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Automatic Billing System

Jyoti Sangogi, Pratik Nagare, Atharv Kharche, Arpita Koralli

Associate Professor, Department of ETE, RMD Sinhgad School of Engineering, Warje, Pune, India

U .G .Student, Department of ETE, RMD Sinhgad School of Engineering, Warje, Pune, India

U. G. Student, Department of ETE, RMD Sinhgad School of Engineering, Warje, Pune, India

U. G. Student, Department of ETE, RMD Sinhgad School of Engineering, Warje, Pune, India

ABSTRACT: Automatic Billing System is an AI powered autonomous checkout system. It uses advanced technologies such as computer vision and machine learning algorithms to enhance shopping experience by providing faster, more efficient and contact free checkout process. This system minimizes human interaction which is useful during situations such as COVID-19 pandemic. In this system once the items are identified, things are automatically added to the cart and the bill is generated instantaneously. QR code is generated for payment allowing users to settle their bills swiftly and securely by simply scanning with their smartphones.

KEYWORDS: Machine Learning, Computer Vision

I. INTRODUCTION

An automated billing system is a type of software solution that takes care of all the functions related to the billing process. With little manual input, an auto billing service can generate invoices, collect payments, and handle approvals and provisioning. Its aim is to streamline all billing processes for greater efficiency. Automated billing software is particularly well suited to businesses with recurring subscription models. Billing tends to be uniform with customers charged at regular intervals. Service providers like medical, law, and consulting firms also benefit from this type of software. For example, an automated medical billing system manages payment plans for those patients paying for treatment over time. If you think your business could benefit from an automated billing system, getting started is easy. To begin with, you should research your options carefully according to industry. An automated medical billing system may have special patient confidentiality and insurance payment features that a restaurant billing system wouldn't need. In addition to considering your industry-specific needs, you should ensure that your choice of billing system will integrate with existing accounting software. This makes it easy to transfer your customer payment data over to the new automated system. The next step is to set up your customer payment portal. This feature allows customers to log in and submit online payments, download their invoices, and update payment methods. Customize your system with your own business details, so that customers can clearly see who they're paying when they log in.

II. LITERATURE SURVEY

2.1 Survey of Smart Billing System

This paper proposes an Al-powered based Smart Billing System designed for amazing shopping experience. The system utilizes an Raspberry-pi for core processing. The System combines the power of computer vision and machine learning to provide an amazing shopping experience. The system provides a faster checkout experience to minimize human interactions in the store to keep shoppers and employees safer during the pandemic[3].

2.2 Survey of Autobill Generator

Consumer demand is increasing as technology advances and innovations emerge in areas such as machine learning, artificial intelligence, and the Internet of Things. With the rapid development of life, people's expectations are also increasing. You don't have time to wait in long lines to get the job done. We demonstrate a clever work using the Raspberry Pi controller. Shopping carts are programmed to capture the price of the items placed inside and send the final invoice to a web application that can be accessed via phone or handheld device. The system also checks for theft and does not allow the customer to transport goods without payment[1].

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2.3 Survey of Image recognition based billing system

This work describes a system that automatically does the billing of fruits in the retail market. Smart billing system is used for identifying and classifying the fruit types and to calculate the bill amount based on the type and quantity of fruits purchased by the consumer. Fruit identification is done using image processing technique and for weight measurement a load cell is used in the smart system. In this system an SVM classifier is used for fruit recognition. This smart billing system analyzes and classifies fruits successfully and bill calculation is performed accurately[5].

2.4 Survey of AI Driven Billing System

The project AI driven billing system aims to revolutionize the retail industry by using machine learning and computer vision technologies for object detection. Shopping is an essential part of daily life, and retail stores are an important source of goods and services for consumers. Barcode scanning is a commonly used method for product identification and billing in retail stores. However, it can be time-consuming and labour- intensive. The AI driven system offers a contactless and faster shopping experience for customers, minimizing human interaction and reducing wait times. The system incorporates MobileNet TensorFlow, an efficient and lightweight convolutional neural network model, to improve computational efficiency and scalability. The system can accurately detect products and prices, making the billing process faster and more efficient. Overall, the AI billing system offers a new and exciting approach to retail billing, providing a faster and more efficient shopping experience for customers[16]

