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SMART DOORBELL SYSTEM

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ABSTRACT

Automated doorbell systems have become increasingly popular due to their convenience and ease of use. These systems provide a secure and efficient way for homeowners to monitor and control access to their homes. The need for an automated doorbell system arises from the limitations of traditional doorbells that require physical proximity to operate. An automated doorbell system can be built using a microcontroller such as an Arduino, which can control various components such as an LCD display, a buzzer, a servo motor, and a voltage regulator. The LCD display can be used to display messages and instructions, while the buzzer can provide an audible alert when someone rings the doorbell. The servo motor can be used to control the door lock, and the voltage regulator can ensure that the system runs smoothly and efficiently. The use of a battery and an on-off switch ensures that the system can operate independently of external power sources and can be turned on and off as needed. The addition of a servo motor provides an added layer of security by allowing homeowners to control the door lock remotely. Overall, an automated doorbell system can provide

homeowners with a secure and efficient way to monitor and control access to their homes.

INTRODUCTION

An automated doorbell system is a modern and convenient solution for homeowners to monitor and control access to their homes. Unlike traditional doorbells that require physical proximity to operate, an automated doorbell system can be controlled remotely, providing added security and convenience. The system can be built using various components such as a microcontroller, an LCD display, a buzzer, a servo motor, a battery, an on-off switch, and a voltage regulator. These components work together to provide a seamless and efficient doorbell system that is easy to use and maintain.

In this day and age where security and convenience are essential, an automated doorbell system can provide homeowners with the peace of mind they need. This paper will discuss the need for an automated doorbell system and the various components required to build one. It will also explore the benefits of using an automated doorbell system and how it can enhance home security and convenience.

An automated doorbell system is a technologically driven solution created to enhance the experience of using a regular doorbell. This system operates by spotting a guest at the door and alerting the building's occupants of their arrival utilizing sophisticated sensors and communication technology. Homeowners and business owners can benefit from improved security, convenience, and peace of mind with an automated doorbell system since they can remotely monitor their door even while they are away from their residence or place of business. For an even more complete solution, the

system can be tailored to meet unique requirements and preferences and combined with additional smart home or security gadgets.

An automated doorbell system combines the practicality of contemporary automation with the basic function of a doorbell, which is to let us know when someone approaches our doorway. But it does more than just chime. An automated doorbell system offers a comprehensive solution to improve security, simplify visitor management, and enable smooth control over entry to your property because it is outfitted with cutting-edge sensors, cameras, and intelligent software.

A smart doorbell serves as the central piece of an automated doorbell system, swapping the conventional button for a high-tech gadget that works with your smartphone, tablet, or other connected devices. The technology instantly sends a notification to your mobile when a visitor presses the doorbell or activates a motion sensor, enabling you to see and communicate with the guest in real-time, regardless of where you are.In addition, a lot of automated doorbell systems come with in-built high-definition cameras that record live video or still images so you can see who is at your door before you answer it. Some systems also allow two-way audio communication, which allows you to speak with the visitor from a distance while creating the impression that you are there even when you are not.

Integration with other smart home systems and devices is what distinguishes automated doorbell solutions from the competition. By connecting them to your home automation hub, you can use voice commands or a specialized mobile app to control the doorbell, see the footage, and manage access. With the help of this connection, you can set up customized routines that let you do things like notify you when certain events happen or open the door for trusted visitors automatically.

Additionally, automated doorbell systems that include capabilities like facial recognition and the capacity to capture and store video on the cloud can improve security. With these features, you can monitor who comes onto your property and leaves it, check video for any suspicious activity, and have a trustworthy record in case of an event.In conclusion, an automated doorbell system is a game-changer since it smoothly combines doorbell functions with current technology. These systems offer an unmatched degree of comfort, control, and security thanks to their real-time notifications, visual and audio communication, interaction with smart home devices, and extensive security measures. With an automated doorbell system, you can wave goodbye to the restrictions of conventional doorbells and welcome the future of home security and visitor control.

