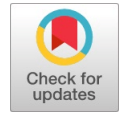


Portable Hotel Management System Using Virtual Reality



Rubasri N, Soundarya Raghu, M. Maheshwari, Ramalakshmi D

Abstract: In today's era, people often go to restaurants. So, good hotel management is necessary to increase the number of customers. To enhance it, a VR model is being developed. The main use of this VR model is to reduce the customer's interaction with the servers and also increase customer satisfaction. VR not only increases satisfaction but also enhances user-friendliness. The existing system has a pen-based technology that is used to select the menu. But, in the updated system a touch screen system has been enabled to increase the accuracy. Customers can order or place the menu through a VR device preinstalled in their tables to reduce the manpower.

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

I. INTRODUCTION

The main aim of this idea is to reduce the manpower and increase the time efficiency. This idea uses technology called virtual reality. In the current era, many restaurants have a difficult ordering method. So to minimize this difficulty we have introduced a system called portable hotel management system. This enhances user- friendliness and improves time management. The customers can place the orders using the virtual reality system which is pre-installed in the tables of the restaurant. Using this system, the orders will be transmitted to the robots so that the order will be placed correctly. It not only reduces the time but also the user 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 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: At today's advanced technologies the mobile phone is brilliant smarter usage product one.[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 B/S mode.
5. The Applied Research on Virtual Management: With the constant development of scientization, there is the hurricane of "digital hotels" in domestic[5]. The intelligent and
6. digital hotel management has already become one of core competitive powers in today's hotel development. In this study, the author conducted the applied research on the virtual reality technology in the hotel marketing management.
7. Hotel Management using VR: The development of information technology over the past few years in Vietnam has led to the potential to be used to build 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 on 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.

Manuscript received on 27 March 2023 | Revised Manuscript received on 26 April 2023 | Manuscript Accepted on 15 May 2023 | Manuscript published on 30 May 2023.

*Correspondence Author(s)

Rubasri N*, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai (Tamil Nadu), India. E-mail: rubasri2202@gmail.com, ORCID ID: <https://orcid.org/0009-0006-8009-8942>

Soundarya Raghu, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai (Tamil Nadu), India. E-mail: Soundaryaraghuis@gmail.com, ORCID ID: <https://orcid.org/0009-0007-2213-1780>

M. Maheshwari, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai (Tamil Nadu), India. E-mail: maheshwari.cse@sathyabama.ac.in, ORCID ID: <https://orcid.org/0000-0001-5551-7961>

Ramalakshmi D, Department of Computer Science and Engineering, Sathyabama Institute of Science and Technology, Chennai (Tamil Nadu), India. E-mail: ramalakshmi.d.it@sathyabama.ac.in, ORCID ID: <https://orcid.org/0009-0009-8535-4601>

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an [open access](https://creativecommons.org/licenses/by-nc-nd/4.0/) article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Portable Hotel Management System Using Virtual Reality

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 with 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 displayed on the LCD module.
- At the same time, it will run and travel to the selected table.

LCD MODULE: This LCD screen was developed specifically for E-blocks. It features an LCD with 16 characters over 2 lines of text and a single 9-pin D-type connection. Along these lines, the gadget can associate with by far most of the E-Block I/O ports. Further details on the serial data format required by the LCD display are in the user manual that follows. The screen also requires a 5V power supply. To avoid damaging the device, please keep the voltage at or below 5V. When creating 5V, the E-blocks Multi programmer or a 5V fixed regulated power supply are your best bets.



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 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 common components are found in a UART. Comparatively less expensive than parallel transmission over a network of wires is the serial transfer of digital information (bits) via a single wire or other media.



FIG 2. UART Board

ARDUINO UNO: Open source and simple to use, Arduino is a microcontroller. It contains analogue inputs and outputs with the ability to use signals to control other circuits and gadgets. There are six analog input/output pins and fourteen digital I/Os on the board (six PWM output). It can run from a 9-volt battery or a USB port. To control the relays, the user just touches the projected labels that match to what they want to happen, and the Arduino UNO (acting as a microprocessor) does the rest. It does it through Zigbee delivers a command to the load after receiving input. Based on how each load is touched by the microcontroller, we may alter the load.



