PORTABLE HOTEL MANAGEMENT SYSTEM USING VIRTUAL REALITY

Submitted in partial fulfillment of the requirements for the award of a Bachelor of Engineering Degree in Computer Science and Engineering

By

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **RUBASRI N (39110861) and SOUNDARYA RAGHU (39110960)** who carried out the project entitled "**PORTABLE HOTEL MANAGEMENT SYSTEM USING VIRTUAL REALITY"** under my supervision from October 2022 to March 2023.

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I, **RUBASRI N (Reg.No- 39110861),** hereby declare that the Project Phase-2 Report entitled **"PORTABLE HOTEL MANAGEMENT SYSTEM USING VIRTUAL REALITY"** done by me under the guidance of **Dr. M. Maheswari, M.E.,Ph.D** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

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PLACE: Chennai **SIGNATURE OF THE CANDIDATE**

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ABSTRACT

A portable hotel management system is a software solution that can be used to manage various aspects of a hotel's operations. This type of system is designed to be portable, which means that it can be accessed from anywhere using a mobile device such as a tablet or smartphone.

Some of the key features of a portable hotel management system may include:

Reservations Management: This feature allows hotel staff to manage room reservations, check availability, and book rooms for guests.

Inventory Management: This feature helps to track inventory levels of hotel supplies, such as linens, towels, and toiletries.

Accounting and Billing: This feature enables hotel staff to manage billing and payments, generate invoices, and track expenses.

Reporting and Analytics: This feature provides hotel managers with detailed reports and analytics on various aspects of the hotel's operations, including occupancy rates, revenue, and expenses.

A portable hotel management system can provide a number of benefits for hotel owners and staff, including increased efficiency, improved guest experiences, and better management of hotel operations. By using a portable hotel management system, hotel staff can easily access critical information and manage hotel operations from anywhere, at any time.

Virtual reality (VR) is a computer-generated environment that simulates a three-dimensional world that can be experienced and interacted with by a person through the use of special equipment, such as a VR headset or a haptic feedback suit. The technology creates a sense of presence, allowing the user to feel as if they are actually inside the virtual environment.

Virtual reality technology is used in a wide range of applications, including entertainment, gaming, education, healthcare, and training. Here are some examples:

Entertainment and gaming: Virtual reality technology is used to create immersive gaming experiences, allowing players to feel as if they are inside the game world.

Education: Virtual reality can be used in education to create interactive learning experiences that are more engaging and memorable than traditional methods.

Healthcare: Virtual reality is used in healthcare to treat patients with conditions such as anxiety disorders, phobias, and post-traumatic stress disorder (PTSD).

Training: Virtual reality is used in various industries to train employees in a safe and controlled environment. For example, pilots can practice flying in a virtual environment before taking to the skies, and soldiers can train in virtual combat scenarios.

To experience virtual reality, you need a VR headset, which usually consists of a display screen or screens and sensors that track the user's movements. The headset is connected to a computer or a mobile device that generates the virtual environment. Additionally, some VR systems incorporate hand-held controllers or haptic feedback suits to enhance the user's experience by providing physical sensations, such as touch or pressure.

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CHAPTER 1

1.1 INTRODUCTION

Virtual reality (VR) can be an innovative tool for hotel management. Here are some ways in which VR can be utilized in hotel management:

Virtual tours: With VR, hotels can offer virtual tours of their facilities, including guest rooms, event spaces, restaurants, and other amenities. This can help guests to get a better sense of the hotel's offerings before booking a reservation.

Training and development: VR can be used to train and develop hotel staff on various aspects of their roles, including customer service, safety procedures, and technical skills. This can be a more engaging and effective training method than traditional classroom or online training.

Design and planning: VR can be used to design and plan hotel renovations or new hotel construction. By using VR, hotel designers and planners can create immersive 3D models of hotel spaces, allowing stakeholders to visualize and interact with the design before construction begins.

Marketing and advertising: VR can be used in hotel marketing and advertising campaigns to create immersive experiences that showcase the hotel's offerings. For example, a hotel could create a VR experience that allows potential guests to "visit" the hotel and explore its amenities and surroundings.

Guest experience: VR can be used to enhance the guest experience in various ways, such as offering virtual concierge services or providing in-room VR entertainment.

Overall, VR can be a powerful tool for hotel management, offering new ways to engage guests, train staff, and improve hotel operations.

A portable hotel management system can provide a number of benefits for hotel

owners and staff, including increased efficiency, improved guest experiences, and better management of hotel operations. By using a portable hotel management system, hotel staff can easily access critical information and manage hotel operations from anywhere, at any time.

1.2 PROBLEM STATEMENT

The problem statement for hotel management can vary depending on the specific challenges that a hotel is facing. Here are some examples of problem statements that a hotel may face:

Low occupancy rates: The hotel is experiencing low occupancy rates, which is resulting in reduced revenue and profitability.

Poor guest satisfaction: The hotel is receiving negative feedback from guests, indicating that they are dissatisfied with their stay and the level of service provided by the hotel.

Inefficient operations: The hotel's operations are inefficient, leading to increased costs, longer wait times for guests, and reduced staff productivity.

Lack of innovation: The hotel is not keeping up with industry trends or implementing new technologies, resulting in a lack of differentiation from competitors and decreased guest appeal.

Staff turnover: The hotel is experiencing high staff turnover rates, which can be costly in terms of recruitment and training and can also impact guest satisfaction.

