Voice-Based Intelligent Door Access security System Using Embedded systems

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Abstract. Secure structures are right now shielded from unapproved access by an assortment of gadgets. Despite the fact that there are numerous gadgets to ensure the system wellbeing, for example, PIN entry devices, electronic devices, cryptographic techniques and double control methodology and the individual's voice are utilized. The ability to confirm the character of a speaker by investigating discourse, or speaker check, is an appealing and moderately subtle method for giving security to entrance into a significant or made sure about spot is questionable. The voice of a particular speaker cannot be taken, lost, overlooked, speculated, or imitated with precision. To alleviate the above limitations, this undertaking depicts structure and prototyping a voice-based intelligent door access security system for the buildings. In the proposed system, the entrance locking system is approved with the help of an enlisted client talking into a mouthpiece attached to the system. Moreover, intelligent system approach is utilized to create an approval process by verifying the individual models dependent on their voice. The proposed method is used to open and close the door using voice command. Voice command will be stored in an easy VR via mic for further processing. If the stored voice is detected door will be opened automatically. Any other voice will be detected that information and displayed in LCD.

1. Introduction

With the development of new technologies, the PCs makes life simpler for the entire word and changed the manner in which every day exercises are done. In this contemporary period the Internet of Things (IoT) technology finds its applications in all the fields. Thus it ended up being winning piece of practically all the businesses [1]. Individuals in the college set their gear, apparatuses and gadgets in a specific space for safety's sake. The traditional room security system utilizes a mechanical locking system that does not disclose the information on who utilizes the room, and also the key for the mechanical locking system can be easily copied. Individuals frequently neglected to turn off the lights and other consumables when they leave the place. Leaving these gadgets, a forced air system for instance, for at least one day will bring about overconsumption of vitality, enormous measure of greenhouse gas outflow, and weakening of gear [4]. For that reason in this examination, we will talk about all the more controlling smart home systems, particularly the locking door controlling system utilizing the voice acknowledgment technique with a progressively trusted and dependable propelled security system [3].

2. Embedded Technology in the security locking system

The Embedded systems technologies has reduced the system complexity and cost to a large extent. It integrates the software and the real time hardware there by making the entire system simple. As this technology performs its tasks, either as a single task or multiple task in an organized manner it overcomes the limitations that exist in the microcontroller based programming techniques. Therefore it finds its applications in all most all the fields

3. Classification of Voice Recognition

Voice recognition otherwise called programmed speech recognition is a subfield of computational phonetics that manages interpreting the voice of a human being and distinguishing them with the other speaker. The voice based acknowledgment are used in communication systems, in-vehicle system, training, get to control systems and the preferences. It is also used in studies of advanced cell structure and various sorts of equipment in performing various exercises or orders utilizing menial helper programming. In the proposed work, the entrance for a building is approved by talking in a microphone connected to the system.

The proposed methods used to open and close the door using voice command. Voice command will be stored in easy VR via mic. If the stored voice is detected door will be opened automatically. Any other voice will be detected that information and displayed in LCD. Since the reason and capacity of the voice acknowledgment are extraordinary, the acknowledgment is delegated talker acknowledgment and voice acknowledgment. Also, the talker acknowledgment can be delegated two sorts, one is pertinent to message and the other is unessential to message. The voice acknowledgment system that is applicable to message needs clients to articulate as indicated by the expressed substance, and afterward everyone's discourse model is developed precisely. Since ID additionally need clients to articulate as indicated by the expressed substance, the impact is excellent. The voice acknowledgment system that is immaterial to message doesn't lead articulation substance of the talkers; it is hard to develop discourse models. In any case, clients utilize the system advantageously, and it is applied generally.

From the utilization, the system can be named talker acknowledgment and talker affirmation. The previous appointed authorities a voice that should be distinguished from a few talkers. The last appointed authorities that a distinguished voice originates from a specific talker whether. Its yield just has two sorts of result, yes or not. The focal processor of this system is the SPCE061A single chip. The talker affirmation that is applicable to text is acknowledged on the chip, and afterward homologous request and activity are done. Finally the database of trademark boundaries of talkers is framed. In recognizing, the voice that should be distinguished is coordinated with the data in the database of trademark boundaries of talkers. Yield circuits control the gating electrical machine, and in conclusion the door lock is controlled [5].

