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DISTANCE GUARD HAT USING IOT

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PROJECT OVERVIEW :

This model is proposed for controlling the covid-19 pandemic situation and from the similar kind of diseases worldwide. This model uses IOT technology connected with various high quality sensors which detects and finds the right gap between the persons and objects which avoids the chances of spreading diseases.

This Physical Distancing Cap has multiple ultrasonic sensors that use sonar to measure distance from an object (or humans in this case). It provides excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package. The range of the sensor is 2 cm to 400 cm with an accuracy of 5 mm. The module consists of an ultrasonic transmitter, receiver, and control circuit. If a human approaches, it has a piezo buzzer that sounds an alarm to help us keep a safe distance between crowded populations.

INTRODUCTION :

The **DistanceGuard Hat** represents a groundbreaking fusion of wearable technology and the Internet of Things (IoT), designed to enhance personal safety by promoting physical distancing. In a world where maintaining appropriate space is increasingly critical for health, particularly in crowded or public settings, this innovative device serves as a proactive solution.
By integrating IoT sensors into a comfortable, everyday accessory like a hat, it allows for seamless monitoring of proximity between individuals. The hat uses advanced proximity sensors, such as ultrasonic or Bluetooth-based technologies, to detect nearby people, triggering alerts when the wearer is too close to others. Through real-time feedback, it helps users adhere to social distancing protocols, reducing the likelihood of accidental close contact in high-risk environments
Additionally, the Distance Guard Hat connects to smartphones or other IoT devices to collect valuable data on crowd density and interaction patterns, providing users and organizations with actionable insights to improve safety measures. This wearable device not only prioritizes health and safety but also paves the way for future IoT-enabled solutions in the realm of personal protective equipment and public health.

SYSTEM ARCHITECTURE :

HARDWARE REQUIREMENTS :

Semiconductors

- Board: Arduino Uno
- US1-US4: HC-SR04 Ultrasonic Sensors
- Piezo Buzzer

Miscellaneous

- 9V PP3 Battery
- DC 2.1mm Plug
- Jumper Wires
- Cap

Tools

- Arduino IDE
- Arduino based programming language similar to C.

BACKGROUND STUDY :

EXISTING SYSTEM :

- In Existing , there is no systems like the social distancing cap , some are used to measure the distances and weapon checking with a sound but used for various other purposes and completely different so due to the lapse of availability to maintain social distancing our proposed system paved the way for the Social distancing cap with IOT technology.
- Current wearable technology has made strides in monitoring health metrics such as heart rate, step count, and even sleep patterns, but there is a notable gap in the market for wearables that actively help maintain physical distance.
- By integrating IoT technology, the DistanceGuard Hat proactively assists wearers in maintaining the legally mandated physical distance. It does so by providing immediate feedback whenever someone enters the predefined safety zone around the wearer

PROPOSED SYSTEM

- The proposed system paves the way for maintaining proper distances without much thing to do with it.
- It is a useful and an effective technology which is very much capable of spreading the safety awareness and helps in controlling the pandemic situations going worldwide.
- In near future there is a lot of chance that most of the people will be using these kind of devices based distancing cap.
- **Enhanced Accuracy:**The sensors in the cap are specifically designed to measure distance accurately, reducing the errors and false alerts common with smartphone apps. This ensures more reliable distance monitoring.
- **Simple Operation:**The cap is designed to be intuitive and easy to use. Users don't need to interact with complex technology; they simply wear the cap and receive alerts when needed.

SYSTEM DESIGN AND ANALYSIS :

ARDUINO UNO

The Arduino is an open-source microcontroller board created by Arduino.cc that is based on the Microchip ATmega328P microprocessor. A variety of expansion boards (shields) and other circuits can be interfaced with the board's sets of digital and analogue input/output (I/O) pins. The Arduino IDE (Integrated Development Environment) can be used to program the board, which contains 14 digital I/O pins (six of which can produce PWM), 6 analogue I/O pins, and a type B USB connector. Although it supports voltages ranging from 7 to 20 volts, it can be powered by an external 9-volt battery or by the USB cable. It is comparable to the Leonardo and Arduino Nano. The Arduino website offers the hardware reference design for free under a Creative Commons Attribution Share-Alike 2.5 license. For certain hardware versions, layout and production files are also accessible.

UNO SPECIFICATION

- Developer: Arduino
- Manufacturer: Many
- Type: Single-board microcontroller
- Retail availability: https://store.arduino.cc/usa/ Operating
- system: None
- CPU: Microchip AVR (8-bit)
- Memory: SRAM
- Storage: Flash, EEPROM

ULTRA SONIC SENSORS

Sonar is used by the HC-SR04 ultrasonic sensor to measure distance from an item (or, in this case, people). In a user-friendly form, it provides outstanding non-contact range detection with high accuracy and consistent results. It has an accuracy of 5 mm and a range of 2 to 400 cm.

An ultrasonic transmitter, receiver, and control circuit make up the module. The four pins of the HC-SR04 ultrasonic sensor are as follows:

- VCC: +5V DC
- Trig: Trigger (input)
- Echo: Output
- GND: Ground

PIEZO BUZZER

Piezo buzzers are simple devices that can generate

I. Basic beeps
II. Tones

ARDUINO IDE

A text editor for writing code, a message box, a text console, a toolbar with buttons for frequently used tasks, and a number of menus are all included in the Arduino Integrated Development Environment, also known as the Arduino Software (IDE).

In order to upload programs and interact with the Arduino and Genuino hardware, it connects to them. Sketches are programs created with the Arduino Software (IDE). The text editor is used to write these sketches, which are then saved with the.ino file extension.

The editor offers tools for text replacement and search as well as cutting and pasting. The message section shows issues and provides feedback during exporting and saving. The Arduino Software (IDE)'s text output, including comprehensive error messages and other data, is shown in the console.The configured board and serial port are shown in the window's lower right corner. The toolbar buttons let you create, open, and save sketches, view the serial monitor, and check and upload programs.

TESTING METHODS

The different types of testing are:

- Usability Testing
- Compatibility Testing
- Reliability and Scalability Testing
- Data Integrity Testing
- Security Testing
- Performance Testing

USABILITY TESTING

The devices that people utilise come in a wide variety of shapes and sizes. Additionally, each user has a different impression. In IoT testing, it is crucial to verify the system's usability.

COMPATIBILITY TESTING

As a result of the wide range of devices that can be connected through IOT systems, which have different hardware and software configurations, there are a lot of possible combinations.

RELIABILITY AND SCALABILITY TESTING

When creating an IOT test environment that uses virtualisation techniques and technologies to simulate sensors, reliability and scalability are crucial.

DATA INTEGRITY TESTING

Because IOT testing involves a lot of data and its applications, it's critical to verify data integrity.

SECURITY TESTING

Many users are accessing vast amounts of data in the IOT environment. Therefore, as part of security testing, it is crucial to establish data privacy rules and confirm users through authentication.

PERFORMANCE TESTING

A strategic approach to creating and carrying out an IOT testing plan requires performance testing.

CONCLUSION :

The main reason for the outbreak of COVID-19 is due to the indiscipline of social distancing. The Physical Distancing Cap helps to be cautious and gives an indication and makes us to be in a safer distance especially in this pandemic kind of situations. Hereafter if we follow social distancing properly we can overcome this pandemic and can lead a very normal and a healthy life. To be safe and secure we can use this Physical Distancing Cap and it will be a support for us to be discipline in maintaining the distances in crowds as well.