Sustainability and environmental impact: The hotel is not implementing sustainable practices or reducing its environmental impact, which can lead to negative perceptions from guests and stakeholders and can also impact the hotel's bottom line.

By identifying the specific problem statement that a hotel is facing, hotel

management can develop targeted strategies and solutions to address these challenges and improve overall hotel performance.

1.3 OBJECTIVES

The objective of a portable hotel management system is to provide hotel staff with an efficient and effective way to manage hotel operations from anywhere using mobile devices. Here are some specific objectives of a portable hotel management system:

Streamline hotel operations: A portable hotel management system should help to automate and streamline various aspects of hotel operations, including reservations management, inventory management, accounting and billing, and reporting and analytics.

Improve guest experience: By using a portable hotel management system, hotel staff can provide better service to guests, including faster check-ins and check-outs, personalized experiences, and efficient handling of guest requests and inquiries.

Increase efficiency and productivity: A portable hotel management system should help to increase staff productivity by providing easy access to critical information and tools, allowing staff to manage hotel operations quickly and efficiently.

Enhance decision-making: By providing real-time data and analytics on hotel operations, a portable hotel management system can help hotel managers make better decisions, improve revenue management, and optimize hotel performance.

Ensure data security: A portable hotel management system should be designed with strong security measures to protect sensitive data, including guest information, financial data, and other confidential information.

Overall, the objective of a portable hotel management system is to help hotel staff manage hotel operations more efficiently and effectively, leading to improved guest experiences, increased revenue, and better overall hotel performance.

1.4 SCOPE

The scope for portable hotel management using virtual reality (VR) is significant, as it can provide a number of benefits for both hotel staff and guests. Here are some examples of how VR can be used in a portable hotel management system:

Virtual tours: With a portable hotel management system that includes VR, guests can take virtual tours of the hotel facilities using their mobile devices. This can help guests to better understand the layout and amenities of the hotel and make more informed decisions when booking reservations.

Remote training and development: With VR, hotel staff can receive training and development remotely, using their mobile devices. This can be particularly useful for staff who are located off-site or who work in different time zones.

Design and planning: VR can be used to create immersive 3D models of hotel spaces, allowing stakeholders to visualize and interact with the design before construction begins. This can help to improve the planning and design process, leading to better hotel layouts and amenities.

Guest experience: VR can be used to enhance the guest experience in various ways, such as offering virtual concierge services or providing in-room VR entertainment. This can help to differentiate the hotel from competitors and provide guests with unique and memorable experiences.

Marketing and advertising: VR can be used in hotel marketing and advertising campaigns to create immersive experiences that showcase the hotel's offerings. For example, a hotel could create a VR experience that allows potential guests to "visit" the hotel and explore its amenities and surroundings.

Overall, the scope for portable hotel management using VR is wide-ranging and can provide numerous benefits for both hotels and guests. By integrating VR into a portable hotel management system, hotels can enhance their operations, improve

guest experiences, and stay ahead of the competition.

Portable restaurant management refers to managing a restaurant using portable devices such as tablets or smartphones. This allows managers and staff to have access to information and data related to the restaurant's operations from anywhere at any time.

Some benefits of using portable restaurant management include:

Increased efficiency: Portable devices enable staff to access information quickly and easily, reducing the time required to perform tasks and increasing overall efficiency.

Better customer service: Staff can access customer data, preferences, and history from anywhere in the restaurant, allowing for more personalized and efficient service.

Real-time data: Managers can access real-time data on sales, inventory, and employee performance, allowing for more informed decision-making and faster response times.

Remote management: With portable devices, managers can manage their restaurant operations remotely, allowing for greater flexibility and work-life balance.

To implement portable restaurant management, you will need to invest in portable devices, such as tablets or smartphones, and a cloud-based restaurant management system that can be accessed from anywhere. You will also need to train your staff on how to use the devices and the management system effectively.

CHAPTER 2

2.1 LITERATURE SURVEY

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2.2 DRAWBACKS IN THE EXISTING SYSTEM

While there are many potential benefits to using VR in a portable hotel management system, there are also some drawbacks to consider. Here are some of the main drawbacks:

Cost: VR technology can be expensive to implement, requiring specialized hardware and software, as well as the cost of developing and maintaining VR applications.

Training: Staff may require specialized training to use the VR technology effectively, which can be time-consuming and costly.

Accessibility: Not all guests may have access to the necessary hardware to use the VR applications, which could limit their ability to take advantage of these features.

Technical issues: As with any technology, there may be technical issues that arise with the VR hardware or software, which could impact the guest experience or cause delays in hotel operations.

Data privacy and security: The use of VR in a portable hotel management system could raise concerns around data privacy and security, as sensitive data such as guest information and financial data could be stored and transmitted through the VR applications.

Integration with existing systems: Integrating VR technology with existing hotel management systems may be complex and require significant customization, which could result in additional costs and time.

Overall, while VR can offer many benefits for portable hotel management, it's important to carefully consider the drawbacks and ensure that the technology is implemented in a way that is effective and secure for both staff and guests.

CHAPTER 3

3.1 ANALYSIS OF THE PROJECT

A portable hotel management system can offer numerous benefits for hotels, including increased efficiency, improved guest experiences, and better decision-making. Here are some key aspects to consider when analyzing a portable hotel management system:

- Ease of use: One of the most important factors to consider is the ease of use of the portable hotel management system. It should be intuitive and user-friendly, with a simple interface that can be easily accessed from mobile devices.

