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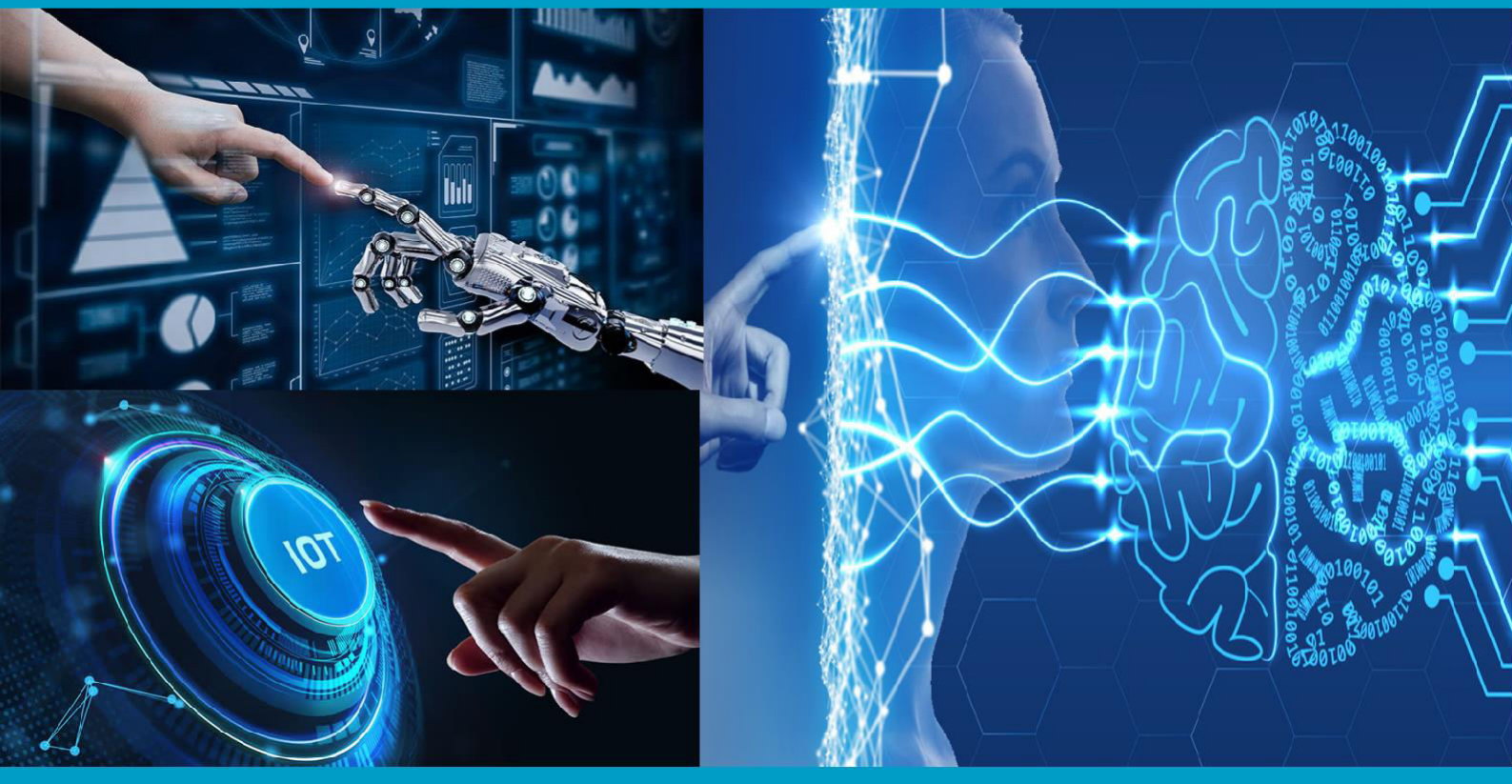


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# Automated Swimming Pool Surveillance System

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**ABSTRACT -** A lot of people, including children under the age of 5, drown at the deep end of swimming pools every year, and lifeguards are ill-equipped to deal with these tragedies. Thus, it becomes necessary to have a system that will identify drowning victims and alert the lifeguard in such situations. Systems for monitoring swimming pools are crucial for keeping the area secure. In this study, a differential pressure method is employed to identify drowning episodes in swimming pools as soon as feasible. When a youngster drowns in the swimming pool, the acrylic plate is raised to save the child's life. The RF module, Pressure Sensor, and Motor Driver make up the suggested method. The demonstration system based on a pressure sensor features the advantages of comfort, financial savings, and straightforward algorithms.

