ALERT SYSTEM TO PREVENT DROWNING USING IOT

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ABSTRACT

Every hour, more than 40 lives are tragically lost to drowning, making it a leading cause of unintentional death worldwide. While various drowning prevention systems have been developed, many of them lack accuracy in detecting drowning incidents and fail to provide an effective rescue mechanism for swimmers in distress. The Smart Anti-Drowning and Alert System is designed to address these shortcomings by promptly detecting and rescuing individuals at risk of drowning while also alerting the relevant authorities. This system relies on two key sensors: a voice recognition sensor and an alarm sensor, which trigger an audible alarm in the event of a drowning emergency.

Ensuring the safety of swimmers is our paramount concern. To achieve this goal, the development of efficient drowning detection systems is imperative. As a result, numerous innovations aimed at preventing drowning and aiding drowning victims have emerged over the years. This paper focuses on a comprehensive examination of drowning detection and prevention strategies. It explores a wide array of methods and innovative technologies that have been proposed to enhance pool safety. Among the most popular approaches are heartbeat sensing, motion sensing, and image processing. The paper represents a synthesis of innovative and traditional techniques in the realm of drowning prevention. These systems have the potential to be life-saving tools for individuals in perilous drowning situations.

Keywords: Drowning prevention, IoT system, Swimmer safety, Detection systems.

INTRODUCTION

GENERAL INTRODUCTION

The Internet of Things (IoT) describes the network of physical objects- “things” that are embedded with sensors,

software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools.

INTERNET OF THINGS

The collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves.

GENERATION OF INTERNET OF THINGS

Generation IoT is first defined by openness- open standards, open collaboration, open communications, and open, flexible business models. Members of Generation IoT can be found in IT or operational technology (OT). They can run the plant or be part of the supply chain. They can be vendors, contractors, or CXOs. They can be young or old.

All are willing to learn and take risks, and are good at building virtual teams internally and partnering externally. You can recognize these new winners not by their age or their titles-but by their ability to build and deploy agile, flexible business solutions. Here's an example of what Generation IoT can do: A decade ago, visionaries talked about mass customization-building mass-produced products to each individual buyer's specifications. But it was difficult to implement efficiently and proved to be an idea ahead of its time.

Today, IoT makes this concept much more practical and cost-effective because information can be shared in real time between every element in the supply chain. Buyers can click on the components they want. Suppliers and logistics providers can see what is being ordered and adjust their scheduling accordingly.

Production systems can be retooled as needed. With the information flowing up and down the supply chain, all the necessary materials are at the production line when that customer's order is being assembled, whether it's a car or a three-piece suit. With IoT, mass customization is not just a future possibility-it's starting to happen. Daihatsu Motor Company is already using 3D printers to offer car buyers 10 colors and 15 base patterns to create their own "effect skins" for car exteriors. Each car rolls off the line customized for that individual buyer.

Here we have to use the different types of sensors to build the IOT device to

prevent the drowning peoples. Drowning is a global concern that claims thousands of lives each year, particularly among children and individuals with limited water safety awareness. In an effort to mitigate this alarming trend, there is a growing interest in integrating advanced technologies into water safety systems.

IoT technology allows for the seamless integration of devices and systems, creating an interconnected network that can enhance real-time monitoring and response capabilities. Applying IoT principles to water safety opens up new possibilities for drowning prevention through the incorporation of intelligent sensors and data analytics. Combining voice recognition and ultrasonic sensor data provides a comprehensive approach to drowning prevention. The IoT platform serves as the central hub for collecting, processing, and analyzing information in real-time. Advanced algorithms can differentiate between regular water activities and emergency situations, ensuring accurate and reliable alerts. The proposed system aims to be user-friendly and accessible to a wide range of users. Mobile applications and wearable devices equipped with the capability to communicate with the IoT network empower individuals to take preventive measures and respond promptly in emergency situations.

EXISTING SYSTEM

Anti-drowning existing systems encompass a range of technologies, approaches, and safety measures designed to prevent or mitigate drowning incidents. These systems can be implemented in various aquatic environments to enhance water safety. Some existing anti-drowning systems include:

Lifeguards: Trained lifeguards play a critical role in preventing drowning incidents by monitoring swimmers, providing assistance when needed, and initiating rescue operations in emergencies.

