CONTACT LESS DOOR BELL SYSTEM

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Abstract:

Everything nowadays should ideally be quick, contactless, and automated. The need for contactless solutions is considerably higher now that COVID has emerged. Our solution uses IoT to automatically identify who is at the door and notify the residents of the house. Using an infrared (IR) sensor, a buzzer will sound when someone approaches the door. The live camera on the phone allows the user to do a quick inspection. The door locks and unlocks with the user's input. The IoT interface provides real-time access to the door's status at any time.

Introduction

Only when we feel secure can we really relax and enjoy our dwelling. Nevertheless, us humans take every precaution to safeguard our dwellings. There are a variety of options for door security at now, such as the age-old metal padlock and the cutting-edge smart doorbell locking devices.

The Internet of Things (IoT) is one of the most remarkable innovations of the 21st century, and it is having a profound effect on our lives. From the realm of health and fitness to that of smart cities, IoT has established its place. We'll look at how to use the Internet of Things to create a contactless doorbell security system that works in real time.

In this case, a Raspberry Pi, camera module, and speaker module work together to power the contactless Internet of Things smart doorbell.

The Raspberry Pi is an inexpensive, compact computer that can be connected to a standard TV or monitor and operated using a keyboard, mouse, and other commonly used input devices. It's a powerful little gadget that opens up the world of computers to individuals of all ages and facilitates the study of programming languages like Scratch and Python. It can do all the tasks often associated with a desktop computer, including web surfing, HD movie playback, spreadsheet creation, document editing, and game playing. Since its first release in 2012, the Raspberry Pi has undergone a number of revisions and iterations. The first Pi only featured a 700MHz single-core CPU and 256MB of RAM, while the newest edition has a quad-core 1.4GHz CPU and 1GB of RAM.Raspberry Pi is used by people all around the globe to learn how to code, automate their homes, and even power cutting-edge gadgets.The Raspberry Pi is compatible with the open source community because it can run Linux (several distributions), and since the primary operating system that is supported for it, Raspbian, is itself open source and can run a suite of open source software. In addition to publishing its own software for the Raspberry Pi as open source, the Raspberry Pi Foundation also includes other open source extensions to Linux. The Raspberry pi is the primary controller in this setup.Raspberry pi controller, camera module, and speaker all work together to make the contactless doorbell fully automated.In addition to serving as a burglar alarm while the owner is away, this system will let the homeowner see who is at the door whenever they want to.

Literature Survey

Since their invention [1] [2], doorbells have played a crucial role in the safety of contemporary households. Ringing the doorbell not only alerts the homeowner to guests' arrival but also seek entrance into a facility and enables the resident to verify the identification of

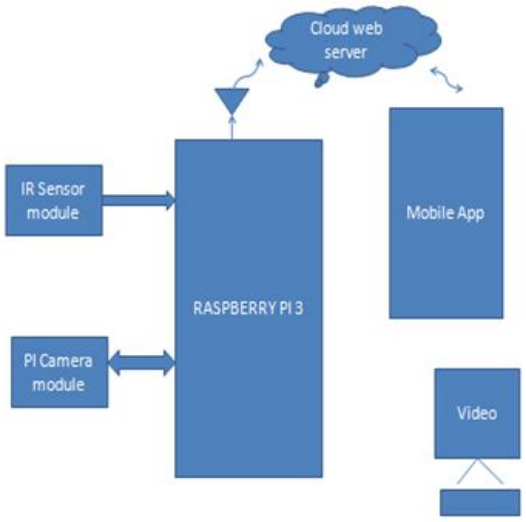
the visitors, so aiding in the prevention of home invasions and robberies at inopportune times [1]. Both wired and wireless doorbells are available, with the former requiring no additional cabling in the wall. In the former, a wire is used to link the front and rear door buttons to a transformer, whereas in the latter, telephone technology is used to transmit the signal wirelessly.