- Functionality: The system should offer a comprehensive range of features, including reservations management, inventory management, accounting and billing, reporting and analytics, and other functions that are critical to hotel operations.

- Integration: The system should be able to integrate with other hotel systems and software, such as property management systems, customer relationship management systems, and accounting software.

- Security: The system should be designed with strong security measures to protect sensitive data, such as guest information and financial data.

- Flexibility: The system should be flexible and customizable, allowing hotels to adapt it to their specific needs and requirements.

- Cost-effectiveness: The system should provide good value for money, with a pricing model that is transparent and affordable for hotels of all sizes.

- Support and training: The system should offer comprehensive support and training for hotel staff, including user guides, tutorials, and customer service.

Overall, a portable hotel management system can be a valuable tool for improving hotel operations and guest experiences. When analyzing such a system, it is important to consider factors such as ease of use, functionality, integration, security, flexibility, cost-effectiveness, and support and training. By carefully evaluating these factors, hotels can select a portable hotel management system that meets their specific needs and requirements.

VR can also be used in restaurant management to improve operations and enhance guest experiences. Here are some potential use cases for VR in restaurant management:

- Staff training: VR can be used to simulate real-life scenarios and provide a safe environment for staff training. Staff can learn how to handle challenging situations, such as dealing with difficult customers or managing busy service periods.

- Menu design: VR can be used to create immersive 3D models of food items, allowing chefs and managers to see and manipulate them in a virtual environment. This can help with menu planning and design, as well as food presentation.

- Restaurant design: VR can be used to create virtual mock-ups of restaurant spaces, allowing owners and designers to experiment with different layouts, lighting, and decor.

- Guest experiences: VR can be used to enhance guest experiences by providing immersive entertainment or educational content during their visit. For example, restaurants could offer VR experiences that showcase the history of a particular cuisine or the sourcing of specific ingredients.

- Remote collaboration: VR can be used to facilitate remote collaboration between staff members and suppliers. Managers can conduct virtual meetings with suppliers or team members who are located in different regions

or countries.

- Health and safety training: VR can be used to provide health and safety training for staff, such as proper food handling and cleaning procedures. This can help to reduce the risk of foodborne illness and improve overall hygiene standards in the restaurant.

Overall, VR can offer many benefits for restaurant management, including improved training, menu design, restaurant design, guest experiences, remote collaboration, and health and safety training. By incorporating VR technology into their operations, restaurants can stay competitive and provide memorable experiences for their guests.

CHAPTER 4

4.1 PROPOSED METHODOLOGY

The transmitting module consists of thefollowing parts:

- Virtual Reality sensing system
- Laptop
- Zigbee

The camera attached to the VR device, which is linked to the laptop, detects when the Virtual System button is blocked. The laptop's visual basic application sends the taken picture to the Zigbee module's receiving portion after comparing it to the standard image.

The receiving section consists of thefollowing parts:

- Zigbee Transceiver
- PICI6F877A Microcontroller
- LCD module
- Solid State Relay
- Driver Module
- Robot

In the receiving section, the data from the Zigbee is fed to the microcontroller which sends the command signal to the solid-state relay and the driver module to drive any device and a motor respectively.

- The food menu pictures are projected in a free space
- That VR module is connected to the pc which consists of image extraction software
- Whenever we place an obstacle on the food menu picture on the surface of the free space.
- This software will detect the image and pass that food menu to the robotic module through wireless.
- Then the menu will be displayedon the LCD module.

At the same time, it will run and travel to the selected table.

1. **ZIGBEE TRANSCIEVER:** A ZigBee transceiver is a device that is used to communicate with other ZigBee-enabled devices in a wireless network. ZigBee is a low-power, low-data rate wireless protocol that is often used for IoT (Internet of Things) applications, such as smart homes, industrial automation, and healthcare monitoring.

   A ZigBee transceiver consists of a radio transceiver, a microcontroller, and a ZigBee protocol stack. The radio transceiver is used to transmit and receive data wirelessly, while the microcontroller manages the device's operation and communication with other devices in the network. The ZigBee protocol stack is a set of software layers that enable the device to communicate using the ZigBee protocol.

Figure 1-zigbee

Some common features of ZigBee transceivers include:

- Low power consumption: ZigBee transceivers are designed to operate on low power, making them ideal for battery-powered devices.

- Low data rate: ZigBee is a low-data rate protocol, typically used for transmitting small amounts of data over long distances.

- Mesh networking: ZigBee networks use a mesh networking topology, which allows devices to communicate with each other through intermediary devices. This enables larger networks with better coverage and reliability.

- Security: ZigBee transceivers typically support various security features, such as encryption, authentication, and access control, to protect against unauthorized access and data breaches.

- Interoperability: ZigBee is an open standard, which means that devices from different manufacturers can communicate with each other if they use the same ZigBee protocol stack.

While Zigbee has many advantages, it also has some disadvantages. Here are some of the disadvantages of Zigbee:

Limited range: Zigbee has a limited range, typically between 10 to 100 meters, depending on the environment and the number of obstacles in the way. This makes it unsuitable for applications that require long-range communication.

Interference: Zigbee operates on the 2.4 GHz frequency band, which is also used by other wireless technologies, such as Wi-Fi and Bluetooth. This can lead to interference and reduced performance.

Complex network setup: Zigbee networks can be complex to set up, especially for larger networks with multiple devices. This can make it difficult for non-technical users to configure and manage.

Limited bandwidth: Zigbee has a low data rate, typically between 20 kbps to 250 kbps, which makes it unsuitable for applications that require high-bandwidth communication, such as streaming video or audio.