PROPOSED SYSTEM

Microcontroller: An Arduino microcontroller can be used to control the various components of the system and program it to perform specific functions. LCD Display: An LCD display can be used to display messages and instructions, such as “Press button to ring doorbell” or “Door unlocked”. Buzzer: A buzzer can provide an audible alert when someone rings the doorbell or when the door lock is engaged or disengaged. Servo Motor: A servo motor can be used to control the door lock remotely. This feature can provide an added layer of security and convenience, as homeowners can lock and unlock the door from a distance.

Battery and On-Off Switch: The system can be powered by a battery and include an on-off switch to ensure that it can operate independently of external power sources and be turned on and off as needed.7805 Voltage Regulator: A 7805 voltage regulator can ensure that the system runs smoothly and efficiently.

The proposed system can be programmed to send alerts to the Homeowner’s mobile phone or other devices when someone rings the doorbell. The LCD display can provide instructions to visitors on how to use the system, and the servo motor can be controlled remotely to lock and unlock the door.

The system can be powered by a battery and an on-off switch, ensuring that it can operate independently of external power sources. The proposed automated doorbell system can provide homeowners with a more secure and convenient solution than traditional doorbells. It can be customized to meet individual needs and preferences and can be built with relatively low-cost components.

The system can provide added security features, such as remote access and control, notifications, and even video monitoring, which can help homeowners keep their homes safe and secure.An automated doorbell system can be more convenient than traditional doorbells, as homeowners can control and

monitor their doors remotely, without needing to be physically present.The system can be customized to meet individual needs and preferences, with various features and components that can be added or adjusted to suit the homeowner's specific requirements.

An automated doorbell system can be low maintenance, as it does not require regular wiring or battery replacements, and can be built with components that are durable and long-lasting.
The system can be designed to be accessible for people with mobility or dexterity issues, with features such as remote control, voice recognition, or other alternative methods of access.

INTRODUCTION TO PROPOSED SYSTEM

The System to be developed should consist of several parts namely, power supply, doorbell button, micro-controller, wireless communication module, audio output device. Fig 1 shows the architectural design of the proposed system.

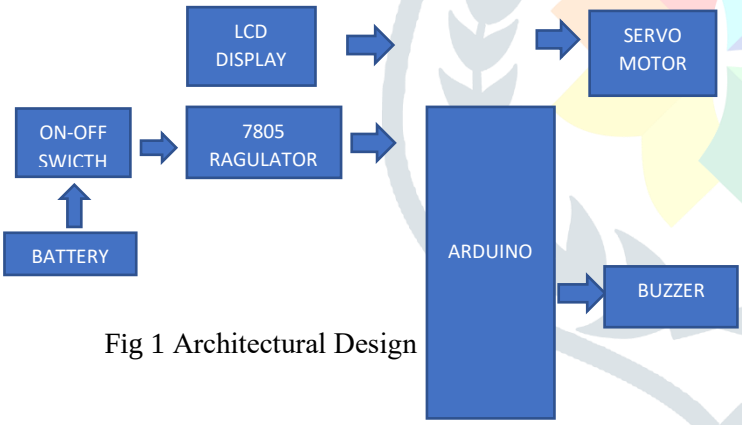

Fig 1 Architectural Design

SYSTEM IMPLEMENTATION

The installation of a smart doorbell system may have an impact on a number of different system components. A smart doorbell system has the following significant system implications

SECURITY SYSTEM INTEGRATION

Smart doorbells can be connected into current security systems to communicate with other security equipment like cameras, alarms, or motion sensors. By offering a thorough surveillance system, this integration improves the overall security of a location.

INTEGRATION WITH HOME AUTOMATION SYSTEMS

Smart doorbells can be connected to home automation systems, giving consumers remote access to a number of features in their houses. When the doorbell rings, users can, for instance, use their smartphones to unlock the door, turn on the lights, or change the thermostat.

REAL-TIME NOTIFICATIONS

When a visitor is at the door, a smart doorbell system may instantly alert homeowners via their smartphones or other electronic devices. This adds another level of convenience and security by ensuring that homeowners are informed of guests even when they are not at home.

VIDEO AND AUDIO RECORDING

Smart doorbells frequently have cameras and microphones that can be used to record audio and video of visitors. This feature can be useful for spotting prospective burglars, recording significant events, or even keeping an eye on regular activities at the front door.

