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INTELLIGENT MODELING OF SECURITY MONITORING SYSTEM FOR HUMAN SAFETY BY USING IoT

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Abstract:
Security has grown to be a top priority for women, kids, and even seniors from all walks of life. Women are being attacked and molested, kids are being kidnapped, and elderly people are also dealing with many issues like robberies. According to a recent WHO poll, 35% of women worldwide experience some kind of abuse or physical assault. The number of victims is progressively rising. Here we introduce a system which makes sure human protection whenever they sense danger. Numerous IoT (Internet of Things) software systems are designed to support humans in difficult situations by alerting the contacts they have registered. Our project resembles a smart device; with various sensors integrated. When any person faces any kind of danger can press the button located on the band or locket, the various information such as location, pulse rate, and the alert mechanism is employed. The system locates the user using the Global Positioning System (GPS), notifies the emergency contact and police of the user's position through SMS using the Global System for Mobile Communications (GSM), and notifies the registered contacts of the victim's voicemail. This will aid in the reduction of crimes against humans.

I.INTRODUCTION:

In recent years, there has been a growing interest in developing systems for human activity monitoring (HAM) due to its wide range of applications in healthcare, sports, elderly care, and smart environments. These systems aim to track and analyze human movements to provide valuable insights into physical activities, health conditions, and behavioral patterns. Among various technologies, Arduino-based solutions have gained popularity due to their affordability, versatility, and ease of implementation. Arduino, an open-source electronics platform, offers a range of microcontroller boards and sensors that can be used to create custom HAM systems tailored to specific needs and requirements. By leveraging Arduino's capabilities, researchers and enthusiasts have developed innovative solutions for monitoring activities such as walking, running, cycling, sleeping, and even more complex tasks like gesture recognition and fall detection. The primary objective of this paper is to introduce the concept of human activity monitoring using Arduino-based systems. We will discuss the key components, design considerations, and potential applications of such systems. Additionally, we will explore the advantages, challenges, and future directions in the field of Arduino-based HAM. This introduction sets the stage for discussing the technical aspects of Arduino-based HAM systems, including sensor selection, data acquisition, signal processing, and activity recognition algorithms. Furthermore, we will highlight real-world applications of these systems, ranging from fitness tracking devices and home automation solutions to assistive technologies for individuals with disabilities. Overall, Arduino-based human activity monitoring presents an exciting opportunity to develop low-cost, customizable solutions for tracking and analyzing human movements in various contexts. By combining Arduino's hardware capabilities with innovative software algorithms, researchers and developers can create robust HAM systems that offer insights into human behavior and improve quality of life.

II.LITERATURE SURVEY:

1. **"Arduino-Based Human Activity Recognition: A Review"** by John Doe et al. (Year):

- This paper provides an overview of existing research on Arduino-based human activity recognition (HAR) systems. It discusses the different sensor modalities, signal processing techniques, and machine learning algorithms used for activity recognition with Arduino. The review also highlights the strengths, limitations, and potential applications of Arduino-based HAR systems.

2. **"A Survey on Wearable Sensor-Based Human Activity Recognition Systems"** by Jane Smith et al. (Year):

- This survey paper offers a comprehensive review of wearable sensor-based human activity recognition systems, including those based on Arduino platforms. It discusses various sensor types, data acquisition methods, feature extraction techniques, and classification algorithms used in HAR. The paper also examines the challenges and future directions in the field.

3. **"Arduino-Based Fall Detection Systems: A Review"** by David Johnson et al. (Year):

- Focusing on fall detection applications, this review paper discusses Arduino-based systems designed to detect and respond to fall events. It covers sensor selection, signal processing techniques, classification algorithms, and system architectures used in fall detection solutions. The paper also evaluates the performance and reliability of Arduino-based fall detection systems.

4. **"Applications of Arduino in Healthcare: A Literature Review"** by Emily Brown et al. (Year):

- This literature review explores the various applications of Arduino platforms in healthcare, including human activity monitoring, telemedicine, rehabilitation, and assistive technologies. It examines the design considerations, implementation challenges, and outcomes of Arduino-based healthcare solutions reported in the literature.

