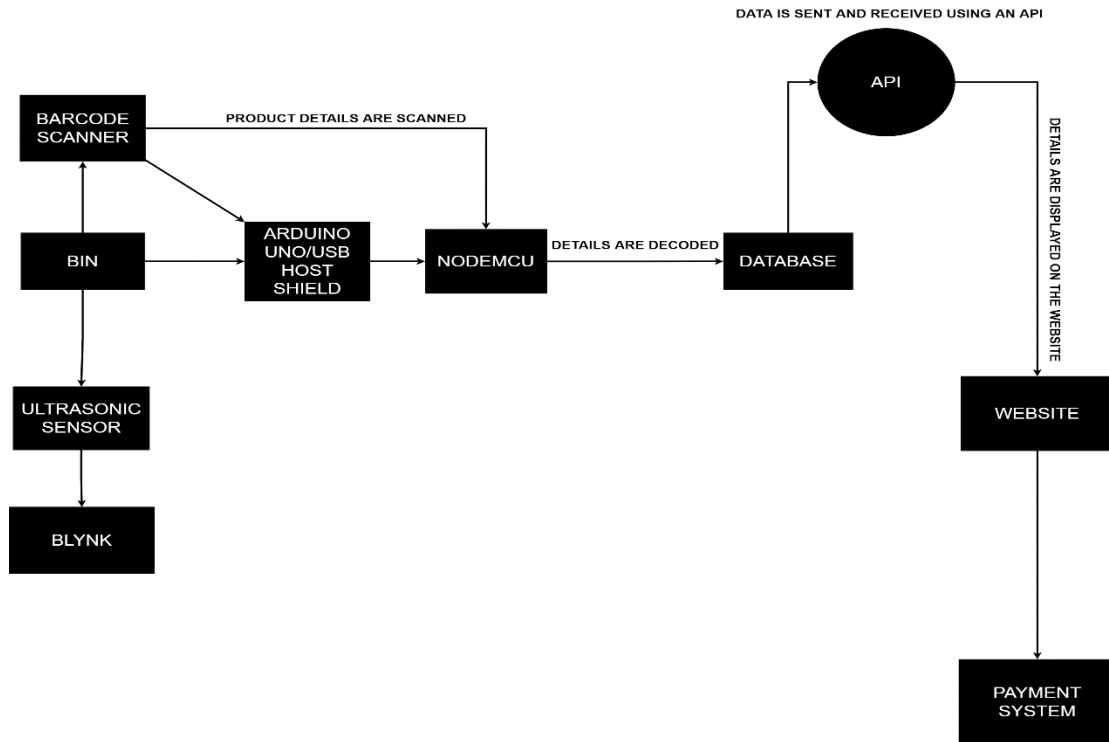
Figure 1: Architecture of the system

```
void sendRequest(String pId)
{
    if (WiFi.status() == WL_CONNECTED) {              //Check WiFi connection status
    HTTPClient http;                                  //Declare object of class HTTPClient
    http.begin("destination of file");               //Specify request destination
        http.addHeader("Content-Type", "application/x-www-form-urlencoded");   //Specify
content-type header

    String postParameterString = "ProductID="+ pId +"&UserID=1122334455";
    int httpCode = http.POST(postParameterString);             //Send the request
    String payload = http.getString();                         //Get the response payload


    Serial.println(httpCode);                             //Print HTTP return code
     Serial.println("the http code value is received");
    Serial.println(payload);                              //Print request response payload
    Serial.println("The payload is sent");

    http.end();                                //Close connection

    }
```
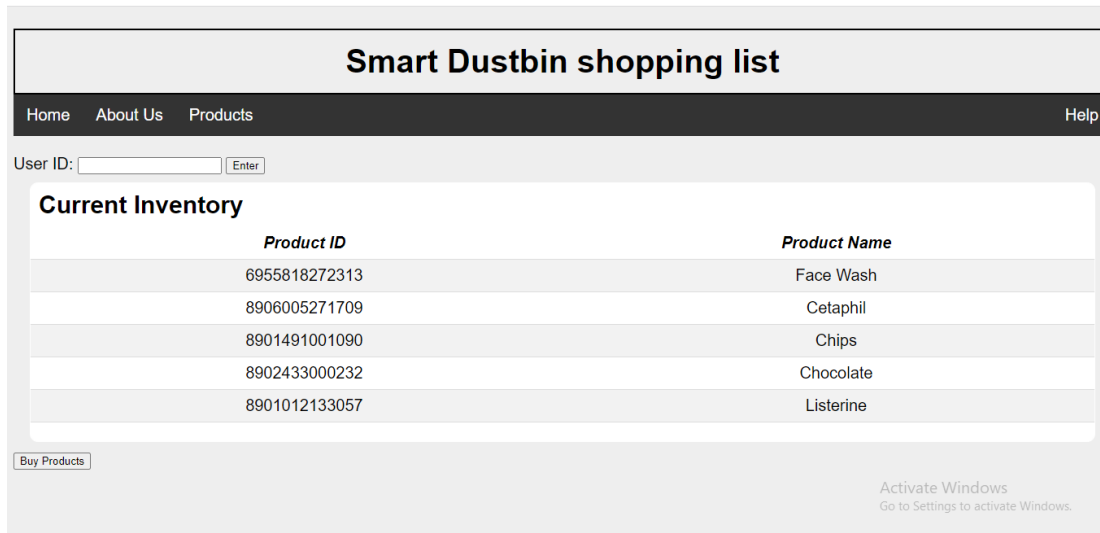
Figure 2: Website screenshot

Now, we shall showcase the test samples. As shown in the screenshot above, once the product ID is scanned and sent to the NodeMCU, the ID and name of the product is displayed on the website. Thus, we can see what products have been added.