Wireless doorbell systems, which use radio technology to signal doorbells and answer doors remotely, are now standard in most modern structures. Despite their obvious advantages over wired doorbells, wireless models nevertheless have trouble keeping up with the needs of contemporary dwellings for the three reasons given below. If a resident wishes to answer the doorbell, he or she must first go to the answering machine, which is often stationed in a permanent location (often near the door). Second, the inhabitant needs to go to the door if he or she wants to view the guests outside. Third, the resident is unable to keep track of who has visited or to answer the door when nobody is there to do so.

A smart doorbell is an essential component of a smart home, since it helps deter intruders and prevent crimes like burglary and home invasion. [4] [5] [6] [7]. Through adaptive learning and other technologies [14], the controller of a smart house may be able to answer the doorbell and determine whether or not to let a guest inside. Numerous methods and tools have been developed in recent years [7] [15] [16] [17] due to the significance of smart doorbells in the development of the smart home.

Existing smart doorbells provide an integrated solution, but consumers have no access to, or understanding of, the underlying processes or implementation details. In the event of a breakdown, customers need to contact repair technicians for assistance. When a smart doorbell's components break, it's not uncommon for consumers to have to replace the whole device.

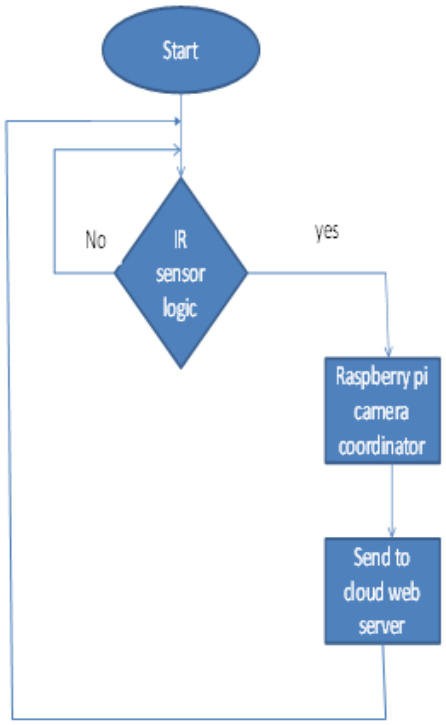
Methodology



Block diagram

Working

Our work here is split into two parts. The first duty is to watch the premises via camera, and the second is to operate the door locks remotely.After an infrared (IR) sensor detects motion, a buzzer will sound for two seconds before the live video feed is activated. The individual's likeness may be established by real-time video surveillance. In the future, we can use the program to get to the toggle switches. A door marked "intruder" may be opened by pressing the open button if the person on the other side is known to us. Similarly, if we don't recognize the visitor, we may use the door's shut button to prevent them from entering.Our app for remote door control was built using MIT's AI2 companion. For remote access management, our app provides two options: open and shut. You can use either block coding or text coding to make those buttons do what you want. To implement the button actions, we utilized block coding's drag-and-drop conditional construct. The authentication key establishes a link between the program's code and its action buttons. This aids in operating the door as we desire and maintaining our safety.



System flow chart.

Raspberry pi

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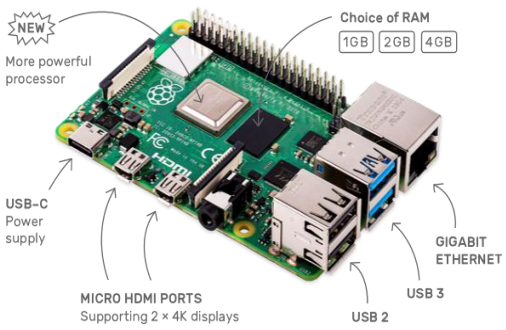


IR SENSOR MODULE

Object motion may be detected with the use of infrared proximity sensors, also known as IR sensors, which are electrical devices that generate infrared photons to perceive some feature of the surroundings. This passive sensor is limited to detecting infrared light. If you've ever attempted to build a robot that can avoid obstacles or a system that relies on proximity sensing, you've probably used one of these sensors.

