

# Portable Hotel Management System Using Virtual Reality

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**Abstract:** In today's era, people often go to restaurants. Therefore, effective hotel management is essential to attract more customers. To enhance it, a VR model is being developed. The primary purpose of this VR model is to minimise customer interaction with servers and to improve customer satisfaction. VR not only increases satisfaction but also enhances user-friendliness. The existing system utilises pen-based technology to select menu options. However, in the updated system, a touchscreen has been enabled to increase accuracy. Customers can order or place their menu through a VR device preinstalled at their tables to reduce manpower.

**Keywords:** Enhance, Interaction, Satisfaction, Pen-Based, Customers, Accuracy.

## I. INTRODUCTION

The primary objective of this idea is to reduce manpower and increase time efficiency. This concept utilises technology known as virtual reality. In the current era, many restaurants have a complex ordering method. To minimise this difficulty, we have introduced a system called the Portable Hotel Management System. This enhances user-friendliness and improves time management. Customers can place orders using the virtual reality system, which is pre-installed on the restaurant's tables. Using this system, orders will be transmitted to the robots, ensuring that they are placed correctly. It not only reduces the time but also the user's interaction with the suppliers.

## II. RELATED WORKS

1. Neuro Management in restaurant management: With growing evidence of biometric identification techniques as authentication,[1] there is a pivotal need for comprehending contactless payments by use of facial recognition algorithms in retail, restaurant, and hotel business models.
2. IT Strategy in the hotel industry: The hotel industry has historically suffered from a misalignment of IT and business strategies[2], and yet has embraced digital technologies in many aspects of its operations in recent years.
3. E-Restaurant: With today's advanced technologies, the mobile phone is a brilliant smart device for use.[3] With the help of this smart gadget we can make our usages as smart as possible. S
4. Hotel Management Platform: The previous two-dimensional visual display mode cannot meet the needs of information acquisition in hotel management,[4] So this paper introduces VR technology into the hotel industry and proposes a hotel management platform based on the B/S mode.
5. The Applied Research on Virtual Management: With the constant development of scientization, there is a hurricane of "digital hotels" in domestic[5]. The intelligent and
6. Digital hotel management has already become one of the core competitive powers in today's hotel development. In this study, the author conducted applied research on the application of virtual reality technology in hotel marketing management.
7. Hotel Management using VR: The development of information technology over the past few years in Vietnam has created potential for building an e-commerce system in Vietnam.[6] From large projects to small projects, for each company

## III. PROPOSED METHODOLOGY

The transmitting module consists of the following 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 captured picture to the Zigbee module's receiving portion after comparing it to the standard image.

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The receiving section consists of the following parts:

- Zigbee Transceiver
- PIC16F877A 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 the food menu to the robotic module wirelessly.
- Then the menu will be displayed on the LCD module.
- At the same time, it will run and travel to the selected table.

**LCD MODULE:** This LCD screen was explicitly developed for E-blocks. It features an LCD with 16 characters over two lines of text and a single 9-pin D-type connection. Along these lines, the gadget can connect to nearly all of the E-Block I/O ports. Further details on the serial data format required by the LCD can be found in the user manual that accompanies this document. The screen also needs a 5V power supply. To prevent damage to the device, please keep the voltage at or below 5V. When creating a 5V supply, the E-blocks Multi Programmer or a 5V fixed-regulated power supply are your best options.



FIG 1. LCD Display

**UART BOARD:** A hardware component for asynchronous serial communication that allows for variable data formats and transmission rates is called a Universal Asynchronous Receiver and Transmitter (UART) board. Bytes of data are taken by the UART, which sequentially sends each bit. The primary means of converting between serial and parallel forms is the shift register, which is a component of each UART. Input and output shift registers, transmit/receive control, read/write control logic, a clock generator, and other standard elements are found in a UART. Compared to parallel transmission over a network of wires, serial transfer of digital information (bits) via a single wire or other media is comparatively less expensive.



FIG 2. UART Board

**ARDUINO UNO:** Open source and simple to use, Arduino is a microcontroller. It contains analogue inputs and outputs, allowing signals to control other circuits and devices. There are six analogue input/output pins and fourteen digital I/Os on the board (six PWM outputs). It can run from a 9-volt battery or a USB port. To control the relays, the user simply touches the projected labels that match their desired action, and the Arduino UNO (acting as a microprocessor) takes care of the rest. It does this by delivering a command to the load through Zigbee after receiving input. Based on how the microcontroller addresses each load, we can adjust the load accordingly.



FIG 3. Arduino Uno

**LS2 RELAY:** The microcontroller sends a signal to this relay, which is used to manage high voltage and turn on the appropriate loads depending on the input. This relay features an electromagnet that can be used to turn on or off, as well as a 120- to 240-volt electric switch. With the assistance of this relay, we can control large electrical loads such as motors, electric valves, and other devices. In addition, the LCD screen would indicate which load or relay is active.



FIG 4. LS2 Relay

**ZIGBEE:** Global control is exercised over the wireless network module known as Zigbee. It is a low-power network comprising sensors, instrumentation, and control devices. Medical automation, low-power sensors, and HVAC management are just a few examples of how it can be utilised in residential applications.