**KEYWORDS:** RFmodule, ATmega32 Microcontroller, Acrylicplate, Pressuresensor, Motordriver.

## 1. INTRODUCTION

Kids love swimming, which is also a terrific way to relieve stress. But when in the water, newcomers frequently experience difficulty breathing, which leads to choking actions, loss of balance, and drowning accidents. Swimmers may potentially perish due to unusual events like cramping, collisions with other people, illness, or mental stress. For kids, drowning is a major cause of mortality and disability. Throughout the world, drowning has the highest fatality rate among children under the age of 15 [3]. Younger children under the age of five are particularly at risk since they have the highest global drowning fatality rates. Approximately 1000 children every year pass away, according to the Centres for Disease Control and Prevention. yearly worldwide from drowning. Because of the use of the acrylic plate in this project, drowning incidents are automatically prevented. The first swimming alarm system occurs in 1976. Following that, other patent applications are filed, but for a variety of reasons, these systems are not widely used[1]. The Poseidon drowning warning system was the first commercially available product, and it was created by the French firm Vision IQ in 2001. The University of Technology Nan Yang in Singapore created DEWS in 2003.

## II. LITERATURE SURVEY

### 2.1 POSEIDON- Movement-based drowning detection system in the swimming pool

The literature mostly reports on swimming pool drowning monitoring systems based on video technology. According to the various camera positions, there are three main types of drowning monitoring systems. One is that the camera is fixed to the wall of the underwater pool, where it then keeps track of the condition of the swimmers. This equipment's drawback is that if there are too many swimmers, an occlusion issue develops. The camera is positioned over the water and keeps track of changes in the swimmers' stance the other. The quality of the image will be impacted by light reflection and refraction due to air-water interference, making it difficult to identify swimmers from divers when a drowning man feature is identified. The third combines the first two, using matching underwater and aerial cameras to monitor observing the stance of the swimmer. The biggest drawback of this approach is that it requires regular inspection.

### 2.2 Wearable devices for early monitoring and alarming for drowning incidents

The wearable drowning monitor gadget can recognize and alarm for drowning accidents. A CPU, power module, SD memory card module, LED warning module, acceleration sensor module, water pressure sensor module, and keys module are among the device's seven primary modules. The human arm must continually wave in the water when

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swimming; if one drowns, this motion is considerably diminished, and if one falls into the water, it becomes practically stationary. By real-time recording arm motion using a wearable wrist accelerometer device, it is possible to identify drowning accidents following the physiological reaction of human drowning. The two interrupt pins on this accelerometer may be configured to perform a variety of embedded operations with several user-programmable choices. To determine if a human body is submerged in water, a pressure sensor was added since LED light-emitting angles are often rather modest. LED lights upward and around the direction are installed to make LED alarm

The power switch is the first. The other is a button for self-help. The blue LED will light for assistance if a drowning risk exists, and if a swimmer unintentionally presses the button, he may push it again to silence the warning. The gadget detects a drowning mishap and turns on the LED light to alert the lifeguard if the swimmer lost consciousness as a result.

When a person is swimming in the water, the device is worn on the wrist and moves with the wrist in a considerable amplitude, causing a significant shift in the data collected from the accelerator. The wrist of a person drowning in water will be nearly stationary, and the data obtained from the accelerator will only experience minor variations as a result of water movement. The threshold is used in the drowning detection method. To determine if a human body is in the water, data from a water pressure sensor is first used. If a body is found in the water, the drowning assessment procedure is then initiated. The three axis acceleration values are then acquired by converting the analogue signal from the three axis acceleration sensor to a digital signal. Moving average and the Hanning filtering technique Filters are employed to lower noise error.