4. Existing System in the Literature

A few computerization system for made sure about access have been presented in this period of advanced mobile phones. At first a few door locking system components were presented. It is a combination of Radio Frequency identification(RFID) for keeping up the validation information, LCD and engine part for keeping up door movements, sensors for inquisitive the earth, a bury report module, and control module for setting up in general control [1].

This article proposes a programmed situating and recognizable proof strategy for door handles and to help the automatic control system. The strategy uses the immersion includes in the visual picture and the relative position of the door to provide the quick access [2].

In proposed strategy, utilization of the Near Field Communication (NFC) technique the door access can be obtained without keys and open any door with only a tap of a solitary card is conceivable. The NFC Controlled Door Lock additionally accompanies a programmed electrical switch that actuates when an individual enters a hall, and it deactivates when the individual exits the hall with less power because of its inert machine usage. Four NFC labels were tried for its identification speed and separation to decide the most appropriate tag to be utilized. As an ever increasing number of scientists and designers started to put resources into research on compartment mechanization terminals, they continually attempted to make port offices progressively adaptable and productive through different methods [4].

After the brief review of the existing literature papers, it is clear about the various techniques used in the previously designed system to control the security system using voice recognition. Though some system achieved better equalization, they have many serious disadvantages like sometimes it recognizes 5-20% incorrectly. It cannot recognize homonyms. In order to reduce the disadvantages, the proposed system is designed using a voice based Intelligent Door Access security System.

5. Proposed System

In this work, the voice-based intelligent door access security system using embedded technology is developed. This system has 3 modules which are Door Unit, Inside Door Unit, and Outside Door Unit. Voice command will be stored in easy VR via mic. If the stored voice is detected door will be opened automatically. If any other voice detected means that information will be sent to inside door unit and displayed in LCD. If authentication command is provided by person inside means door will be opened automatically. This can be used in school/college's office room, homes and wherever the security is needed to open the door. Figures 1 to 3 shows the block diagram representation of Door unit.
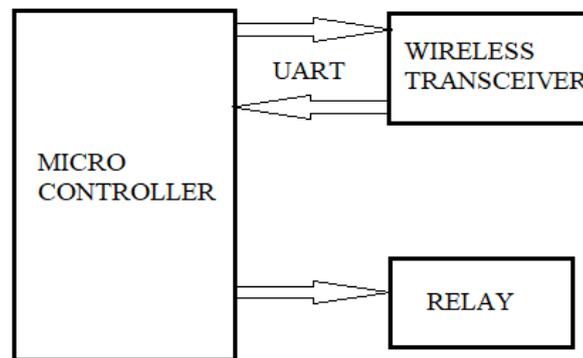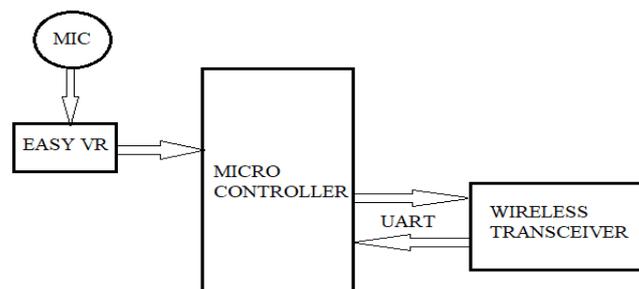

Fig.1. Block Diagram of Door Unit

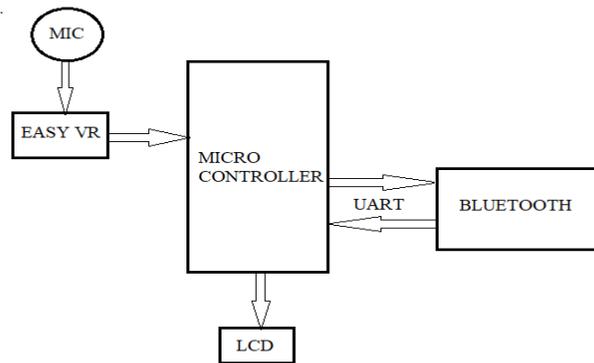Fig.2. Block Diagram of Inside Door Unit

Fig.3. Block Diagram of Outside Door Unit

5.1 Description of Proposed System

The Figure 3 shows the block diagram representation of the proposed work. Easy VR, Micro Controller, Wireless Transceiver, relay, Bluetooth and LCD are used in this proposed system. Easy VR is used to recognize the voice from the user. It is connected to the Micro Controller to access the control and LCD is connected to display the message. Bluetooth also connected to transfer the information. This is similar to both inside and outside door unit. Micro Controller, Wireless Transceiver and Relay are connected in the door unit.

