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Social Distancing In Id Card System

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ABSTRACT:

Social distancing has become a critical public health strategy during pandemics like COVID-19. This study proposes integrating social distancing measures into ID card systems to enhance compliance and safety. By embedding proximity sensors and leveraging real-time data analytics, these systems can monitor individual proximity, provide alerts when safe distances are breached, and identify high-risk areas. Additionally, they can support contact tracing efforts, helping to limit disease spread. The implementation focuses on workplaces, educational institutions, and public spaces, aiming to assess the system's feasibility in promoting safer environments. Key considerations include data privacy, user acceptance, and compatibility with existing infrastructures. This project also aims to develop a prototype to demonstrate the effectiveness of this innovative approach in reducing transmission risks and supporting public health efforts.

Key Issues in IoT Applications

1. **Device Overload:** The exponential growth in connected devices presents challenges in network bandwidth, compatibility, and management.
2. **Data Privacy and Security:** The vast amount of data collected by IoT devices is vulnerable to breaches, raising concerns about user privacy and secure data handling.
3. **Infrastructure Costs:** Expanding IoT networks demands significant investments in sensors, communication networks, and storage solutions.
4. **Interoperability:** Lack of standardized protocols makes it difficult for devices from different manufacturers to work together seamlessly.
5. **Energy Consumption:** Many IoT devices are constrained by battery life, making energy-efficient designs crucial.

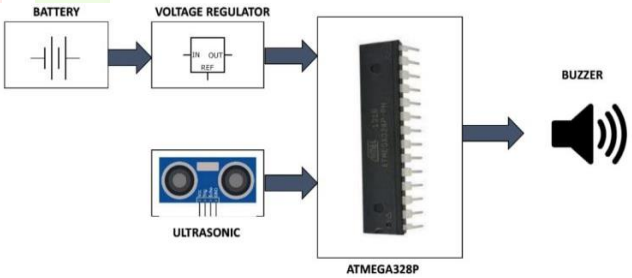
6. **Regulatory Challenges:** Different regions have varying laws and guidelines, complicating the global deployment of IoT technologies.
7. **Scalability and Maintenance:** Managing updates, connectivity, and scalability of millions of devices is a logistical challenge.

User Engagement in IoT

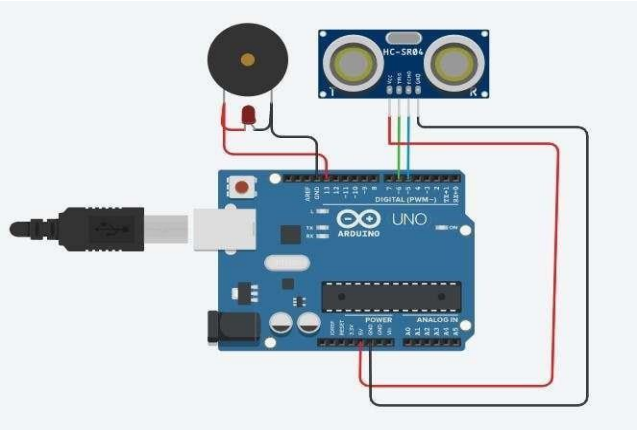
1. **Enhanced Connectivity:** IoT systems enable real-time interaction between devices and users, offering greater control and responsiveness.
2. **Personalized Experiences:** IoT devices use data analytics to offer tailored experiences, such as customized environmental settings in smart homes.
3. **Automation and Efficiency:** From automating daily tasks in homes to optimizing industrial operations, IoT fosters efficiency and productivity.
4. **Ease of Access:** Mobile applications and cloud integration allow users to monitor and control devices remotely, increasing convenience.
5. **Feedback Loop:** IoT encourages users to provide data and feedback, which helps refine device functionalities and user satisfaction.

Methodology for the System

1. **Block Diagram Overview:** The system's block diagram outlines the functional units, including Arduino Uno as the controller, input sensors (ultrasonic sensor), and output components (LEDs and piezo buzzer). Each block represents a specific role, ensuring seamless integration and communication between components.



2. **Circuit Design:** The circuit diagram demonstrates the connection of all components, including power supply, input/output pins, and signal pathways. Proper connections between the Arduino Uno, ultrasonic sensor, LEDs, and buzzer ensure accurate functioning and reliable output.



3. Component Description:

- **ArduinoUno:**

  An open-source microcontroller board based on the ATmega328P chip, providing a platform for programming and interfacing with sensors and actuators. Its versatility allows for easy integration and control of connected devices.
- **Ultrasonic Sensor(HC-SR04):**Used for non-contact distance measurement by emitting ultrasonic waves and detecting their reflection. It calculates distance using the time-of-flight principle, offering accuracy up to 3mm for objects within 2-400 cm range.
- **LEDs:** Serve as visual indicators in the system. When connected, LEDs emit light based on the p-n junction's properties, producing visible or near-visible illumination depending on material composition.
- **PiezoBuzzer:** Provides an auditory alert based on the input voltage, emitting sound at a predefined frequency. It operates within a voltage range, with various models catering to different power requirements.

