



Enhanced User Voice Control Ticket Vending Machine Using Raspberry Pi

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Abstract - To provide a more accessible and user-friendly experience to purchase ticket, the ticket vending machine with voice control can also help reduce transaction times. With the use of voice commands, users can quickly navigate through the interface and complete their transactions, saving time and improving the overall efficiency of public transportation. Moreover, the ticket vending machine with voice control can cater to a wider audience, including individuals with disabilities or language barriers. By providing a spoken interface, the machine can accommodate users who may struggle with reading, writing, or navigating traditional touchscreens. Additionally, the voice assist feature can provide instructions in multiple languages, making it easier for non-native speakers to use public transportation. To ensure the security of transactions, the ticket vending machine with voice control will incorporate authentication methods, such as biometric identification or PIN codes. This will help prevent unauthorized use of the machine and protect users' personal and financial information. Overall, the ticket vending machine with voice control has the potential to revolutionize public transportation by providing a more accessible, user-friendly, and efficient experience. By incorporating the latest technological advancements, this machine can cater to a wider audience and encourage more people to use public transportation, leading to a reduction in traffic congestion and environmental pollution.

Keywords - Raspberry pi, Microphone, Speaker, display, Mini WIFI Dongle

1. INTRODUCTION

The enhanced user voice control ticket vending machine, built with a Raspberry Pi, offers a convenient and user-friendly experience for purchasing tickets. With its built-in microphone, speaker, and screen, users can interact with the machine through voice commands and receive audio feedback from the machine. This eliminates the need for complex button presses or touch screen navigation, making it a great solution for individuals with disabilities or language barriers. The software used in the ticket vending machine provides a simple and easy-to-use interface that guides users through the ticket purchasing process. The

machine provides line-by-line instructions that guide users through each step, making the process of purchasing a ticket quick and easy. The voice assist feature ensures that users have a seamless and hassle-free experience, regardless of their level of familiarity with technology or the ticket purchasing process.

Moreover, the ticket vending machine with voice control offers added convenience and accessibility by providing a contactless payment option. With the previous COVID-19 pandemic, contactless payment options have become increasingly important to ensure the safety of both users and operators. This feature allows users to purchase their tickets without the need to physically interact with the machine or any payment devices, reducing the risk of transmission of viruses or bacteria. Furthermore, the ticket vending machine can be customized to cater to different types of transportation or venues, such as buses, trains, cinemas, and theaters. This versatility makes it an ideal solution for various industries and public transportation systems. The machine can also be programmed to accept various forms of payment, including cash, credit cards, and mobile payments, making it a flexible solution for different user preferences. Another significant advantage of the ticket vending machine with voice control is its ability to improve efficiency and reduce waiting times. By eliminating the need for manual input or navigation, transactions can be completed more quickly, reducing queues and wait times at ticket counters. Additionally, the ticket vending machine with voice control can provide valuable data insights to operators. By collecting and analyzing user data, operators can gain insights into user behavior, preferences, and trends. This can help operators make data-driven decisions to improve the overall user experience and optimize their operations.

The enhanced user voice control ticket vending machine with Raspberry Pi technology offers a range of benefits for both users and operators. Its versatility,

customization options, and contactless payment features make it a convenient and safe solution for purchasing tickets, while its ability to provide valuable data insights can help operators optimize their operations. With its user-friendly interface and step-by-step voice assist feature, the ticket vending machine with voice control is a great solution for making public transportation more accessible, efficient, and user-friendly. For now, we created a prototype for Bus Ticket Vending Machine.

2. RELATED WORKS

Nowadays, there are many things required Ticket to access everything. To purchase ticket, it requires human or vending machine to purchase ticket. Where some has complex methods to purchase ticket such as ticket vending device in Railways.