Easy VR is a multi-reason discourse acknowledgment module intended to include adaptable, hearty and cost effective discourse and voice acknowledgment capacities to for all intents and purposes any application. Easy VR is the second era rendition of the effective VRbot modules and expands on the highlights and usefulness of its ancestor. The Easy VR module can be utilized with any host with a UART interface controlled at 3.3V-5V, for example, PIC and Arduino board.

Bluetooth may be a wireless technology normal for mercantilism info over short separations. Bluetooth utilizes a radio innovation known as repeat bouncing unfold vary, that cleaves up the knowledge being sent and transmits lumps of it on up to seventy nine teams within the vary 2400 - 2483.5 MHz. This vary is within the internationally unaccredited Industrial, Scientific and Medical (ISM) two.4 GHz short vary radio repeat band.

6. Working

In this work, an intelligent voice-based door access system victimization embedded application is developed. This technique has three modules that square measure Door Unit, within Door Unit, door Unit. Voice command holds on the Easy VR via mic. If the hold on voice is detected door are going to be opened mechanically. If the other voice detected means info are going to be sent to within door unit and displayed in LCD. If authentication command is provided by person within means that door are going to be opened mechanically. Figure 4 shows the hardware setup used for the validation of the proposed work.

6.1. Door Unit

In this section, door unit receives the voice from within door unit or door unit via wireless transceiver and opens the door.

6.2. Inside Door Unit

During this section, Easy VR is employed to record the voice via MIC and establish the proper voice input. Microcontroller receives knowledge from Easy VR. If the hold on voice is detected means that door are going to be opened mechanically. Door won't be opened, if hold on voice isn't detected.

6.3. Outside Door Unit

During this section, if anyone offers voice command from android application that may be converted to text. LCD is employed to display the text. Relay is employed to open the door. Bluetooth is employed to transfer the text data to controller.
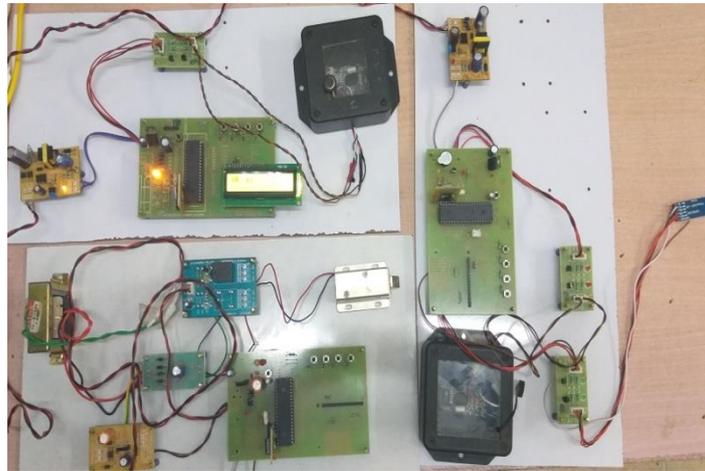

Fig. 4. Hardware setup for Three Doors

7. Results and discussion

This door locking system with smart voice access has been implemented using voice recognition technology, Bluetooth and microcontroller, enabling the user to access the locking system in a secured safe manner using voice and ensure the others has no access to their personal space. This system has various important safety based applications they include: School\College's Office doors, Individual houses, Industries where secured spaces are required.

8. Conclusion

The proposed work deals with the design and execution of Voice-Based Intelligent Door Access security System Using Embedded systems which can be controlled using a Mobile Phone. The cell phone present in the system utilizes android application to give viable correspondence among client and individual inside the door. The entire locking system is validated by testing at different environmental conditions and it is found to be robust The future extent of our venture is to give profoundly made sure about smart door lock system to bigger industries at affordable cost.

Acknowledgments

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