2.5 Survey of Automatic Billing System using Li-Fi Module

Large super markets have a great variety of goods and different supermarkets may have different distribution of commodity. Most of the customers find it difficult to stand in long queue for billing the purchased products. This causes waste of time and wrong billing for wrong customers. This project provides a great solution to all these problems. Most recently LIFI is new emerging technology in the trend. In this project data transfer is processed between products and the mobile phone. Each and every product is having LIFI transmitter and it store the encoded data similar to the product id, cost of product and quantity. Here the mobile is integrated with LIFI receiver via OTG communication in the shopping cart. It can read the commodities' information when the LIFI transmitter holding goods are chosen by the customers, each information of the goods can be entered by using the mobile LIFI and when the product is kept into the trolley, which also contains the LIFI module, double check the product identity. After completing the purchase, the payment is processed in mobile itself via mobile banking system. Finally the cart section will verify the payment and purchase of product which will again cross check the products by the trolley module when we come out of the exit section of the shopping center. If the product is mismatched at this stage it immediately alerts the owner. This technology is used in this project for finding out the information of the commodities.

2.6 Survey of Smart Shopping Cart with Automatic Billing System through RFID and ZigBee

Contemporary embedded systems are habitually based on microcontroller's i.e. CPUs in the company of integrated memory as well as peripheral interfaces but ordinary microprocessors by means of external chips for memory and peripheral interface circuits are also still common, especially in more complex systems. Radio frequency identification (RFID) technology may not only be useful for streamlining inventory and supply chains: it could also make shoppers swarm. ZigBee is based on an IEEE 802.15 standard. ZigBee devices often transmit data over longer distances by passing data through intermediate devices to reach more distant ones, creating a mesh network; i.e., a network with no centralized control or high-power transmitter/receiver able to reach all of the networked devices. This paper provides centralized and automated billing system using RFID and ZigBee communication. Each product of shopping mall, super markets will be provided with a RFID tag, to identify its type. Each shopping cart is designed or implemented with a Product Identification Device (PID) that contains microcontroller, LCD, an RFID reader, EEPROM, and ZigBee module. Purchasing product information will be read through a RFID reader on shopping cart, mean while product information will be stored into EEPROM attached to it and EEPROM data will be send to Central Billing System through ZigBee module. The central billing system gets the cart information and EEPROM data, it access the product database and calculates the total amount of purchasing for that particular cart. Main aim of this paper was to provide an automatic billing to avoid queue in malls and super markets.

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2.7 Survey of An Automatic Supervisory Control System Based on Real-Time Embedded Technology and GSM or GPRS Network

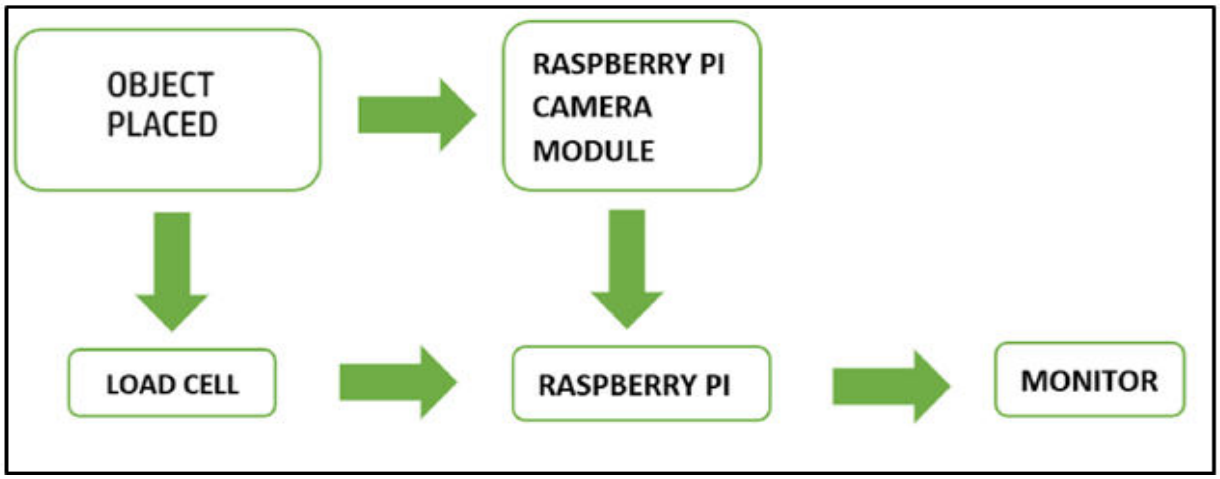
An automatic supervisory control system of power system based on GSM/GPRS Network is presented and designed. This system adopts multi-communication medium, the advance wireless communication is included, such as GSM and GPRS. The system not only reduces the labor cost and increases information reading accuracy, but also make utilities to provide accuracy load parameters and billing data to advise customs. The distributed structure of the system makes extension possible. The applications in several media utilities showed its efficiency.