3. **How the System Works:**

- **Signal Transmission and Reception:** The ultrasonic sensor emits ultrasonic pulses triggered by the Arduino and waits for reflected signals. The time taken for the echo helps determine the distance of an object.
- **Distance Calculation:**The Arduino processes the echo signal's duration to compute the object's distance using the speed of sound and a simple distance-speed-time formula.
- **Outputs Activation:**Based on the calculated distance, the system activates the LEDs or piezo buzzer. For example, if the distance is below a threshold, the buzzer and LED alert users about the object's proximity.

4. **Software Implementation:** The Arduino Uno is programmed using the Arduino IDE. The code includes logic for triggering the sensor, receiving input signals, calculating distances, and activating the outputs based on conditions.
5. **Testing and Calibration:** After assembling the system, it is tested under various scenarios to ensure accurate distance measurement, reliable output, and consistent performance. Calibration is performed to fine-tune sensor sensitivity and output responses.

LITERATURE SURVEY

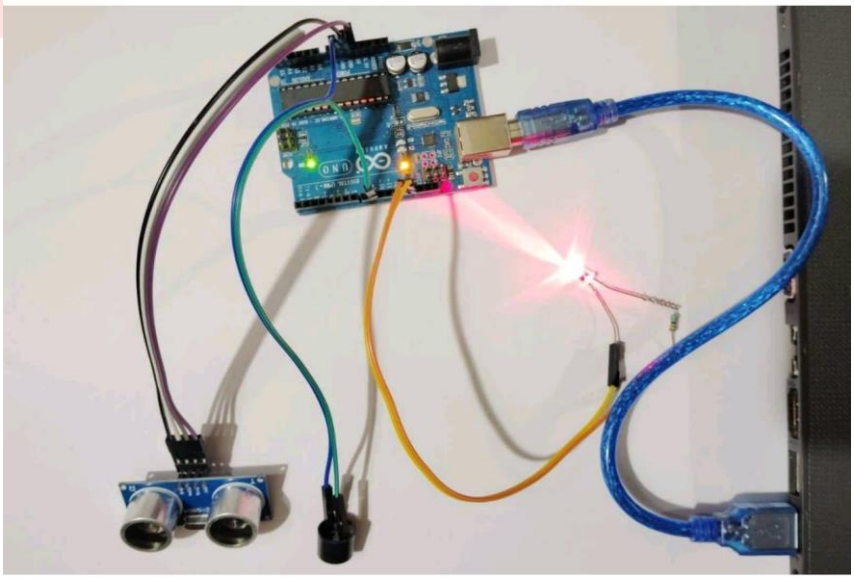
Technological advancements in electronics are driving innovation in automation and campus security. In the 21st century, "smart access cards" have become integral in educational, business, and government sectors, utilizing diverse technologies to streamline operations. These cards commonly leverage **high-frequency RFID (Radio Frequency Identification)** technology for contactless functionality, offering superior reliability compared to traditional magnetic stripe cards.

Magnetic stripe cards, often used for identification, require physical swiping, which can slow down access and create inefficiencies. Additionally, they are prone to demagnetization, which further limits their reliability.

Features and Benefits of Smart Access Cards:

1. **Streamlined Access**: RFID-enabled contactless cards eliminate the need for swiping, ensuring faster and smoother entry processes without causing delays.
2. **Integrated Payment Options**: These cards can serve as prepaid debit cards, allowing students to pay for meals, vending machines, and event tickets. Parents and students can also monitor spending, add funds, and set automated allowances through online portals.
3. **Enhanced Campus Security**: Smart cards provide unique identification for each user, reducing the risk of unauthorized access and improving overall safety measures.
4. **Cost-Effective Multi functionality**: By combining various uses such as identification, access, and payment into a single card, institutions can simplify campus management while cutting operational costs.

RESULT:



The **HC-SR04 Ultrasonic Sensor** is used to measure the distance of objects using SONAR technology. It emits ultrasonic waves at a frequency of 40 kHz, which travel through the air, strike an object, and bounce back to the sensor. The module has four terminals: **VCC** (+5V power supply), **TRIG**, **ECHO**, and **GND**, with TRIG and ECHO connected to the Arduino's digital I/O pins. The sensor is effective for distances between **10 cm to 3 m**, with a resolution of **0.3 cm**, and has a maximum range of **4.5 m**.

During the COVID-19 pandemic, the importance of maintaining social distance became a priority, and it remains relevant even today. However, people often forget to adhere to social distancing guidelines. To address this issue, a **wearable social distancing ID card** was developed to remind individuals to maintain proper distance.

The system employs an ultrasonic sensor, an ATmega microcontroller, a buzzer, and basic electronic components.

The ultrasonic sensor continuously measures the distance to nearby objects. The microcontroller processes this data to determine if someone is within a specified range. Based on the detected distance, the buzzer's intensity changes:**closer objects trigger a higher intensity alert**, while farther objects result in a less intense or no alert. This automated system ensures that individuals are reminded to maintain social distance effectively.

CONLUSION

The analysis and design of social distancing and alert system is presented. The proposed system is used to avoid unnecessary encounters between person to person. And also, this system used for security purpose of a person so that he or she can maintain a minimum distance of 6 feet. This paper involves avoiding encounter to unconsciousness through getting accumulate at a particular place. It’s like the time when two person encounters each other after having the social distancing device wearing the ultrasonic sensors detect the presence and it’s like violating the rule of getting closer to someone than maintain a 6feet distance thus it will give a beep so it makes both persons aware.

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