Ir sensor

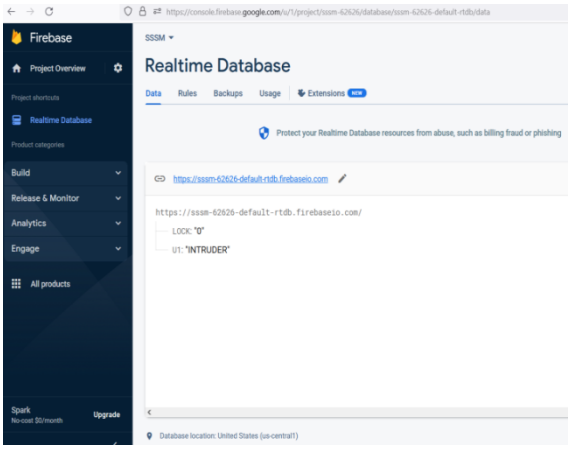
Camera:

The board version determines the camera module's resolution. Version 2 of this tutorial makes use of the 8MP Sony IMX219 sensor. OmniVision's OV5647 5MP sensor is used in the first release. The Raspberry Pi camera module can take still images and videos in 1080p30, 720p60, and VGA90 resolutions. It's compatible with any Raspberry Pi model from the past.

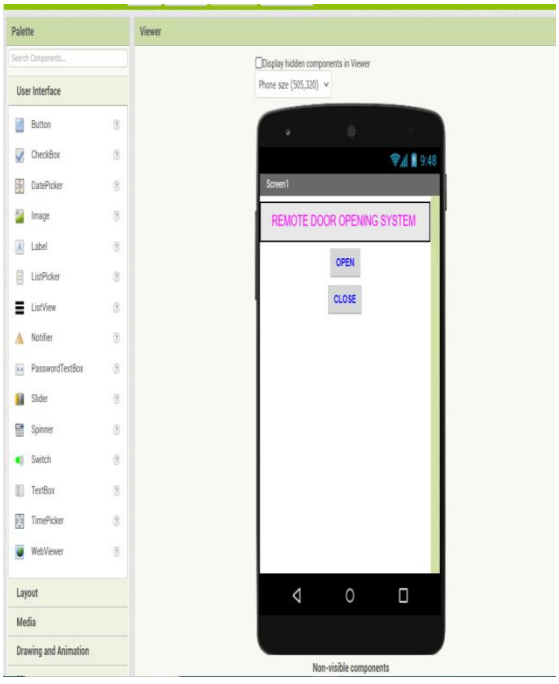
Camera

Results

When an IR sensor in our project detects motion at the entrance, it alerts us with the sound of a buzzer. The live camera on the user's phone makes it possible to verify the identity of the target. The door locks and unlocks with the user's input. The IoT interface provides real-time access to the door's status at any time.



Cloud web server interface.



Mobile application interface.

Applications

This system helps the user to monitor the visitors in real time with the help of the IoT module. Hence, apart from being used at homes, this system can be useful in other places like farmhouses, offices, bungalows, apartments, etc.

Advantage

- Increased Security
- Complete wireless system
- Automatic face recognition
- Voice User Interface
- 24/7 monitoring
- Alerts on abnormal or suspicious behaviour
- Self-operated System

Conclusion:

A touchless doorbell was created in an effort to make our lives safer amid the current COVID-19 outbreak. Because the suggested device may be used in both touch-enabled and touch-less modes with just minor adjustments to the existing circuitry, it complements rather than replaces the standard doorbell. All of the goals for deploying and testing the model were achieved. Adding a diode in series with the relay improves the model's reliability and longevity. Based on the comprehensive cost and energy use analysis performed throughout this study, it is clear that the suggested product is both a cost-effective and energy-efficient solution. The use of resistors rated for the product's stated power wattage ensures that the product's quality and longevity have not been sacrificed despite these additions. The product's sensitivity is taken into mind as well, since any hand motions may be detected from a respectable distance. In light of the catastrophic damage done to our country's economy by COVID-19, our primary objective is to distribute a product to all demographics in an effort to stem the virus's further spread. To prevent the spread of additional infectious illnesses like COVID-19, the concept may be used as-is or updated in the next years. Future improvements in health and safety at home will be possible with the use of further embedded devices.