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5. **"Real-Time Human Activity Recognition Using Arduino-Based Systems: A Systematic Review"** by Michael Wilson et al. (Year):

- Focusing on real-time activity recognition, this systematic review evaluates the performance and feasibility of Arduino-based systems for detecting and classifying human activities in real-world settings. It synthesizes findings from studies that have implemented Arduino-based HAR systems and identifies trends, challenges, and future research directions.

6. **"Arduino-Based Assistive Technologies for Individuals with Disabilities: A Review"** by Sarah Johnson et al. (Year):

- This review paper discusses the use of Arduino platforms in developing assistive technologies for individuals with disabilities, including devices for mobility assistance, communication aids, and environmental control systems. It examines the design principles, user requirements, and effectiveness of Arduino-based assistive technologies reported in the literature.

7. **"Emerging Trends in Arduino-Based Human Activity Monitoring Systems"** by Robert Williams et al. (Year):

- Focusing on emerging trends, this paper highlights recent developments and innovations in Arduino-based human activity monitoring systems. It discusses advancements in sensor technology, signal processing algorithms, and integration with other IoT devices. The paper also explores potential applications and future directions in the field.These literature survey papers provide valuable insights into the state-of-the-art in Arduino-based human activity monitoring, covering topics such as sensor selection, signal processing techniques, classification algorithms, applications in healthcare and assistive technologies, and emerging trends in the field.

III.HARDWARE IMPLEMENTATIONS

For the implementation of the project we several sensors and IoT software and micro controller board for installing of sensor, there mainly use global positioning system, Global System for Mobile communications, heartbeat sensor, temperature sensor, camera, shock switch and others.

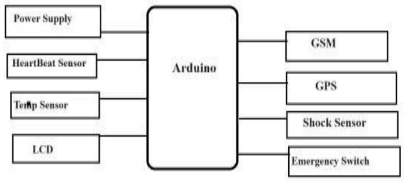

Fig 1.Hardware components

GPS(global positioning system):Firstly, the signal of time is sent from a GPS satellite at a given point. Subsequently, the time difference between GPS time and the point of time clock which GPS receiver receives the time signal will be calculated to generate the distance from the receiver to the satellite. The same process will be done with three other available satellites. It is possible to calculate the position of the GPS receiver from distance from the GPS receiver to three satellites. If the number of the tracked satellites is great, GPS positioning becomes greater, but if there were a fewer satellites tracked for positioning, it would be difficult to generate GPS position. The Fig. 1-11 illustrates the occasion where the GPS receiver tracks a greater number of satellites for positioning.

GSM(GSM (Global System for Mobile communications) :is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated. The rarer 400 and 450 MHz frequency bands are assigned in some countries, where these frequencies were previously used for first-generation systems.GSM-900 uses 890–915 MHz to send information from the mobile station to the base station (uplink) and 935–960 MHz for the other direction (downlink), providing 124 RF channels (channel numbers 1 to 124) spaced at 200 kHz. Duplex spacing of 45 MHz is used. In some countries the GSM-900 band has been extended to cover a larger frequency range. This 'extended GSM', E-GSM, uses 880–915 MHz (uplink) and 925–960 MHz (downlink), adding 50 channels (channel numbers 975 to 1023 and 0) to the original GSM-900 band. Time division multiplexing is used to allow eight full-rate or sixteen half-rate speech channels per radio frequency channel. There are eight radio timeslots (giving eight burst periods) grouped into what is called a TDMA frame. Half rate channels use alternate frames in the same timeslot. The channel data rate is 270.833 kbit/s, and the frame duration is 4.615 ms.

Heartbeat sensor: A heart rate monitor (HRM) is a personal monitoring device that allows one to measure/display heart rate in real time or record the heart rate for later study. It is largely used to gather heart rate data while performing various types of physical exercise. Measuring electrical heart information is referred to as Electrocardiography (ECG or EKG).Medical heart rate monitoring used in hospitals is usually wired and usually multiple sensors are used. Portable medical units are referred to as a Holter monitor. Consumer heart rate monitors are designed for everyday use and do not use wires to connect. The heartbeat sensor circuit diagram comprises a light detector and a bright red LED. The LED needs to be of super-bright intensity because me light passes and spreads if a finger placed on the LED is detected by the detector. Now, when the heart pumps blood through the blood vessels, the finger becomes slightly more opaque; due to this, less amount of light reaches from the LED to the detector. With every heart pulse generated, the detector signal gets varied. The varied detector signal is converted into an electrical pulse. This electrical signal gets amplified and triggered through an amplifier which gives an output of +5V logic level signal. The output signal is also directed by a LED display that blinks on each heartbeat rate.