### 2.3 LDR based automated drowning detection system in the swimming pool

In The LDR and laser are used in the proposed approach to identify humans in swimming pools. Data from a water pressure sensor is first utilised to determine whether a human body is in the water; if so, the judgement procedure is started.The swimming pool's floor is covered with the iron metal plate. The wall's side is where the laser and LDR source are mounted. Here, the entire procedure is managed by an ATmega8l microcontroller. The code is done using embedded C. At first, there is a laser source that covers the entire pool and an LDR that detects the laser light and calculates the resistance value. Depending on the method used and the resistance value. When With regard to human mobility, the resistance value will fluctuate. The GSM service will be used to deliver the message to the administration. If there is no change after 30 seconds, the motor and motor driver will automatically raise the plate. This procedure is safe for humans.

## III. PROPOSED SYSTEM

The automatic drowning detection system utilises the differential pressure theory to operate. Two basic components make up the system. The first is the wristband, which has pressure sensors on the transmitter side. Second, the swimming pool site's receiver module. Wearing the bracelet is required for kids entering the pool area. Underwater pressure is distinct from and higher than that at the air-water boundary. A threshold is established by measuring the pressure at a given depth. Once the kid enters the water, the strain is The microcontroller Continually measures and records everything. When the current value exceeds the threshold limit, the receiver receives an alarm signal. Signals are wirelessly delivered and received by using an RF module. The buzzer and the motor driver are turned on by the microcontroller in response to a valid signal, which raises the acrylic plate of the multi-floor swimming pool. The youngster is raised up to the swimming pool's highest level, where the air and water converge.continuously.

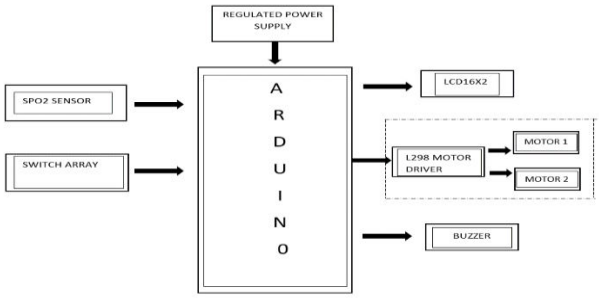


**Fig -2:** Block Diagram of Receiver

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### 1. Microcontroller

Here, an Atmega32 AVR microprocessor is utilised. The fast RISC architecture of the AVR microcontrollers, which have 32 x 8-bit universally useable working registers, is what they rely on. It is used to continually monitor the pressure levels. An warning signal indicating a drowning accident is delivered to the receiver as soon as the value exceeds the threshold limit.

### 2. Pressure Sensor

Here, the input is the pressure sensor. According to the picture above, the pressure sensor has 4 pins. A diaphragm with a crystal lattice circuit within makes up this system. The diaphragm bends more and generates a matching voltage as pressure increases. The microcontroller receives this digitally transformed analogue voltage as an input.

### 3. RF module

The Radio Frequency is used by the RF module. There are two components to this RF module: an RF transmitter and an RF receiver. The 434 MHz frequency is used by the transmitter and receiver pair. An RF transmitter uses its antenna to wirelessly send serial data via RF after receiving it. An RF receiver that uses the same frequency as the transmitter receives the signal that is being delivered.A pair of encoder/decoders are employed in addition to the RF module. A decoder is used to decode reception while an encoder is used to encode parallel data for transmission feed. The encoder/decoder pair in use here is HT12E-HT12D.

### 3.4 Transmitter module

## IV.CONCLUSION

Consistently numerous people, including kids, are suffocated or near suffocating in the deeps of the swimming pools, and the lifeguards are not prepared all around to deal with these issues. In this manner raises the necessities for having a framework that will thus recognize the suffocating people and alert the lifeguards at such hazard. It can be installed in International standardized schools where classes are held for training kids.

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