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 may be used to turn on or off and 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 made up of sensors, instrumentation, and control devices. Medical automation, low-power sensors, and HVAC management are just a few examples of how it might be used for 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 fully safe for industrial application. At the point when our hand obstructs the light, the projected switch turns on and ascertains the shadow cast by the light utilizing picture handling. 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.

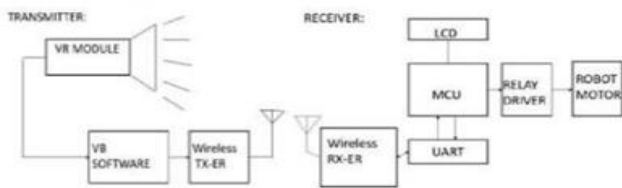


FIG 6. Architecture Diagram

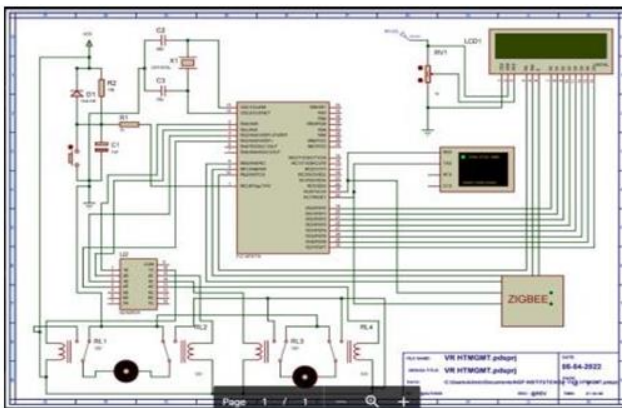


FIG 7. Block Diagram

RS232: The USB RS232 cables are a collection of USB to RS232 levels serial UART converter cables that use FTDI's FT232RQ USB to serial UART interface IC chip, which is responsible for managing all USB signaling and protocols. These links simplify it to interface any two gadgets with a USB port. with RS232-level sequential UART interfaces. A minuscule interior electronic circuit board utilizing 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

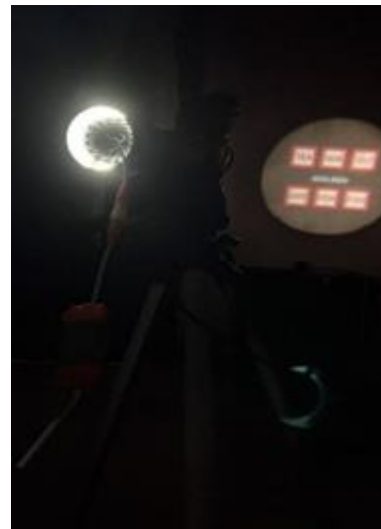


FIG 9. VR Projector

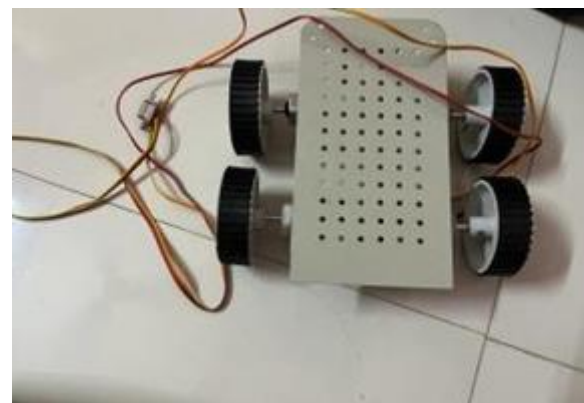


FIG 10 Robotic Module

V. EXISTING SYSTEM

As a result of its inability to endure high temperatures, the old system's traditional switches lack safety and are unsuitable for use in big businesses. It also has a number of 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 so significant harm, it cannot presently be utilized anywhere.

VI. RESULT

Safety is of utmost importance in today's society, particularly in sectors like the petrol, 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. In order to solve this issue, we used a virtual reality idea that projected the buttons on the wall and served as a switch.

