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Children And Kids Swimming Safety Tracker For Avoid Shrink Through IoT

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Abstract: This paper propose a swimming safety tracker system is designed using Internet of Things (IoT). The proposed system is really helpful for preventing accidents when swimming to save lives. The Dip sensor is used to determine whether a person is above or below the water by sending signals to the detector circuit via a sensor. An amplifier receives the output signal for additional amplification. A/D converter is given the signal that has been enhanced. When the sensor is in a dip situation, the microcontroller begin the internal timer. RF transmitter receives the signal that has been amplified. The sensor provides the transmitter with the corresponding voltage signal as soon as the RF receiver picks up the signal that sends data to the Node MCU. The received signal calculate by microcontroller. Here the microcontroller is the flash type reprogrammable microcontroller in which we have already programmed with IOT cloud server link. Then the microcontroller received the monitored parameter from the RF receiver. These data send to cloud database for retrieve in any were by IOT and identify the DIP person for make alert sound. The proposed system gives optimal results when compared to other traditional approaches.

Keywords: IoT, Dip sensor, Node MCU, Microcontroller, Alarm

I. INTRODUCTION

Swimming is one of the most well-liked summertime pastimes for kids in the United States and much of the rest of the world.Swimming is generally an entertaining and healthful kind of physical activity, but there is a chance of becoming hurt by drowning [1, 2]. This work develops an efficient method for avoiding swimming pool accidents.Many academics looking to create and develop intelligent systems have been interested in the Internet of Things technologies and artificial intelligence algorithms due to their rapid development. Millions of different objects and devices may now talk and share information over the internet thanks to the Internet of Things. By 2023, according to a Cisco estimate, 52 percent of the 29.2 billion network devices will enable various IoT applications [3]. These gadgets and things will produce a lot of data that can be used to improve efficiency and sustainability and offer better solutions. By analyzing the enormous amount of data gathered from possibly millions of internet-enabled gadgets and sensors, IoT is created to tackle and solve complex problems in our environments, industries, cities, homes, and society [3, 4].The current swimming detection techniques can be broadly categorized into wearable sensor-based detection systems and vision-based detection systems. The position of the picture capture can further categorise vision-based detecting structures: above water cameras and submerged cameras. Only vision-based detection methods are studied and thoroughly covered in this section.Using video sequences obtained by underwater cameras, [5, and 6] proposed a camera-based drowning detection system. A background subtraction technique is used to identify a swimmer, and then an interframe-based denoising strategy is used to eliminate detection noise.To stop swimming incidents, the author [7] suggested a computerized vision-based surveillance platform. A Raspberry Pi, two Pixy cameras, an Arduino Nano board, a set of stepper motors, a warning system, and drivers for motors constitute their system. Swimmers needed to put on passive yellow jackets, and two cameras were utilised to calculate the positions of the swimmers in order to detect and track them.The researchers developed the NEPTUNE early warning method for near-drowning incidents in References [8, 9]. In order to analyses frames of images and obtain the segmentation of the swimming product, it uses statistical image processing and K-means clustering.Reference [10] describes an enhanced VIBE drowning-person identification method that analyses a series of video images taken by a camera mounted above the water's surface of the swimming pool. An updated visual backdrop extraction technique is used to monitor the swimmer's movement and placement.A real-time swimming pool monitoring system is presented in [11, 12] that uses a thermal vision system to find the movement of people and water activity. This method divides the images into two zones to do the identification: head tracking in both regions and water activity in only the second zone. These two sub-algorithms work together to efficiently identify a criminal inside and outside the swimming pool.A swimming alert system is described in [13] using a collection of video frames taken from an underwater webcam. To find motion items, the researchers used the

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background subtraction approach.Employing pictures of drowning[14] recently explored and examined the visual behaviour of drowning people. International water safety specialists and the Lince observation software watch and analyses these films to spot victims of drowning and provide early behavioral identification. Drones and online machine learning were utilised in [15] to identify people who drowned in the ocean. However, these methods are traditional, less accurate in predicting the swimming pool incidents.

Therefore, this work propose an effective children and kids swimming safety tracker for avoid shrink through IoT.The Dip sensor sends data to the detection circuit via a sensor to identify whether a person is above or underneath the water.Shortly as the RF receiver detects the signal that delivers data to the Node MCU, the sensor transfers the transmitter the necessary voltage signal.The main goal of this paper is to develop a safety track while swimming in a pool and monitor the state in the IoT.

II. PROPOSED SYSTEM

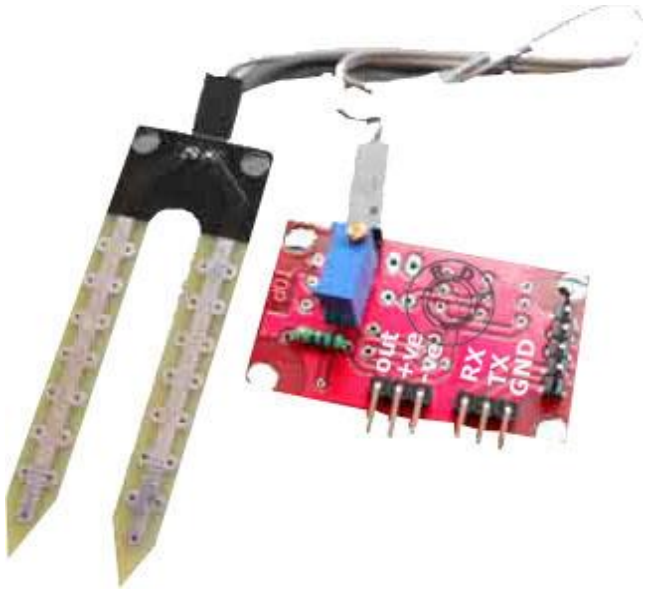
Figure 1 illustrates the block diagram for recommended system. The description of proposed system is explained elaborately in upcoming section.