Cost: Zigbee devices can be more expensive than other wireless technologies, such as Bluetooth, which may make it less attractive for cost-sensitive applications.

It's important to consider both the advantages and disadvantages of Zigbee when choosing a wireless communication technology for a specific application.

2. **PICl6F877A Microcontroller:** The PIC16F877A is a popular 8-bit microcontroller manufactured by Microchip Technology. It is based on the PIC architecture, which stands for Peripheral Interface Controller, and is widely used in embedded systems and IoT applications.

Figure 2-PICl6F877A Microcontroller

The PIC16F877A microcontroller has the following features:

- 8-bit architecture: The PIC16F877A is an 8-bit microcontroller, which means it can process data in 8-bit chunks.

- Flash memory: The microcontroller has 14KB of flash memory, which can be programmed and reprogrammed to store the program code.

- RAM memory: The microcontroller has 368 bytes of RAM memory, which is used for storing variables and other data during program execution.

- Peripherals: The PIC16F877A has a wide range of peripherals, including analog-to-digital converters (ADC), timers, UARTs, SPIs, I2C, and PWM modules, which can be used for a variety of applications.

- Low power consumption: The microcontroller is designed to operate on low power, making it suitable for battery-powered devices.

- Operating voltage: The operating voltage range of the PIC16F877A is 2.0V to 5.5V, which makes it compatible with a wide range of power supplies.

- Interrupts: The microcontroller supports hardware and software interrupts, which can be used to trigger specific actions during program execution.

3. **LCD MODULE:** An LCD (Liquid Crystal Display) module is an electronic component that is commonly used to display text and graphics in various electronic devices such as calculators, clocks, and consumer electronics. It consists of a liquid crystal material sandwiched between two glass plates, with a backlight or front light to illuminate the display.

Figure 3-lcd module

LCD modules come in different sizes, from small displays used in handheld devices to large displays used in TVs and computer monitors. They are available in monochrome and color versions and use different types of LCD technologies such as TN (Twisted Nematic), STN (Super Twisted Nematic), and TFT (Thin Film Transistor).

An LCD module typically includes a display controller and a driver circuit to control the display. It can be interfaced with a microcontroller or other digital devices using different communication interfaces such as SPI (Serial Peripheral Interface), I2C (Inter-Integrated Circuit), and parallel interfaces.

LCD modules have several advantages over other display technologies,

including low power consumption, high contrast, and wide viewing angles. They are also relatively inexpensive, making them popular for use in many electronic devices.

Overall, an LCD module is a reliable and versatile display technology that is widely used in various applications, from small handheld devices to large-scale industrial displays.
While LCD modules have many advantages, they also have some disadvantages. Here are some of the disadvantages of LCD modules:

Limited viewing angle: LCD modules have a limited viewing angle, which means that the display may be difficult to read from certain angles. This can be a problem in applications where the display needs to be visible from multiple angles.

Limited color range: LCD modules are typically limited to displaying a few colors, which can make it difficult to create high-quality, vibrant displays. This can be a problem in applications where color accuracy is important.

Slow refresh rate: LCD modules have a slow refresh rate, which means that moving images may appear blurry or distorted. This can be a problem in applications where fast-moving images need to be displayed.

Limited durability: LCD modules are relatively fragile and can be easily damaged if dropped or mishandled. This can be a problem in applications where the display needs to be durable and rugged.

Power consumption: LCD modules can consume a significant amount of power, especially if they are backlit. This can be a problem in applications where power consumption needs to be minimized.

It's important to consider both the advantages and disadvantages of LCD modules when choosing a display technology for a specific application. In some cases, other display technologies, such as OLED or LED displays, may be more

suitable.

4. **SOLID STATE RELAY:** A Solid-State Relay (SSR) is an electronic switching device that is used to control the flow of electrical power without the use of any mechanical parts. It is a type of semiconductor switch that uses an electronic circuit to switch on or off the power supply to the load.

Figure 4-solid state relay

An SSR consists of two main parts: a control circuit and a switching circuit. The control circuit is used to control the switching circuit and is typically driven by a low-power signal such as a DC voltage or a digital signal. The switching circuit is responsible for switching the high-power AC or DC load current.

The switching circuit of an SSR typically consists of a power semiconductor device such as a thyristor or a triac, which can handle high current and voltage levels. When the control circuit sends a signal to the switching circuit, the semiconductor device turns on, allowing the current to flow through the load. When the signal is removed, the semiconductor device turns off, cutting off the power supply to the load.

SSRs have several advantages over traditional mechanical relays, including faster switching times, longer lifespan, and better reliability. They also generate less noise and interference and do not produce any mechanical wear and tear. Additionally, SSRs can switch AC and DC loads, making them suitable for a wide range of applications.

SSRs are commonly used in industrial automation, process control, and power management applications. They are also used in home appliances such as refrigerators, air conditioners, and heating systems, where they help improve energy efficiency and reduce noise.

5. **DRIVER MODULE:** A driver module is an electronic component that is used to interface between a microcontroller or other digital device and a high-power load, such as a motor, LED, or relay. It is used to provide the necessary power and control signals to the load while isolating the low-power signal source from the high-power load.
This type of driver module is used to control the brightness of an LED. It typically includes a power transistor or MOSFET to switch the high current to the LED and a control circuit to receive the brightness signals from the microcontroller.

