CONTACTLESS DOOR BELL

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ABSTRACT

This abstract explores the concept of a contactless doorbell using IoT technology, highlighting its relevance in modern residential and commercial settings. By leveraging sensors and IoT connectivity, the doorbell detects proximity or motion to alert homeowners via smartphone notifications. Additionally, it offers video streaming capabilities for remote visual verification of visitors, enhancing security and convenience. This innovative application of IoT demonstrates its transformative impact on traditional home devices, promoting efficient management of visitor interactions and reinforcing home security measures.

Keywords: Arduino Uno, Ultrasonic Sensor, Buzzer, Jumper Wires, Breadboard.

I. INTRODUCTION

A doorbell is a signaling device that is often installed near a building's entrance door. When a visitor hits the button, an internal bell rings, alerting the occupants to the visitor's presence. It works louder and clearer rather than just knocking. A doorbell before consisted of an actual bell that one had to pull with a rope in order to hear it chime, but today, a doorbell now is mechanical and with just one push of a button, it announces your arrival. However, with this ongoing pandemic, we shouldn't be touching anything from outside of our house as we contribute more to the spreading of germs everywhere around us, which is not what we want right now. Thus, the making of a contactless doorbell. This research will be utilizing the use of ultrasonic sensors due to their effectiveness. An ultrasonic sensor is a device that uses ultrasonic sound waves to determine the distance to an item. A transducer is used in an ultrasonic sensor to emit and receive ultrasonic pulses that relay information about the proximity of an entity. Our study aims to help solve this issue with the contactless doorbell as it is a device that would help reduce and prevent the disease, which results in saving more lives.

II. LITERATURE SURVEY

The literature surrounding IoT-powered contactless doorbells reflects a growing interest in leveraging smart technologies to enhance traditional home security and convenience. Researchers and industry reports consistently highlight the integration of sensors such as motion detectors and proximity sensors as foundational to these devices. These sensors enable the detection of approaching individuals without physical contact, triggering notifications to homeowners via connected smartphones or devices (Moses et al., 2020). Studies emphasize the role of IoT in expanding security features, enabling real-time video streaming and remote access capabilities.

III. PROBLEM STATEMENT AND SOLUTION

Traditional doorbells require physical contact to announce visitors, which can be inconvenient and pose hygiene concerns, especially in today's context of heightened awareness of cleanliness and social distancing. Additionally, conventional doorbells often lack integration with modern smart home technologies, limiting their functionality and security features. These limitations highlight the need for a more advanced solution that enhances convenience while addressing health and security concerns

IV. METHODOLOGY

The methodology for researching IoT-powered contactless doorbells involves a multi-faceted approach to understand their technological implementation, user benefits, and market adoption.Initially, a comprehensive review of existing literature and academic research was conducted to gather insights into the technical specifications, sensor technologies (such as infrared, ultrasonic, and motion sensors), and IoT integration strategies employed in these devices.
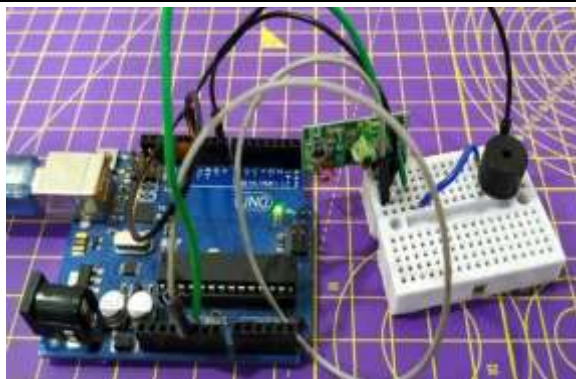
Fig 1: Block diagram

SOFTWAREREQUIREMENTS

- ARDUINO UNO
- LANGUAGE :C++

HARDWAREREQUIREMENTS

- Arduino UNO
- Ultrasonic Sensor
- Jumper wires
- Breadboard
- Buzzer

Arduino Uno:

The Arduino Uno is a popular microcontroller board in the Arduino family, widely used for prototyping and DIY electronics projects. It features an ATmega328P microcontroller at its core, offering a good balance of performance and ease of use. The board includes 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a USB connection for programming and power, a 16 MHz crystal oscillator, a power jack, an ICSP header, and a reset button. These features make it versatile for a wide range of applications, from controlling LEDs and sensors to more complex projects like robotics and home automation. Programming the Arduino Uno is straightforward using the Arduino IDE, which simplifies the process with a user- friendly interface and a rich ecosystem of libraries and community support.

Ultrasonic Sensor:

An ultrasonic sensor is a versatile device commonly used in various applications, from distance measurement to object detection and motion sensing. It operates on the principle of sending out high-frequency sound waves (ultrasonic pulses) and measuring the time it takes for the waves to bounce back after hitting an object. This time measurement helps calculate the distance to the object, utilizing the speed of sound in the air.

Jumper Wires:

Jumper wires are essential components in electronics prototyping and circuit assembly, commonly used to establish connections between various electronic components on breadboards or between different points on a printed circuit board (PCB). They typically consist of flexible wires with connectors or pins at both ends, allowing for quick and easy temporary connections.