Pool Safety Equipment: Swimming pools are often equipped with safety measures such as lifebuoys, reach poles, and ring buoys to aid in rescues and assist struggling swimmers.

Swimming Lessons: Formal swimming lessons and water safety education can help individuals, especially children, develop essential swimming skills and water safety knowledge.

Public Awareness Campaigns: Public awareness campaigns provide information about water safety and the importance of

supervision and responsible behavior in and around water.

Here are some examples of existing anti-drowning systems:

Pool Alarm Systems: Pool alarm systems are designed to detect water disturbances in residential swimming pools. These systems use sensors to monitor the water surface, and an alarm is triggered if significant disturbances, such as a person falling into the pool, are detected.

Wearable Devices: Several companies have developed wearable devices specifically designed for water safety. These devices can be worn as wristbands, necklaces, or attached to clothing. They often incorporate sensors to monitor the wearer's movements and can send alerts in the event of prolonged submersion or unusual patterns indicative of distress.

Underwater Motion Sensors: Underwater motion sensors are deployed in swimming pools or other aquatic environments to detect unusual underwater movements. These sensors can identify the presence of a person in the water and can be integrated with alarm systems or surveillance cameras.

Computer Vision and Surveillance Systems: Advanced computer vision systems and underwater cameras are used to monitor swimming areas. These systems can recognize human shapes, movements, and behaviors. Algorithms are employed to detect potential drowning incidents and trigger alerts or notifications to lifeguards or designated authorities.

Drowning Detection Platforms: Some companies offer comprehensive drowning detection platforms that combine various technologies, including video analytics, wearable devices, and smart algorithms. These platforms aim to provide real-time monitoring and rapid response capabilities in aquatic environments.

Remote Monitoring Systems: Remote monitoring systems use IoT technologies to track and monitor swimming activities. These systems may include sensors placed in the water, wearable devices, or a combination of both. Alerts are sent to caregivers or lifeguards if unusual events are detected.

Education and Training Programs: While not a technological system, educational programs play a crucial role in drowning prevention. These programs provide water safety training, swimming lessons, and awareness campaigns to promote responsible behavior around water.

These existing anti-drowning systems and safety measures work in combination to reduce the risk of drowning incidents and enhance water safety in various aquatic environments. The effectiveness of these measures often depends on factors like awareness, training, adherence to safety guidelines, and the presence of trained personnel. It's important to consider that the effectiveness of these systems may vary based on factors such as the specific environment (e.g., pool, beach, natural water bodies), user compliance, and the integration of multiple technologies for a comprehensive approach.

DISADVANTAGES

Technical Challenges, False Alarms, Technical Failures.

Cost, Training Requirements, Network Connectivity.

PROPOSED SYSTEM

The proposed drowning framework includes a low-cost and lightweight IoT node that continuously recognise a person's voice. The proposed IoT based alert system to recognise the drowning person's voice and it produces the alert sound to the nearby peoples. The proposed system consists of three layers as voice recognition, alert the message about the victim, nearby peoples. These layers have individual functioning and connected to each other for wireless monitoring of drowning affected person. alert device which can be conveyed by everybody. Ultra-low power utilization. Compact in size with wireless device. Easy Maintenance. Environmentally friendly system.

ADVANTAGES

Real-time Monitoring.

Automated Alerts.

Prevention of False Alarms.

Reducing Drowning Incidents.