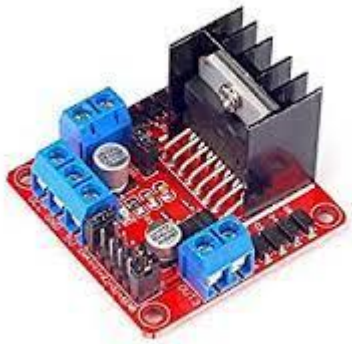

Figure 5-driver module

Driver modules are available in different types, depending on the load requirements and the control signals. Some common types of driver modules include:

- Motor driver module: This type of driver module is used to control the speed and direction of a DC motor. It typically includes a power transistor or MOSFET to switch the high current to the motor and a control circuit to receive the speed and direction signals from the microcontroller.

- LED driver module: This type of driver module is used to control the brightness of an LED. It typically includes a power transistor or MOSFET to switch the high current to the LED and a control circuit to receive the brightness signals from the microcontroller.

- Relay driver module: This type of driver module is used to control the switching of a relay. It typically includes a transistor or MOSFET to switch the high voltage to the relay coil and a control circuit to receive the switch signals from the microcontroller.

- Power supply driver module: This type of driver module is used to control the output voltage and current of a power supply. It typically includes a power transistor or MOSFET to switch the high current to the load and a control circuit to receive the voltage and current signals from the microcontroller.

- Driver modules have several advantages over direct control of the load from the microcontroller, including higher power handling capabilities, better noise immunity, and improved safety. They are widely used in various applications, including robotics, automation, and consumer electronics.

A driver module is a device or component that is used to control or manage another device or component. Here are some advantages of driver modules:

Simplifies design: Driver modules can simplify the design process by providing a pre-built solution for controlling a specific device or component. This can save time and reduce the risk of errors in the design process.

Eases integration: Driver modules can make it easier to integrate different components or devices into a larger system by providing a standard interface for communication and control.

Reduces development time: By providing a pre-built solution, driver modules can reduce the time and effort required to develop custom control circuits or software.

Improves reliability: Driver modules are often designed and tested to meet specific performance and reliability standards, which can improve the overall reliability of the system.

Enhances safety: Driver modules can incorporate safety features, such as fault detection and protection circuits, that can prevent damage to the system or injury to users.

Overall, driver modules can simplify the design, integration, and testing of complex systems by providing a pre-built solution for controlling specific devices or components. This can save time, reduce costs, and improve the overall reliability and safety of the system.

6. **ROBOT:** A robot in VR (virtual reality) refers to a robot that is controlled by a human operator through a virtual reality interface. The VR interface allows the operator to immerse themselves in a virtual environment and control the robot's movements and actions using hand gestures, body movements, or other input devices.

   The use of VR in robot control offers several advantages over traditional control methods, including improved situational awareness, reduced cognitive load, and increased safety. It allows the operator to have a more intuitive and immersive control experience, which can improve the robot's efficiency and effectiveness in completing tasks.

   One example of a VR-controlled robot is a teleoperated robot, which is controlled remotely by a human operator. The operator wears a VR headset and uses a motion controller to move the robot's arms, legs, and other components. The robot's cameras and sensors provide a live feed of the environment to the operator, who can control the robot's movements and actions in real-time.

   Another example of a VR-controlled robot is a collaborative robot, or "cobots", which are designed to work alongside human operators in a shared workspace. The VR interface allows the operator to control the cobot's movements and

actions in a more natural and intuitive way, which can improve collaboration and efficiency in completing tasks.

Overall, the use of VR in robot control offers a promising avenue for improving the performance and capabilities of robots in various applications, from manufacturing and logistics to healthcare and entertainment.

Robots have become increasingly popular in the hotel industry in recent years, with many hotels using robots for tasks such as housekeeping, room service, and concierge services. The use of robots in hotels can offer several benefits, including increased efficiency, improved guest experiences, and reduced labor costs.

One example of a robot used in hotels is the delivery robot, which can be used to deliver room service or other items to guests' rooms. These robots can navigate through the hotel's corridors and elevators, avoiding obstacles and delivering items directly to the guest's door. They can also be programmed to interact with guests, providing information about the hotel and its amenities.

Another example of a robot used in hotels is the cleaning robot, which can be used for housekeeping tasks such as vacuuming and mopping floors. These robots can navigate through the hotel's rooms and hallways, avoiding furniture and other obstacles while cleaning. They can also be programmed to work at night, allowing for more efficient cleaning without disturbing guests.

In addition to delivery and cleaning robots, some hotels are also using robots as concierge services, providing guests with information about the hotel and local recommendations, and other useful information, and can interact with guests through voice commands or touch screens.

Overall, the use of robots in hotels is a growing trend that is expected to continue in the future. While robots cannot replace human staff entirely, they can offer a valuable addition to hotel services, improving efficiency and guest experiences.

4.2 SYSTEM ARCHITECTURE

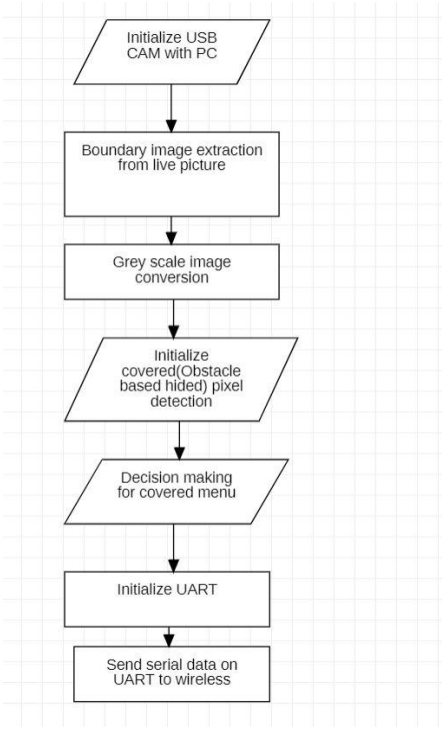

Figure 6-system architecture

Portable restaurant management using VR (virtual reality) is a system that enables restaurant managers to manage their operations remotely through a virtual reality interface. The system consists of a VR headset, a computer, and a set of sensors and cameras that can be placed in the restaurant to capture the environment and the activities of the staff.