The research paper titled "Embedded System Based Automatic Ticket Vending Machine for Modern Transport System" proposes an automated solution to the traditional paper ticketing system in public transportation. The system employs RFID and Zigbee techniques to ensure a convenient and secure transaction process. The ticket vending machine operates with a smart card that contains all the user's details, including bank account information, and displays the availability of buses for all destinations. The user can select their destination by pressing the buttons on the machine, and the availability of buses along with the time is displayed. Once the user confirms their selection, they can receive their tickets by using the smart card and RFID technique. The system is also equipped with an alcohol sensor that detects if a person is not permitted to board the bus. A voice GPS system is installed inside the bus to guide passengers on the route, and the display shows the route map. The system aims to minimize the need for manpower in buses and ticket counters, predetermine bus routes accurately, provide a safe and disturbance-free journey, and enable easy and efficient system-based bookings. The proposed solution has the potential to revolutionize public transportation and improve the overall user experience.

The Automatic Public Transport Ticketing System is a project that aims to streamline public transportation by implementing an automated ticketing system. This project was developed by Shanthi N and Sasikala A in 2020. The system is designed to reduce the burden of manual ticketing by enabling passengers to purchase tickets through an automated process. The system uses various technologies such as RFID and GPS to ensure that the process is accurate and efficient. The system is user-friendly and straightforward. Passengers can purchase their tickets using a mobile app, which is available for both Android and iOS platforms. The app provides real-time information about the availability of buses and trains, as well as their arrival and departure times. The app also provides the option of selecting the preferred mode of transport, allowing passengers to plan their travel according to their

convenience. The Automatic Public Transport Ticketing System has several advantages over traditional manual ticketing systems. The system reduces the amount of time and effort required to purchase a ticket, as well as the possibility of errors in manual ticketing. The system also ensures that the fare charged is accurate and fair, eliminating the possibility of overcharging. Moreover, the system is environmentally friendly, as it eliminates the need for paper tickets.

The Automatic Ticket Validation System for Indian Railways is a proposed system that aims to streamline the ticket validation process and reduce the occurrence of fraud in the railway industry. The proposed system would utilize advanced technologies such as Radio-Frequency Identification (RFID) and Global Positioning System (GPS) to track and validate tickets in real-time. Each passenger would be assigned a unique RFID tag embedded in their ticket, which would be scanned at various points throughout their journey to ensure its validity. Additionally, the system would use GPS to track the location of the train and provide passengers with up-to-date information on their journey, including expected arrival times and delays. The system would also provide real-time data to railway authorities, enabling them to make informed decisions regarding scheduling and maintenance. Overall, the Automatic Ticket Validation System has the potential to significantly improve the efficiency and reliability of the Indian railway system, reducing instances of fraud and enhancing the overall passenger experience. However, its successful implementation would require significant investment in infrastructure and training, as well as cooperation and support from all stakeholders involved in the railway industry.

The RFID Automatic Bus Ticketing System is an innovative solution that makes the ticketing process on buses faster, more efficient, and more accurate. This system uses Radio Frequency Identification (RFID) technology to automatically deduct the fare from passengers' RFID cards when they board the bus. The system consists of an RFID reader installed at the entrance of the bus and an RFID card for each passenger. The reader scans the RFID card as the passenger boards the bus, and the fare is automatically deducted from the card's balance. This eliminates the need for manual ticketing and reduces the chances of errors or fraud. The RFID Automatic Bus Ticketing System also provides several benefits for bus operators and passengers. It reduces the time needed for ticketing, which can help buses run on time and reduce delays. It also eliminates the need for cash handling, which can increase safety and reduce the risk of theft. Passengers benefit from the convenience of not having to carry cash or wait in line to purchase a ticket. Overall, the RFID Automatic Bus Ticketing System is a modern solution that improves the efficiency and accuracy of the ticketing process on buses. It provides a seamless

experience for passengers and can help bus operators improve their operations while reducing costs.