LIST OF MODULES

Voice recognition sensor

Ultrasonic sensor

Arduino Uno

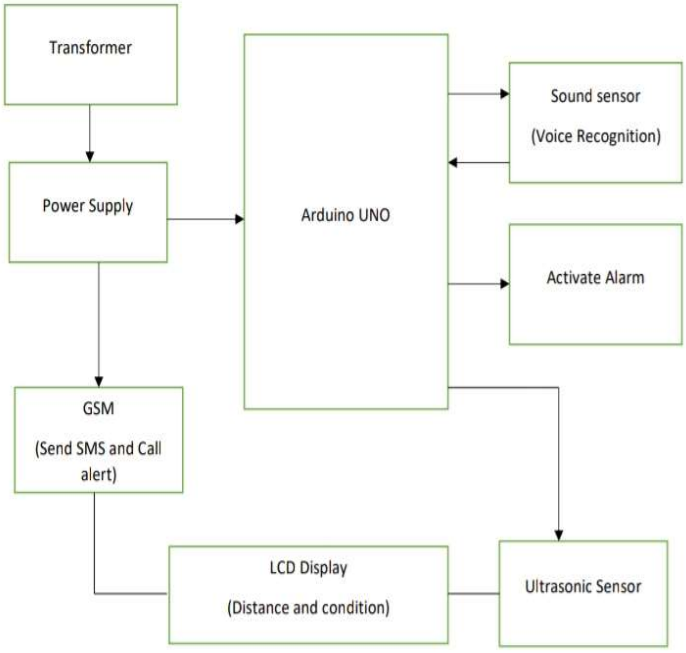
GSM

LCD

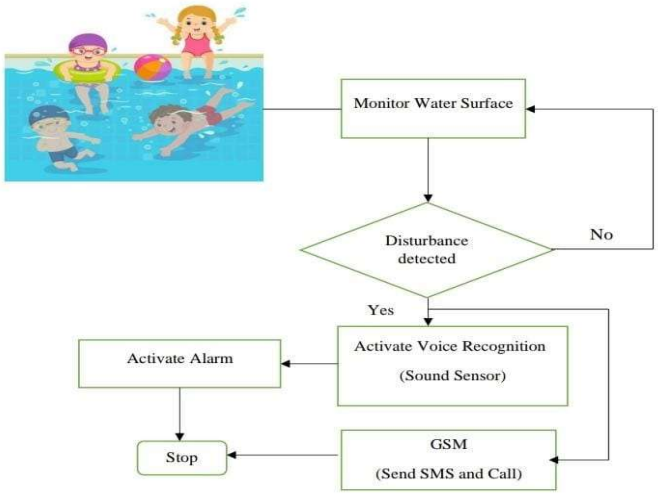
Transformer

Power Supply

Block Diagram



Architecture Diagram



HARDWARE REQUIREMENTS

VOICE RECOGNITION SENSOR

Voice recognition sensor can continuously recognise the drowning person's voice.The process begins when a voice recognition sensor receives an audio input. Voice recognition sensor, also known as voice recognition modules or systems, work by capturing and analyzing audio input to identify and process spoken words or phrases. These systems use a combination of hardware components and software algorithms to perform voice recognition.

ULTRASONIC SENSOR

Ultrasonic sensors work based on the principles of sending and receiving high-frequency sound waves to measure distances and detect objects. The ultrasonic sensor contains a transducer that generates high-frequency sound waves. They can be send the alarm sound to the nearby peoples and They are known for their reliability, accuracy, and relatively low cost.

ARDUINO UNO

Arduino UNO is a microcontroller board based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller simply connect it to a computer with a USB cable or power

it with a AC-to-DC adapter or battery to get started.

LCD

An LCD consists of a layer of liquid crystals sandwiched between two transparent electrodes. When an electric current is applied, the crystals align to control the amount of light passing through them, creating the image you see on the screen.

POWER SUPPLY

A power supply is a device that converts one voltage to another more convenient voltage while delivering power. Power supplies are designed from the output back to the input.

TRANSFORMER

transformer, device that transfers electric energy from one alternating-current circuit to one or more other circuits, either increasing (stepping up) or reducing (stepping down) the voltage.

GSM

A GSM (Global System for Mobile Communications) module refers to a specialized hardware device that utilizes GSM technology to enable communication capabilities through cellular networks.

CONCLUSION

Implementing an IoT-based alert system for drowning prevention is crucial for enhancing water safety. By seamlessly integrating sensors, real-time data analysis, and swift communication channels, this system provides a proactive approach to identify potential drowning incidents. The ability to promptly alert lifeguards or emergency services significantly reduces response time, saving lives and fostering a safer aquatic environment.

The proposed system consists of three layers as voice recognition, alert the message about the victim, nearby peoples. These layers have individual functioning and connected to each other for wireless monitoring of drowning affected person. alert device which can be conveyed by everybody. Ultra-low power utilization. Compact in size with wireless device. Easy Maintenance. Environmentally friendly system.

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