2.8 Survey of Automated Household Water Supply Monitoring & Billing System

The paper describes our research in household water supply monitoring & billing. Arduino mega 2560 was utilized in this project along with double relay for automation of the switching feature and water level sensors and water flow sensors was used to detect the level and the amount of water used respectively. The feature of this project is automatic switching of the DC water motor based on the level of water present in reservoir along with display of the amount of water used in each block. For the display, an LCD Alphanumeric display was used. We have also included a set capacity of usage for each floor and billing according to usage.

- Raspberry Pi as a main controller with has been connected to the Load cell, Led, Camera module and API.
- The customer places the product on the load cell and the camera recognizes the product. This data is sent to the UI screen by using RESTAPI. Rest API helps to send data to the main screen where customers can see their product. In the main screen we have the home page and checkout page.
- Home page shows the product items and the details to the customers and Checkout page show the QR code, which helps the customer to pay for there product and checkout the screen. If customer wants to add more products they can just add the items and in the screen we can get the data of that products.
- After complete process of Checkout a success page is show up to screen, which said that successfully pay.

III. PROPOSED METHODOLOGY



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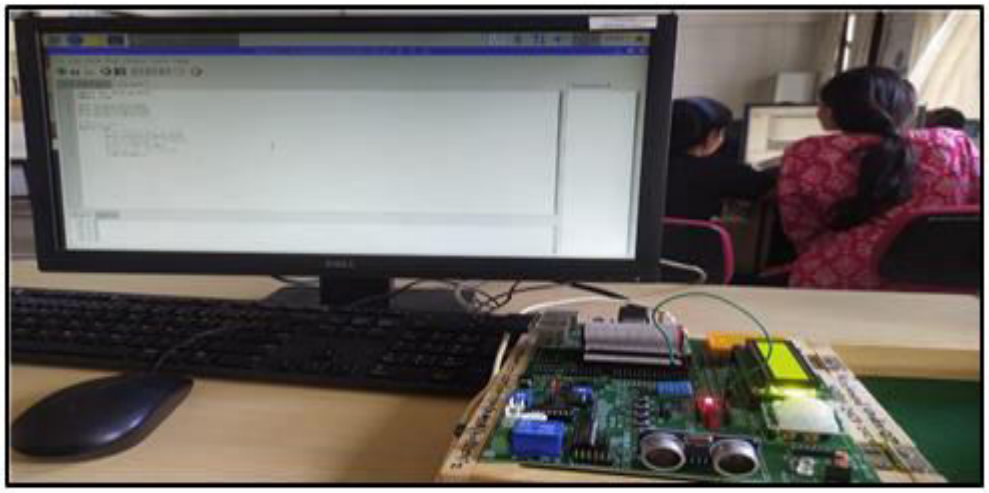
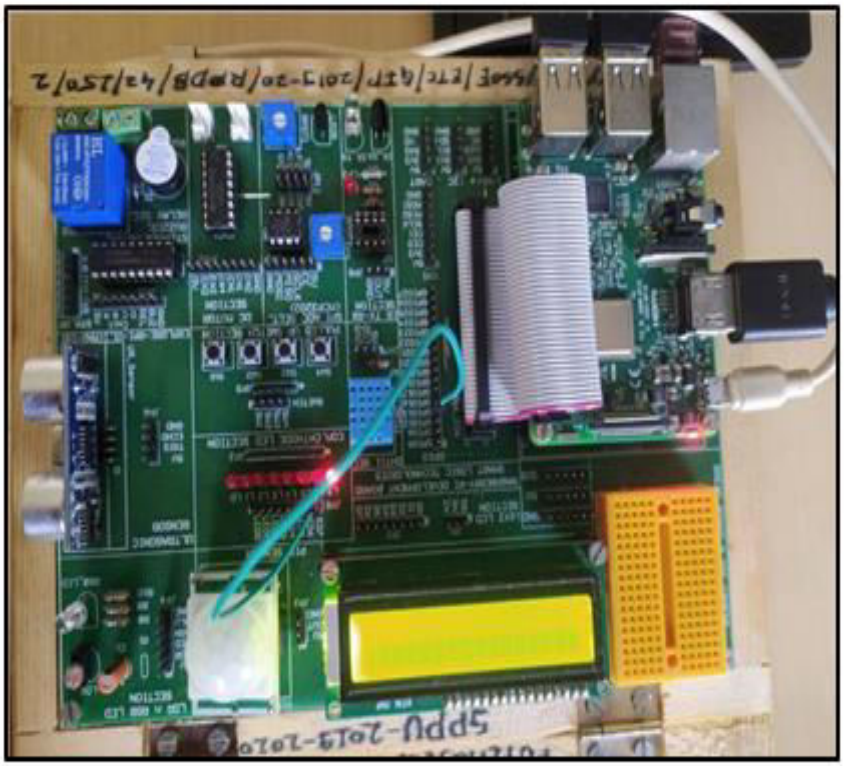
IV. RESULTS