3. METHODOLOGIES

The Proposed system reduce the cost of initialization of Hardware and Software. This machine assists the blind people to purchase the ticket through voice assist. The machine should be implemented in the bus stops/railway stations/theatre entrance. It reduces the ticket purchasing time and it makes the ticket purchasing easier. This machine will be ideal, once user need to purchase the ticket the user wake the device by saying “Hello Jarvis” or “Hello Computer”

A. Voice Based Ticket Vending Machine

Recent technological improvements have resulted in great innovations in many domains for public services and community transportation. This machine helps customers to purchase ticket through the voice without any physical contact

B. Availability

The ticket will be generated in the app and the ticket will be available for some period of time only.

4. SYSTEM ARCHITECTURE DIAGRAM

In this paper, we are going to generate a QR Code for payment to generate a ticket in the application. Through this the user can get a QR code for payment once the process of choosing a destination and seat count for the ticket. The user can scan the code to pay the money and generate a ticket in mobile app is shown in Figure 1.

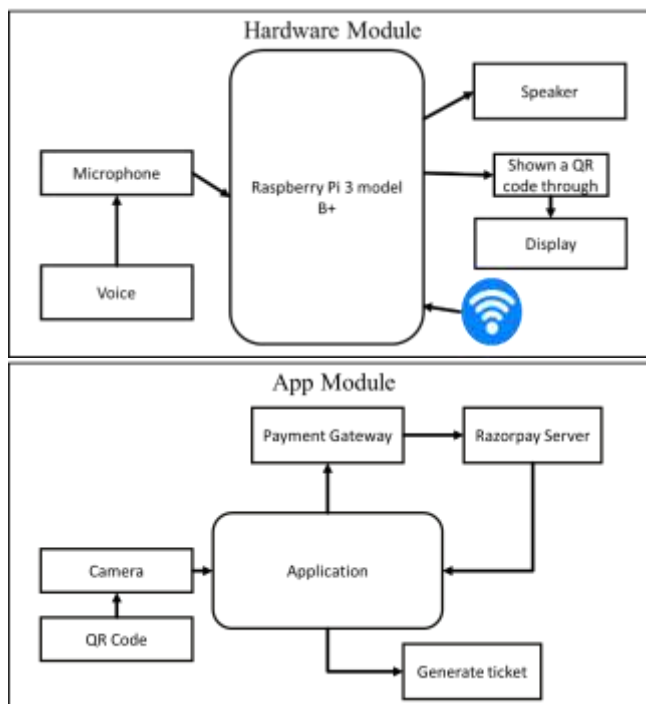


Figure 1. Hardware and App Module

A. APP MODULE:

App module is used camera to scan the QR Code and move to payment screen the payment status will be check through the payment gateway in the razorpay server which is used as a payment between user and a person who place the machine.

B. APPLICATION:

The application needed to login first and it moves to next screen which shows Scanner options after clicked scanning the camera will be opened and once QR Code is detected it redirect to browser for payment and app redirect to payment statuses check screen.

Once payment is completed there will be option shown as generate ticket button once the button is clicked the ticket information will be retrieved from the QR Code and ticket will be generated. Those information’s are stored in data base which is used for future reference.

The information of ticket with payment id is stored in the MySQL database for further uses. The information stored in the database are form, to, seat count, ticket price, validity from and to.

C. HARDWARE MODULE:

To get the voice command of the user here microphone is used. Microphone recognize the speech/voice of the user and transfer the voice command into text using speech recognition module. Those commands are processed and reply by voice through the speaker, once process is completed QR Code will be generated for the payment and shown through the display.

5. DESIGN AND IMPLEMENTATION

Start: The machine is in the ideal state until user request to use the machine.

Wake the system: User request to wake the system by saying the wake word (“Hello Computer”).

Conversation: After wake the machine from here on wards conversations starts. The user can now communicate with the machine and book their ticket using voice command and with help of machine assistance.

QR code: The machine generates QR code according to your destination and seat count.

Scanner: The QR code only used to by our application to scan and pay the money and generate a ticket.

Stop: Once the ticket has been generated then use the ticket for further uses.

6. TECHNOLOGY STACK

For implementation purpose of the system, we used different hardware components. The major and important components are: -

A. RASPBERRY PI 3 B+

The Raspberry Pi 3 Model B+ is widely used in various projects and applications, including home automation, robotics,

media centers, retro gaming consoles, and educational purposes. It supports multiple operating systems, including Raspbian (the official Raspberry Pi OS), Ubuntu, and many others.