The VR interface allows managers to view the restaurant environment in real-time and control various aspects of the restaurant's operations, such as inventory management, menu selection, and staff scheduling. The system can also be used to monitor the activities of the staff, such as food preparation and customer service, and to provide feedback and training to improve performance.

One of the main advantages of portable restaurant management using VR is its flexibility and mobility. Managers can access the system from anywhere, as long as

they have an internet connection and a VR headset, allowing them to monitor and manage multiple restaurants at once. This can be particularly useful for chain restaurants or franchises that have multiple locations.

Another advantage of VR restaurant management is the potential to improve efficiency and reduce costs. By monitoring staff activities and identifying areas for improvement, managers can optimize operations and reduce waste, leading to cost savings and improved profitability.

Overall, portable restaurant management using VR is a promising technology that has the potential to transform the restaurant industry. While it is still a relatively new technology, its potential benefits in terms of efficiency, flexibility, and cost savings make it an attractive option for restaurant managers looking to stay competitive in a rapidly changing industry.

Virtual reality (VR) technology has the potential to transform the restaurant industry in a number of ways. Here are a few examples of how VR is being used in restaurants:

Menu Selection - Some restaurants are using VR to give customers a virtual tour of their menu items. For example, customers can use a VR headset to see 3D images of the dishes, which can help them make more informed decisions about what to order.

- Restaurant Design - VR can also be used to create virtual models of restaurant designs. Restaurant owners and designers can use VR to create 3D models of the restaurant's layout, decor, and lighting, which can help them visualize different design options and make more informed decisions.

- Employee Training - VR can be used to provide realistic training simulations for restaurant employees. For example, chefs can use VR to practice cooking techniques, and servers can use VR to practice customer service skills.

- Customer Experiences - Some restaurants are using VR to enhance the dining experience for customers. For example, customers can use a VR headset to take a virtual tour of the restaurant's kitchen or to see how their food is being prepared.

- Remote Management - Finally, VR can be used to manage restaurants remotely. For example, restaurant managers can use VR to monitor operations at multiple locations or to attend virtual meetings with staff and suppliers.

Overall, VR technology has the potential to revolutionize the restaurant industry by enhancing the customer experience, improving operational efficiency, and providing innovative new ways to design and manage restaurants.
Zigbee technology can be used for restaurant management in various ways. Here are some examples:

- Inventory Management - Zigbee sensors can be placed in food storage areas, walk-in refrigerators, and freezers to monitor the inventory levels in real-time. When the inventory level falls below a certain threshold, the system can alert the manager to order more supplies.

- Temperature Monitoring - Zigbee sensors can be used to monitor the temperature of food items in refrigerators and freezers. If the temperature exceeds a safe range, the system can send an alert to the manager to take corrective action.

- Table Management - Zigbee can be used to track table occupancy in a restaurant. When a customer arrives, a Zigbee sensor can detect their presence and notify the server. This can help improve customer service and reduce wait times.

- Staff Tracking - Zigbee can also be used to track the movement of staff in a restaurant. This can help managers monitor staff performance and identify

areas for improvement.

- Energy Management - Zigbee can be used to monitor energy consumption in a restaurant. By analyzing energy usage patterns, managers can identify areas where energy is being wasted and take steps to reduce energy .

CHAPTER 5

5.1 DEVELOPMENT AND DEPLOYMENT SETUP

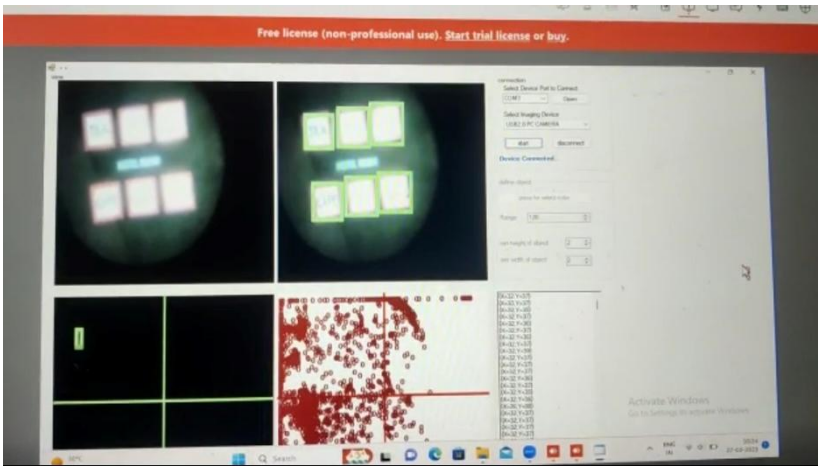

Figure 7-demo1

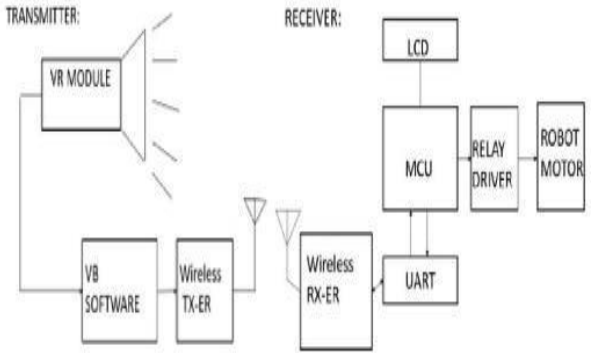

Figure 8-block diagram

Figure 9-lcd monitor

CHAPTER 6

6.1 RESULTS AND DISCUSSIONS

A smart restaurant using VR technology has the potential to provide a number of benefits, such as:

- Enhanced Customer Experience - Customers can use VR technology to explore the restaurant, view the menu, and even see 3D models of food items before they order. This can enhance the overall dining experience and improve customer satisfaction.

- Digital Ordering and Payment - VR technology can be used to enable digital

ordering and payment options for customers. This can help reduce wait times and improve efficiency, especially during peak hours.

- Personalized Marketing and Promotions - VR technology can be used to collect data on customer preferences and behavior, allowing restaurants to create personalized marketing campaigns and promotions that are tailored to each customer's interests.

- Operational Efficiency - Smart restaurants can use VR technology to monitor operations in real-time and identify areas where improvements can be made. For example, they can use data on customer traffic patterns to optimize staffing levels and reduce wait times.

- Remote Management - Smart restaurant owners and managers can use VR technology to monitor operations and manage the restaurant remotely. This can be especially useful for multi-location restaurants, as it can reduce the need for on-site management and improve operational efficiency.

Overall, a smart restaurant using VR technology can help improve the customer experience, increase operational efficiency, and drive growth and profitability.

The future scope for smart restaurants is vast and can involve a number of technologies and advancements. Some potential future developments include:

- Advanced Artificial Intelligence (AI) and Machine Learning (ML) - These technologies can be used to provide more personalized customer experiences and optimize operations. For example, AI can be used to predict customer preferences and suggest menu items or promotions that are tailored to each individual customer.

- Internet of Things (IoT) - IoT can be used to connect various devices in the restaurant, such as kitchen appliances and ordering systems. This can help improve communication and efficiency, reduce waste, and optimize

operations.

- Augmented Reality (AR) - AR can be used to enhance the customer experience by providing interactive 3D visuals of menu items or offering immersive dining experiences.

- Robotics - Robotics can be used to automate various tasks in the restaurant, such as food preparation and delivery, cleaning, and inventory management. This can help improve efficiency, reduce costs, and increase customer satisfaction.

- Voice-Activated Systems - Voice-activated systems can be used to provide customers with a more convenient ordering and payment experience. They can also be used to improve communication between staff members, reduce errors, and increase efficiency.

Overall, the future scope for smart restaurants is likely to involve a combination of these and other technologies, all aimed at improving the customer experience, increasing efficiency, and driving growth and profitability.

CHAPTER 7

7.1 CONCLUSION

Portable restaurant management using VR (virtual reality) is a system that enables restaurant managers to manage their operations remotely through a virtual reality interface. The system consists of a VR headset, a computer, and a set of sensors and cameras that can be placed in the restaurant to capture the environment and the activities of the staff.

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monitor the activities of the staff, such as food preparation and customer service, and to provide feedback and training to improve performance.

One of the main advantages of portable restaurant management using VR is its flexibility and mobility. Managers can access the system from anywhere, as long as they have an internet connection and a VR headset, allowing them to monitor and manage multiple restaurants at once. This can be particularly useful for chain restaurants or franchises that have multiple locations.

Another advantage of VR restaurant management is the potential to improve efficiency and reduce costs. By monitoring staff activities and identifying areas for improvement, managers can optimize operations and reduce waste, leading to cost savings and improved profitability.

Overall, portable restaurant management using VR is a promising technology that has the potential to transform the restaurant industry. While it is still a relatively new technology, its potential benefits in terms of efficiency, flexibility, and cost savings make it an attractive option for restaurant managers looking to stay competitive in a rapidly changing industry.