DATA PRIVACY AND SECURITY

Because smart doorbells record audio and video, it's important to think about the privacy and security concerns. To safeguard the data from misuse or unauthorised access, it is crucial to implement strong security measures like encryption and access controls.

Overall, installing a smart doorbell system has a lot of advantages, such as improved security, convenience, and remote accessibility. To guarantee seamless integration and top performance, it also needs thorough design and consideration of numerous system consequences.

RESULT

The dataset was created with the help of photos.py and train_images.py programs. The dataset has over 100 images of the owners showing various facial positions. Fig 2 Hardware implementation of the doorbell system.

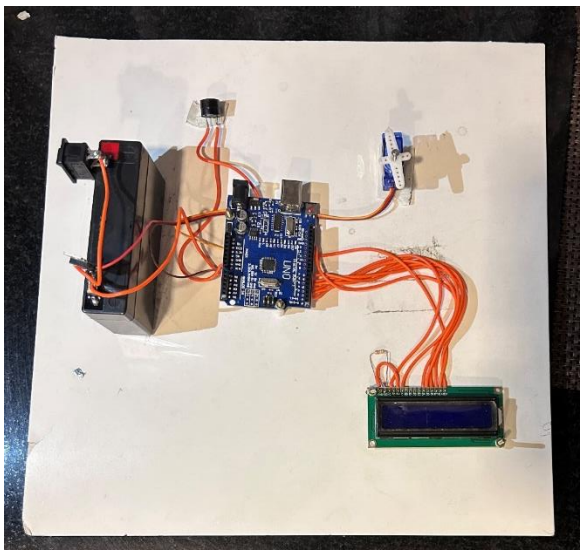

Fig 2 Hardware implementation.

EXPERIMENTAL SETUP

To enhance model's performance, the data was preprocessed and normalized. The appropriate tools for collecting the images of the visitors includes the camera for interpreting their motion and detection.

EXPERIMENTAL RESULTS

The model's performance was increased by enhancing the data with high quality images with clear view of the face.Till now the faces are efficiently recognized and the message about the visitors are on time.

CONCLUSION

In conclusion, the convenience and security advantages of automated doorbell systems have led to their rising popularity in recent years. These systems, which typically include a camera, speaker, and motion sensor, let users view and speak with guests from a distance.Homeowners can gain from automated doorbell systems in the form of improved security, convenience, and peace of mind. They also offer extra functions like video recording, motion detection, and remote access and can be combined with other smart home gadgets.

An automated doorbell system can provide homeowners a safer and more practical alternative to conventional doorbells. With a variety of features and components that may be added or changed to satisfy the homeowner's unique needs, the system can be tailored to meet individual wants and tastes. In order to help homeowners maintain the security of their homes, automated doorbell systems can offer extra security features including remote access and control, notifications, and even video monitoring.

A cost-effective solution for many houses, the system can also be low maintenance and does not require routine wiring or battery replacements. To make sure that the automated doorbell system is installed properly and fits the needs of the homeowner, thorough planning, testing, and refining are necessary. Once installed properly, the device can provide homeowners a more secure, practical, and individualised option than conventional doorbells.

FUTURE ENHANCEMENT

Future automated doorbell system improvements could increase efficiency, convenience, and security in a number of ways. Future doorbell systems might interact even more deeply with smart home ecosystems, enabling users to automate a variety of tasks. For instance, the system might send a notification to the homeowner's smartphone or turn on the foyer lights automatically when someone rings the doorbell.

The doorbell system might become more functional if environmental sensors, including temperature, humidity, or air quality sensors, were added. For instance, the system might warn the owners if the temperature suddenly drops or if it notices poor air quality close to the door. Features like two-factor authentication, encrypted communication, or sophisticated motion detection algorithms could be added to increase security. These upgrades would aid in preventing unauthorised entry or doorbell tampering.

The mobile apps that come with the doorbell system might be improved with further capabilities like two-way audio communication, live streaming of the doorbell camera, and the opportunity to personalise notification settings based on user preferences.

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