B. MICROPHONE

To use a microphone with the Raspberry Pi 3 Model B+ for a project, USB microphones are convenient and easy to use with the Pi 3 B+ as they provide good audio quality and are readily available in the market. Once connected, you can configure the Raspberry Pi's audio settings to recognize the USB microphone as the default input device. This allows you to capture audio and integrate it into your project, whether it's voice commands for a voice-controlled assistant, audio recording, or any other application that requires audio input. Make sure to check the compatibility of the USB microphone with the Raspberry Pi and consider any additional drivers or configurations that may be required based on the specific microphone model you choose.

C. MINI USB WIFI DONGLE

We utilized a mini-USB Wi-Fi dongle to provide wireless connectivity to the Raspberry Pi 3 Model B+. The selected dongle, specifically designed for Raspberry Pi compatibility, offered a compact form factor while delivering reliable Wi-Fi capabilities. With support for the IEEE 802.11n wireless standard, the dongle facilitated seamless communication between the Raspberry Pi and our network infrastructure. Its compact design allowed for easy integration into our project, minimizing space requirements. The dongle was connected to one of the available USB ports on the Raspberry Pi, enabling wireless data transfer and network connectivity essential for our research.

D. RPi LCD (B)

The RPi LCD (B) is a high-quality LCD display designed specifically for the Raspberry Pi 3 Model B+. It is an ideal choice for projects requiring a compact and reliable display solution. The LCD features a 3.5-inch diagonal screen with a resolution of 320x480 pixels, providing clear and crisp visuals. It connects to the Raspberry Pi via the GPIO interface, eliminating the need for additional cables or connectors. The display module integrates a resistive touch panel, enabling user interaction directly on the screen. It is equipped with an onboard driver and supports a wide range of operating systems, including Raspbian, Ubuntu, and others. The RPi LCD (B) is widely used in various applications, such as embedded systems, portable devices, and educational projects, offering a convenient and cost-effective display solution for the Raspberry Pi 3 Model B+.

E. SPEAKER

When choosing a Bluetooth speaker for the Raspberry Pi 3 Model B+, it is important to consider compatibility, audio quality, and ease of integration. One recommended option is the Anker Sound Core Bluetooth Speaker. This portable speaker offers a combination of excellent audio performance, compact

size, and Bluetooth compatibility, making it an ideal choice for integration with the Raspberry Pi 3 Model B+. It features Bluetooth 4.0 technology, ensuring seamless wireless connectivity with the Raspberry Pi. The speaker delivers impressive sound quality, with rich bass and clear treble, enhancing the audio experience for various applications. Additionally, it has a built-in rechargeable battery, allowing for wireless operation, and offers a range of up to 66 feet, providing flexibility in placement within a project setup. Its compact and portable design makes it suitable for a wide range of projects, including those involving audio streaming, home automation, or multimedia applications.

7. CONCLUSION

The enhanced user voice control ticket vending machine with Raspberry Pi technology is a convenient and user-friendly solution for purchasing tickets. With its built-in microphone, speaker, and screen, users can interact with the machine through voice commands, eliminating the need for complex button presses or touch screen navigation. The machine provides line-by-line instructions that guide users through each step, making the process of purchasing a ticket quick and easy. It also offers a contactless payment option, ensuring safety during the pandemic and beyond. The ticket vending machine with voice control can be customized for different types of transportation or venues, and programmed to accept various forms of payment, including cash, credit cards, and mobile payments. It is a flexible solution for different user preferences. The machine's ability to collect user data provides valuable insights for operators to improve their operations and optimize the user experience, reducing waiting times and improving efficiency

8. FUTURE SCOPE

In future we add some more additional features to improve the UI(user Interfaces). We add multi language support, We develop application for both android and ios. Add features for ticket generated in application will be store in the storage of the application in the platform

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