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SCREENSHOTS

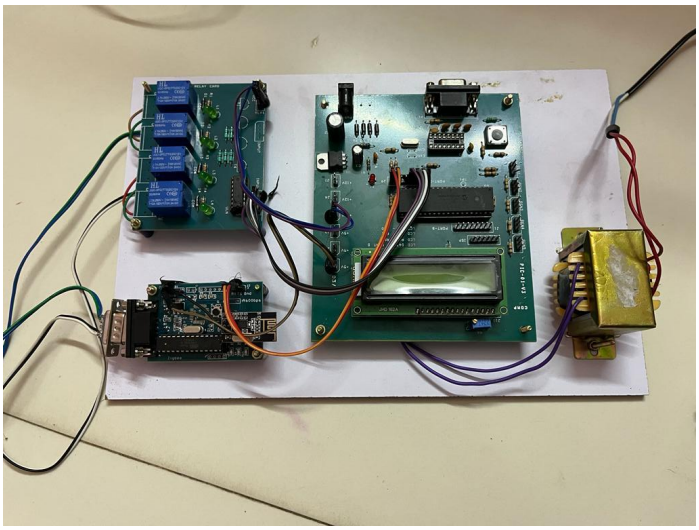

Figure 10-SETUP

Figure 11-SETUP2

SAMPLE CODE

```
#include <htc.h>#include "lcd16.h"
void txs(unsigned char val)
{
int i;
while(!TXIF)
        continue;
TXREG=val;
for(i=0;i<10000;i++);
}

void delay2()
        {
        long i;
        for(i=0;i<100000;i++);
        }

unsigned char rxs(void)
{
int c=0;
while(!RCIF)
        {
                c++;
                        if(c>5000)
                                break;

        }
return RCREG;
}

unsigned char val[6],flagx=0,val1[90],j=0,k;

int x;
int sp,sp1,spt;
int i;

void rxmo()
        {
         char i;
         unsigned int c;
                                                for(i=0;i<26;i++)
                                                        {
                                                         while(!RCIF)
                                                        {
                                                        c++;
                                                         if(c>65000)
                                                                 break;

                                                        }
        val1[i]=RCREG;
        RCIF=0;
        CREN=0;
        //for(x=0;x<10;x++);
        CREN=1;

                                                }
```

```
        }

/* Sample code to set up the A2D module */
void init_a2d(void){
        ADCON0=0;   // select Fosc/2
        ADCON1=2;   // select left justify result. A/D port configuration 0
        ADON=1;             // turn on the A2D conversion module
}

/* Return an 8 bit result */
unsigned char read_a2d(unsigned char channel){
        channel&=0x07;          // truncate channel to 3 bits
        ADCON0&=0xC5;       // clear current channel select
        ADCON0|=(channel<<3);       // apply the new channel select
        GO=1; // initiate conversion on the selected channel
        while(GO)continue;
        return(ADRESH);       // return 8 MSB of the result
}

long af,bf,cnt,cc;

static void interrupt isr(void)         // Here be interrupt function - the name is
{
  if(RCIF)      // Was this a timer overflow?
    {
    val1[k]=RCREG;
        if(val1[k]=='A')
        {
                RB0=1;
        Lcdcmd(0xC0);
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
        lcddata('T');
        lcddata('E');
        lcddata('A');
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
                delay2();
                RB0=0;

        }
        if(val1[k]=='B')
        {
                RB3=1;
        Lcdcmd(0xC0);
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
        lcddata('C');
        lcddata('A');
        lcddata('F');
```

```
		lcddata('E');
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
			delay2();
			RB3=0;



		}
if(val1[k]=='C')
		{
				RB2=1;
		Lcdcmd(0xC0);
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
		lcddata('V');
		lcddata('A');
		lcddata('D');
		lcddata('A');
		lcddata('I');
		lcddata(' ');
			delay2();
			RB2=0;

		}
		if(val1[k]=='D')
		{
			RB4=1;
		Lcdcmd(0xC0);
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
		lcddata(' ');
		lcddata('D');
		lcddata('O');
		lcddata('S');
		lcddata('A');
		lcddata('I');
		lcddata(' ');
		lcddata(' ');
			delay2();
			RB4=0;

		}
if(val1[k]=='E')
		{
			RB1=1;
		Lcdcmd(0xC0);
		lcddata(' ');
		lcddata(' ');
```

```
lcddata(' ');
lcddata(' ');
lcddata('I');
lcddata('D');
lcddata('L');
lcddata('Y');
lcddata(' ');
lcddata(' ');
lcddata(' ');
        delay2();
        RB1=0;


}
if(val1[k]=='F')
{
        RB5=1;
Lcdcmd(0xC0);
lcddata(' ');
lcddata(' ');
lcddata(' ');
lcddata(' ');
lcddata('F');
lcddata('I');
lcddata('S');
lcddata('H');
lcddata(' ');
lcddata(' ');
lcddata(' ');
        delay2();
        RB5=0;


}

if(val1[k]=='X')
{

Lcdcmd(0xC0);
lcddata('T');
lcddata('A');
lcddata('B');
lcddata('L');
lcddata('E');
lcddata(' ');
lcddata('1');
lcddata(' ');
lcddata(' ');
lcddata(' ');
lcddata(' ');
                PORTC=0x55;
                delay2();
                PORTC=0x11;
                delay2();
                PORTC=0x55;
```

```
                        delay2();
                        PORTC=0x00;
        }

        if(val1[k]=='Y')
        {

        Lcdcmd(0xC0);
        lcddata('T');
        lcddata('A');
        lcddata('B');
        lcddata('L');
        lcddata('E');
        lcddata(' ');
        lcddata('2');
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
        lcddata(' ');
                        PORTC=0x55;
                        delay2();
                        PORTC=0x44;
                        delay2();
                        PORTC=0x55;
                        delay2();
                        PORTC=0x00;
        }


    RCIF = 0;      // Clear interrupt flag, ready for next
    OERR=0;
    CREN=0;
    CREN=1;
    }

}

int val2;

void main()                     //Main entry
{
        CMCON=0x07;
        RCSTA=0x90;                                                     // receive enabling
with the same speed
        TXSTA =(0x24);                                          // High speed selection baud rate
9600
        SPBRG = 64;
        ADCON1=0x09;
        ADCON0=0xC1;
        CVRCON=0x00;
        TRISD=0x00;
        TRISE=0x00;
        Lcdinit();
        TRISC=0x80;
        PORTC=0;
```

```
        Lcdcmd(0x80);
        lcddata('#');
        i++;
    GIE=1;
    PEIE=1;
    RCIE=1;
        Lcdcmd(0x80);
        lcddisp("Smart Restaurant          ");

        while(1)
        {



        }
}
```