FIG 5. Zigbee

#### IV. PROPOSED SYSTEM

The system is created with virtual switches that can be projected using a projector. The UI can also be remapped, allowing the user to alter the UI and UX of the virtual switches. As there is no current leakage, this system is entirely safe for industrial applications. When our hand obstructs the light, the projected switch turns on and determines the shadow cast by the light using image processing. Using wireless ZigBee technology and an Arduino microcontroller, the computer compares the picture to the relay and operates it. The operator in the industry may verify the relay to be operated on the LCD and adjust the load as necessary. Hence, in highly electrically sensitive businesses where there are no live switches or devices, virtual switches are built.

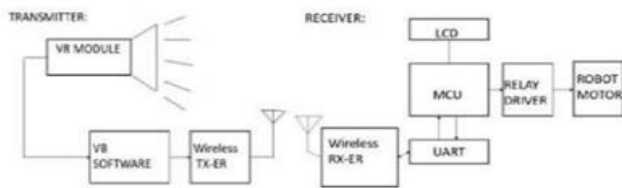


FIG 6. Architecture Diagram

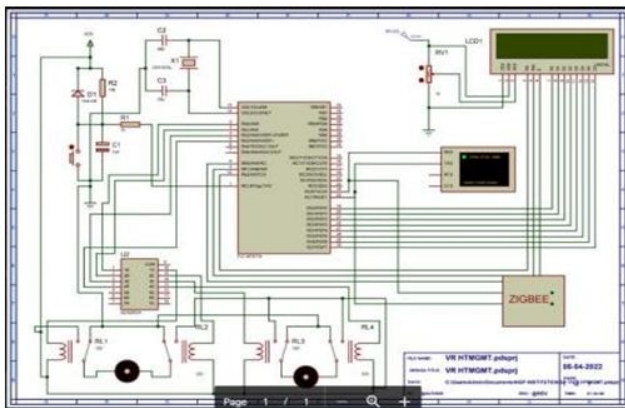


FIG 7. Block Diagram

RS232: The USB RS232 cables are a collection of USB to RS232 level serial UART converter cables that use FTDI's FT232RQ USB to serial UART interface IC chip, which is responsible for managing all USB signalling and protocols. These links simplify the process of interfacing any two gadgets with a USB port. With RS232-level sequential UART interfaces. A minuscule interior electronic circuit board utilising the FT232R is housed within each USB-RS232 cable and is attached to the end with the USB connection. The Tx and Rx LEDs, which illuminate when data is being sent and received across a connection, and the RS232 level shifter are all part of the integrated electronics.



FIG 8. Hardware Setup



FIG 9. VR Projector

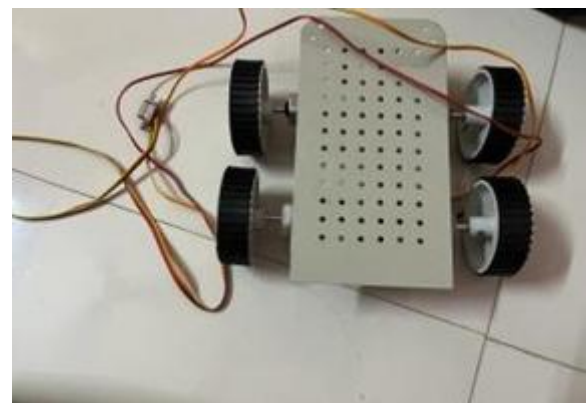


FIG 10 Robotic Module

#### V. EXISTING SYSTEM

Due to its inability to withstand high temperatures, the traditional switches of the old system lack safety and are unsuitable for use in large businesses. It also has several other drawbacks. The fact that UX and UI cannot be altered to suit our needs is another serious issue. In addition to these switches, there were push buttons, toggle switches, limit switches, magnetic switches, diaphragm switches, pressure switches, lever switches, rotary switches, and pull chain switches. The industrial leakage and damage that may occur to any of these switches is simple. As LCD causes such significant harm, they cannot be used anywhere presently.

#### VI. RESULT

Safety is of utmost importance in today's society, particularly in sectors such as the petroleum, chemical, and nuclear power industries. In industries where the electrical switch also plays a significant role, current leakage is a common cause of fires. Even a little spark may result in severe harm in certain businesses, including petrol stations. To solve this issue, we employed a virtual reality concept that projected buttons onto the wall, serving as a switch.



## VII. CONCLUSION

These days, the switch's layout and design are crucial components. Here, we can modify the switches' UI and UX to suit the users' needs better. Using the projector, visibility and other functions may also be adjusted, and the load is managed accordingly. This idea enhances the customer's comfort and also helps increase the hotel's productivity. In this advanced generation, VR plays a significant role in advancing technologies. Here, we are using a robotic module to serve food to the respective tables. Robotic modules can automate tasks and reduce the need for human labour. Additionally, the portability of these systems allows for quick and easy deployment, making them a valuable tool for event management and other temporary setups.

## DECLARATION

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