VII. CONCLUSION

These days, the switch's layout and design are crucial components. Here, we may alter the switches' UI and UX and categorize them to better suit the demands of the users. Using the projector, visibility and other functions may also be altered, and the load is immediately managed in accordance. So, this idea enhances the customer's comfort and also helps in increasing the productivity of the hotel. In this advanced generation, VR plays a major role in advancing technologies. Here we are using robotic module to serve the food to the respective table. robotic modules can automate tasks and reduce the need for human labor. Additionally, the portability of these systems means that they can be deployed quickly and easily, making them a valuable tool for event management and other temporary setups.

DECLARATION

We declare the support of the professors of the Sathyabama Institute of Science and Technology, Chennai. for giving up this valuable opportunity to work on this project. A special thanks to M Maheshwari and D Ramalakshmi who assisted throughout our project work.

Funding/ Grants/ Financial Support	No, I did not receive.
Conflicts of Interest/ Competing Interests	There is no known competing financial interest and no potential conflict of interest.
Ethical Approval and Consent to Participate	No, the article does not require ethical approval and consent to participate with evidence.
Availability of Data and Material/ Data Access Statement	Not relevant.
Authors Contributions	This project is done with group effort at all stages.

REFERENCES

- Sophia Jasmine G, Magdalin Mary D, Naveen S, Murugan V, Mohamed Ibrahim. A, Praveen S. Load control using projected VR system of wallmounted buttons2021 7th International Conference on Advanced Computing & Communication Systems (ICACCS). [CrossRef]
- Wynn, Martin, and Peter Jones. "IT strategy in the hotel industry in the digitalera." Sustainability 14, no. 17 (2022): 10705.J. Grubert, E. Ofek, M. Pahud, P.O. Kristensson, F. Steinicke, and C. Sandor. The office of the future: Virtual, portable, and global. IEEE computer graphics and applications, 38(6):125–133,2018. [CrossRef]
- Rajesh, Mardela, G. Prabha Satya, and Vara Prasad Rao PV. "E-Restaurant: Online Restaurant Management System for Android." International Journal & Magazine of Engineering, Technology, Management and Research 2 (2015): 574-579.Kadambari Deherkar, Glen Martin, Nathaneal George, Vinay Maurya "Gesture Controlled Virtual Reality-Based Conferencing", International Conference on Smart City and Emerging Technology (ICSCET).
- Xueyan, Ding. "Hotel Management Platform Design Based on Virtual Reality." In 2021 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS), pp. 113-116. IEEE, 2021. [CrossRef]
- Ting, Chen. "The Applied Research on the Virtual Reality Technology in the Hotel Marketing Management." In 2019 International Conference on Smart Grid and Electrical Automation (ICSGEA), pp. 242-246. IEEE, 2019. [CrossRef]
- Tri, Nguyen Minh. "Hotel management based on VR and web360 technologies." PhD diss., International University-HCMC, 2019.

AUTHORS PROFILE



Rubasri N pursuing Bachelor of engineering in Computer Science and engineering from Sathyabama University, Chennai, India, from 2019- 2023. She organized national level IOT & ARDUINO related workshops at symposium elint 2022. she also presented papers in the national level technical events conducted by various universities.



Soundarya Raghu pursuing Bachelor of engineering in Computer Science and engineering from Sathyabama University, Chennai, India, from 2019-2023. she organized robotics workshops at college fest. she hosted many technical events for college.



M. Maheswari received the Ph.D. Degree in Computer Science and engineering from Anna University, India, in November 2019. She is currently as a Associate Professor School of Computing, Sathyabama University, Chennai, India. She has rich teaching and research experience. She has published papers in reputed Inter- national Conferences and refereed Journals. She has organized many technical events and symposiums. Her research interests include machine learning, recommender systems, computer networks and data mining. She serves as a Life Member in CSI and ISTE Computer Society



D. Ramalakshmi completed M.E in Computer Science and engineering from sathyabama University, India, in November 2010 She is currently as a Assistant Professor School of Computing, Sathyabama University, Chennai, India. She has rich teaching and research experience. She has published paper in reputed Inter- national Conferences, she has organized technical events and symposiums.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of the Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP)/ journal and/or the editor(s). The Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP) and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.