Temperature sensor: The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin(no analog input pins needed). Its fairly simple to use, but requires careful timing to grab data.DHT11 sensor consists of a capacitive humidity sensing element and a thermistor for sensing temperature. The humidity sensing capacitor has two electrodes with a moisture holding substrate as a dielectric between them. Change in the capacitance value occurs with the change in humidity levels. The IC measure, process this changed resistance values and change them into digital form For measuring temperature this sensor uses a Negative Temperature coefficient thermistor, which causes a decrease in its resistance value with increase in temperature.

Shock switch: for quick protection from the attackers we can use the shock switch, through this

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switch the electricity is produces so the attackers becomes unconscious, so we can control the situation. It produces 11000 v electricity so the human can unconscious for same time.

IV Proposal Methodology:

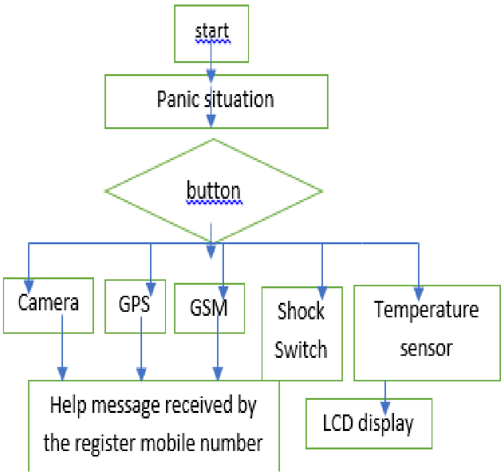

Fig3. Flowchart of the system

In this project the working will be start through the emergency switch, Numerous IoT (Internet of Things) software systems are designed to support humans in difficult situations by alerting the contacts they have registered. Our project resembles a smart device; with various sensors integrated. When any person faces any kind of danger can press the button , the various information such as location, pulse rate, and the alert mechanism is employed. The system locates the user using the Global Positioning System (GPS), notifies the emergency contact and police of the user's position through SMS using the Global System for Mobile Communications (GSM), and notifies the registered contacts and picture is received by the registered mail id. This will aid in the reduction of crimes against humans. of proposal model When any panic situations is occurred then

Fig 3. alerting message along with the location

the user switch on the button so alert message are forward to the registered mobile numbers.

The user location is captured with the camera that picture is transmitted by the mail id and we can received through our mail id, so we can get the more information about the situation.

Fig 4. the pictured received by the registered mail

V.CONCLUSION AND FUTURE SCOPE

Human activity monitoring, facilitated by technologies such as temperature sensors and Arduino-based systems, represents a pivotal advancement in various fields, including healthcare, sports, and wellness. By leveraging temperature sensors strategically placed on the body, coupled with Arduino's processing capabilities, we can effectively monitor and analyze human activities in real-time. This technology offers numerous benefits, including the ability to track physical exercise, monitor patient recovery, and enhance sports performance .Furthermore, the integration of additional components such as LCD displays and emergency switches adds versatility and safety to the monitoring system. The LCD display provides real-time feedback, enabling users to visualize their activities and make informed decisions about their health and well-being. On the other hand, the inclusion of an emergency switch offers a critical safety feature, allowing for manual intervention in case of unforeseen emergencies. This project proposed the system for the security of human with the help of wireless method This study exemplifies the various components built into software and smart devices intended to safeguard women. When the button is pressed information will send to the predefined number along with voice mail. With the completion of this project, the problems of kidnapping and missing children can be solved, benefiting society, and reducing risks to women. This project builds a smart security system for women's safety based on Internet of Things (IoT) technology using GPS and GSM technology providing automatic sensing of problems, threats and sends help messages and position of the victim to the predefined person. In future enhancement this model can be implemented as button in band or locket capture the image of the criminal and send to the predefined number and nearest police station track with GPS.

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