4.1.1 Interfacing of Rasberry pi with led



4.1.2

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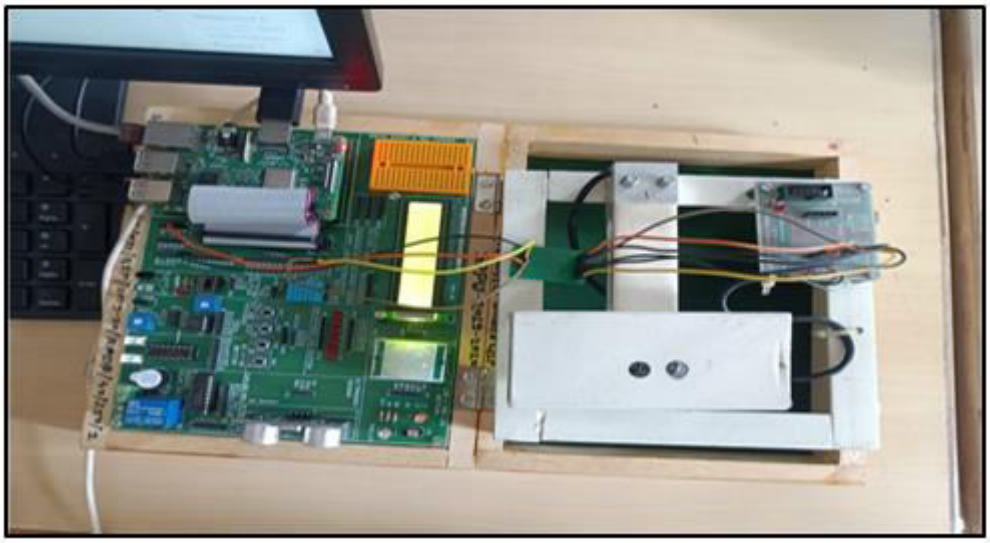
4.2.1 Interfacing of raspberry pi load cell



4.2.2

V. CONCLUSION

The proposed work namely "Automatic Billing System" started with the need of a billing system for an conclusion, the use of artificial intelligence (AI) and computer vision in the retail industry has the potential to significantly improve the billing process, leading to increased efficiency, accuracy, and customer satisfaction. By leveraging deep learning architectures for object detection and image processing, we can automate the identification of products and generate bills in real-time. Additionally, by using machine learning algorithms, we can optimize pricing strategies, reduce inventory costs, and personalize promotions based on customer behavior and preferences

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