REFERENCES:

1. *R. J. Robles, T.-h. Kim, D. Cook, and S. Das, "A review on security in smart home development," International Journal of Advanced Science and Technology, vol. 15, 2010.*
2. *A. H. MOHAMMAD, "Of electronic door bell with counter and display," Ph.D. dissertation, 2009.*
3. *H. V. Shah, G. Y. Tsao, A. L. Arizpe, and A. S. Oztaskin, "Doorbell mechanism using protection domains," Dec. 14 2010, uS Patent 7,853,957.*
4. *M. Senagala, "Rethinking smart architecture: Some strategic design frameworks," International Journal of Architectural Computing, vol. 4, no. 3, pp. 33–46, 2006.*
5. *J. C. Augusto and C. D. Nugent, "Smart homes can be smarter," in Designing Smart Homes. Springer, 2006, pp. 1–15.*
6. *D. Cook and S. Das, Smart environments: technology, protocols and applications. John Wiley & Sons, 2004, vol. 43.*
7. *S. Vig and S. Vig, "Smart doorbell security system and method to identify visitors," Aug. 23 2010, uS Patent App. 12/861,427.*
8. *G. Demiris, B. K. Hensel et al., "Technologies for an aging society: a systematic review of smart home applications," Yearb Med Inform, vol. 3, pp. 33–40, 2008.*
9. *D.-M. Han and J.-H. Lim, "Design and implementation of smart home energy management systems based on zigbee," Consumer Electronics, IEEE Transactions on, vol. 56, no. 3, pp. 1417–1425, 2010.*
10. *S. Higginbotham, "Connected doorbells might become the new hot smart home accessory," May 21 2015.*
11. *D. Leclair, "What is a smart doorbell, and which should you buy?" 27 2014.*
12. *A. Baker, "See when opportunity knocks with these smart doorbells," 21 2015.*
13. *M. Hinkle, "Evolution of smart home and the internet of things," Nov. 22 2014, parksassociates.com.*
14. *O. Lehmann, M. Bauer, C. Becker, and D. Nicklas, "From home to world-supporting context-aware applications through world models," in Pervasive Computing and Communications, 2004. PerCom 2004. Proceedings of the Second IEEE Annual Conference on. IEEE, 2004, pp. 297–306.*
15. *T. J. Huisking, "Method and apparatus for unlocking/locking a door and enabling two-way communications with a door security system via a smart phone," Sep. 7 2012, uS Patent App. 13/606,690.*
16. *C.-t. Yang and S.-h. Liu, "Smart doorbell with energy saving method," May 21 2015, uS Patent 20,150,138,353.*
17. *A. M. Fadell, M. L. Rogers, Y. Matsuoka, D. Sloo, S. Honjo, S. A. McGaraghan, M. Plitkins, M. Veron, and I. Guenette, "Visitor feedback to visitor interaction with a doorbell at a smart-home," Dec. 31 2014, uS Patent App. 14/587,966.*
18. *Amazon, "Amazon dash button," Nov. 22 2015, amazon.com.*
19. *[19] P. Fernandez and M. Kesselman, "Thinking through the internet of things," Library Hi Tech News, vol. 32, no. 5, 2015.*
20. *[20] S. ELLIS, "Honoring," Chance, vol. 88, p. 65.*
21. *[21] I. Crouch, "The horror of amazon's new dash button," 2 2015.*
22. *[22] T. Benson, "How i hacked amazon's 5-dollar wifi button to track baby data," Aug. 10 2015.*
23. *[23] R. Baguley, "Amazon dash: Hack it to run your own code," Aug. 12 2015, hackaday.com.*