Breadboard:

A breadboard is a fundamental tool in electronics prototyping, providing a platform for building and testing circuits without soldering. It consists of a rectangular plastic board with numerous interconnected holes, typically arranged in a grid pattern. These holes are designed to accept the leads of electronic components, such as resistors, capacitors, integrated circuits (ICs), and wires

Buzzer:

A buzzer is an electro-acoustic device used in electronics to produce audible tones or sound alerts. It typically consists of a small housing with a piezoelectric element or an electromagnetic coil and a diaphragm. When an

electrical signal is applied to the buzzer, the piezoelectric element vibrates or the electromagnetic coil generates a magnetic field, causing the diaphragm to oscillate. This oscillation creates sound waves, producing a buzzing or beeping sound depending on the design and frequency of the signal.

V.   PROPOSED SYSTEM

A contactless doorbell system uses infrared sensors or motion detectors to detect visitors without physical contact. When someone approaches, the sensor activities the doorbell, sending a notification to the occupants' smartphones or other devices. Integrated with a camera, it provides visual identification of visitors, enhancing security.

6.1 Data Flow Diagram

A Data Flow Diagram is a showing the flow of data values from their sources in objects through processes the transforms them to their destination
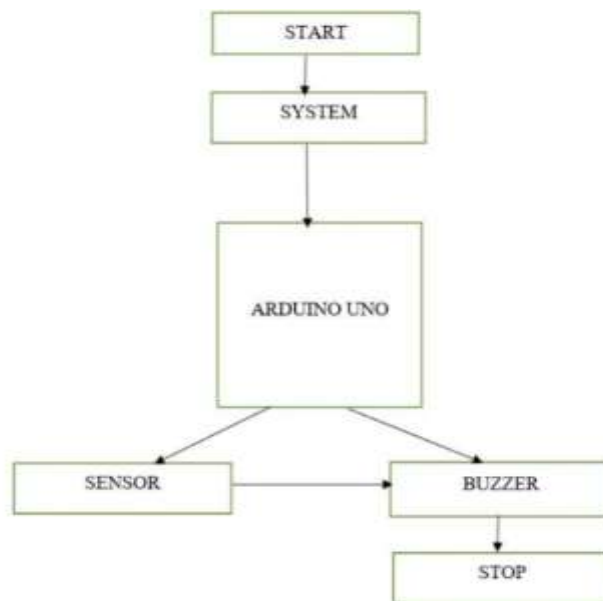

Fig 2: Data flow

6.2 Context Flow Diagram

A context diagram defines for the system, its sub parts and its environment. It comprises the function of the system in associated with external entities.
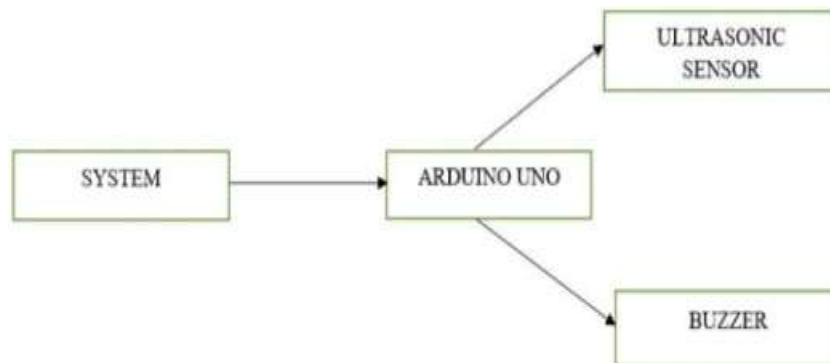

Fig 3: Context Flow Diagram

Applications Of Contactless Door Bell:

- **Accessibility**: Contactless doorbells are beneficial for individuals with disabilities or mobility issues. They provide an easier and more convenient way to alert occupants or staff inside a building without requiring physical interaction or effort.

- **Smart Homes**: In smart home setups, contactless doorbells can be integrated with IoT systems. They can trigger notifications on smartphones or smart displays when someone approaches the door, enhancing

security and convenience.

- **Security**: In conjunction with security systems, contactless doorbells can be part of a broader access control strategy. They can be integrated with cameras or intercom systems to verify visitors before granting access.
- **Public Places**: Contactless doorbells are useful in public places like libraries, museums, and government buildings. They provide a way for visitors to announce their presence or request assistance without physically interacting with staff.

VI.   CONCLUSION

In conclusion, contactless doorbells represent a significant advancement in both convenience and safety across a wide range of applications. By eliminating the need for physical contact with traditional doorbell buttons, these innovative devices contribute to maintaining hygiene standards, particularly in sensitive environments like hospitals, clinics, and food establishments. Moreover, they enhance accessibility for individuals with disabilities, offering a user-friendly solution that requires minimal effort to operate. In smart home environments, contactless doorbells integrate seamlessly with IoT systems, providing real-time notifications and enhancing security measures. Their versatility extends to commercial settings, where they streamline visitor management and contribute to a more efficient and secure operational environment. As technology continues to evolve, contactless doorbells exemplify how simple yet effective innovations can significantly improve everyday experiences while addressing contemporary challenges such as hygiene concerns and accessibility needs.

VII.   REFERENCES

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