3.1. Hardware and software description

The NodeMCU is a low-cost wi-fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems in Shanghai, China. The chip first came to the attention of Western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Arduino Uno along with a USB Host Shield will be used. Visual Studio Code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++. It is based on the Electron framework, which is used to develop Node.js Web applications that run on the Blink layout engine. The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to

Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards. The connection to the database is done using XAMPP and phpmyadmin.

Figure 3 : Ultrasonic Sensor and Barcode Scanner

4. Result and discussion

As an end product deliverable, an industry standard application is created following the guide's procedures and thereby validating it. This application is rather complex to build. This project builds a (proprietary and commercial) business application. We've devised a strategy for developing a project that saves time and effort while revolutionizing the supermarket shopping experience. In today's culture, when a client runs out of a food item he or she opts to get it online. Since its start, the grocery delivery sector has seen many changes and advancements, and consumers are increasingly selecting for technologically advanced services. We tried to make it as easy as possible because purchasing the same items month after month takes time. Because he or she does not have to add products to the basket every time, the customer is running out of items. As a consequence, we chose the clever garbage can. As a result, the classic and traditional technique of shopping in supermarkets has become obsolete.
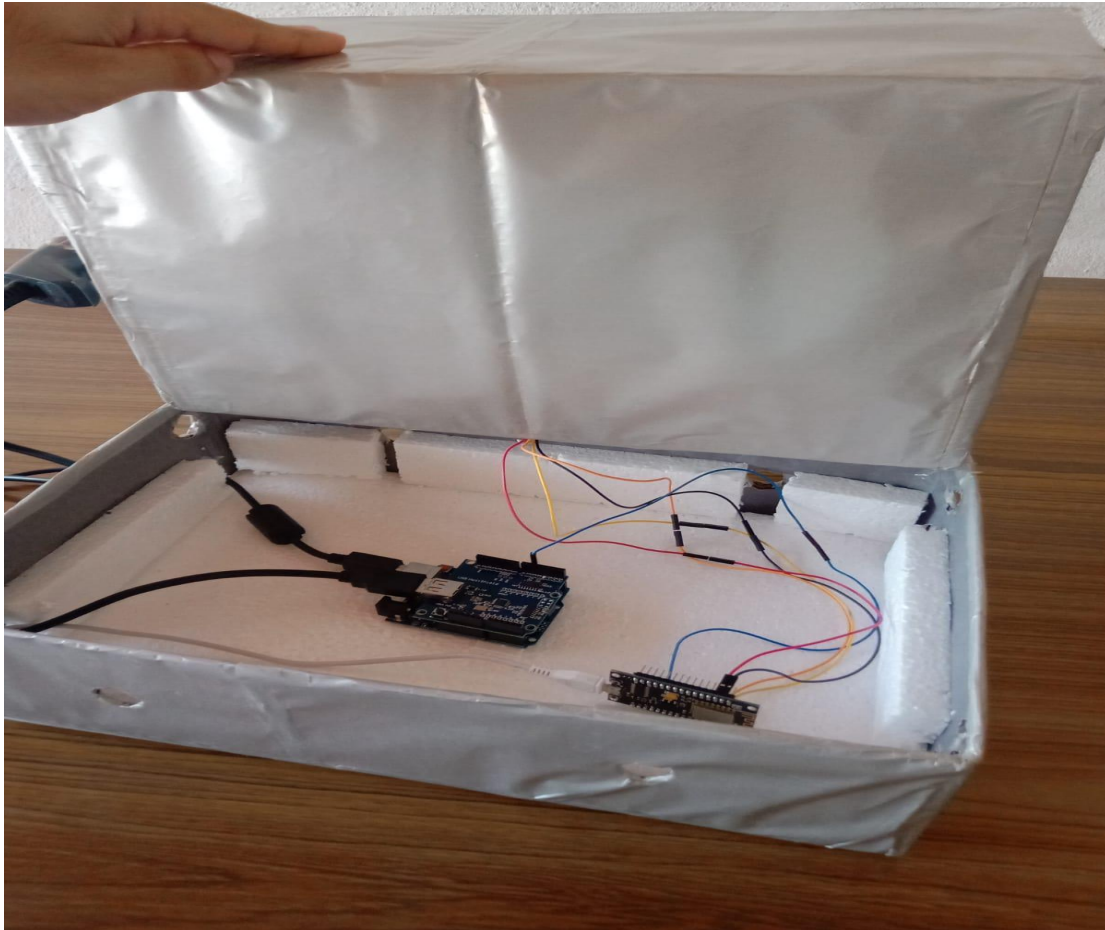
Figure 4: NodeMCU and Arduino

5. Conclusion and future scope

This paper has a vast variety of future scope as this can be used in multiple ways. One such way is that this smart dustbin can be embedded with Amazon and as we know that Amazon deals with almost every commodity hence the company can have a bigger customer base and the customer will also have a wide range of products to choose from. Another possibility is that this kind of system can be embedded with WhatsApp just like Jiomart and Whatsapp may have an upcoming project which will enable the whatsapp user to shop for grocery in the app itself here of the dustbin is smart a section can be created in whatsapp wherein the user just has to approve and make the payment for the scanned product hence making it very convenient and hassle-free. This system can also be incorporated in a smart city for efficient waste management. However, the system won't work with no internet connection and power supply.

6. Acknowledgements

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