DESCRIPTION OF BLOCK DIAGRAM:

DIP Sensor:

❖ This sensors is able to be utilised for assessing the moisture content of the soil; while the soil lacks water, the sensor's result is excessive; otherwise, it is minimal level.

❖ One can water a blossoming plant or any other plant that requires watering automatically by utilizing this sensor. Digital output from the module is straightforward, analogue output is more precise, and serial output provides precise measurements.



Characteristics:

❖ Programmable intensity (digital potentiometer controller displayed in blue).

❖ 3.3 to 5 volts as the operational voltage

❖ The triple output function of the module provides accessible digital output, precise analogue output, and precise serial output.

❖ Installation is convenient due to the fixed bolt hole.

❖ As indicated in Figure 1, threshold level can be set.

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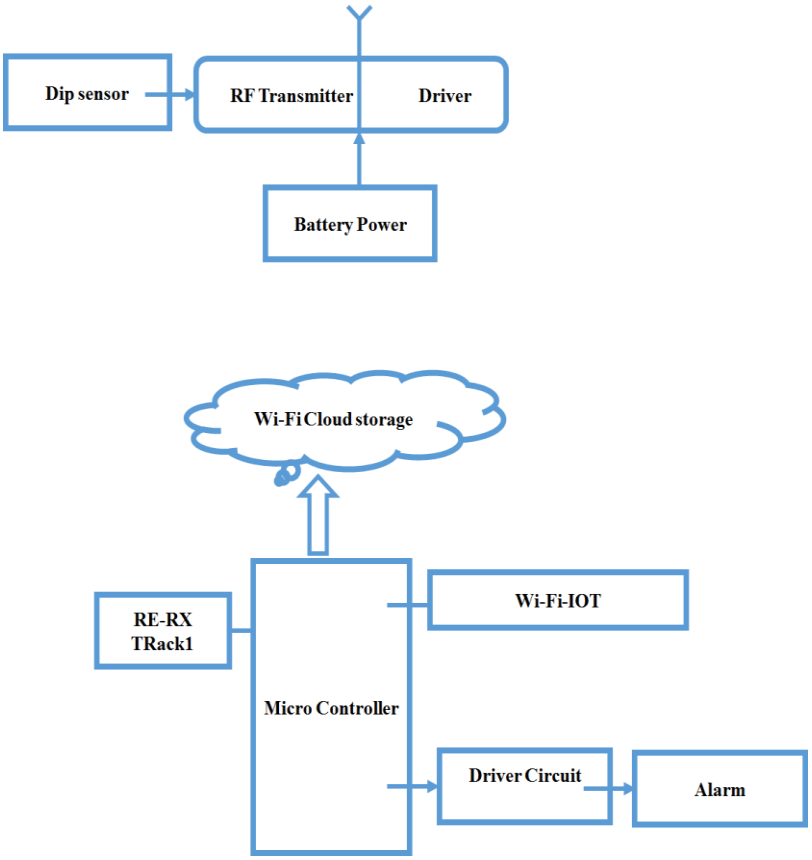

Figure 1 Proposed Model

WIFI-UART (Universal Asynchronous Receiver – Transmitter):

The WiFi is an incorporated device that adheres to WiFi wireless WLAN standards and depends on the UART protocol. It complies with the TCP/IP and IEEE802.11 protocol frameworks and facilitates data translation among the wireless network module and consumer's interface. The conventional serial peripherals can easily connect to the wireless network with the UART-WiFi device. The WU105 has been optimized for consumer applications in the energy system, enterprise, smart homeand automation control that transmit or receive information at lower rates of data. Given the whole programme SW on-chip, the WU105 WiFi module also enables quick application development for extremely low power devices.

The WU105 WiFi Device is an individual stream, 802.11b/g/n, tiny form-factor WiFi unit with an integrated low power implementation processor. It is a cheap serial WiFi module that supports data transmission through WiFi over UART. The module makes use of the MT7681 WiFi (b/g/n) SOC, which is adaptable and low consumption. Due to its great performance and low electrical consumption the WU105 WiFi module is an excellent choice for low power control and sensor solutions. Additionally, the module's encrypting and detection of tampering features make it appropriate for safety-critical uses.

Characteristics:

- ❖ Interface: HDR254M-2X4 has two pairs of four pins.
- ❖ IEEE 802.11b/g/n Single Stream @ 2.4GHz
- ❖ Supports 1T1R mode with data rate up to 150 Mbps
- ❖ Baud rate range: 1200 115200bps • RTS / CTS Hardware flow control
- ❖ Single 3.3V power supply

Cloud APL:

The simplicity of constructing and sustaining structures is the thing People regret most about higher education, aside from Duffield Hall, College town Bagels and late examinations. Even if implementation is rarely perfect, each

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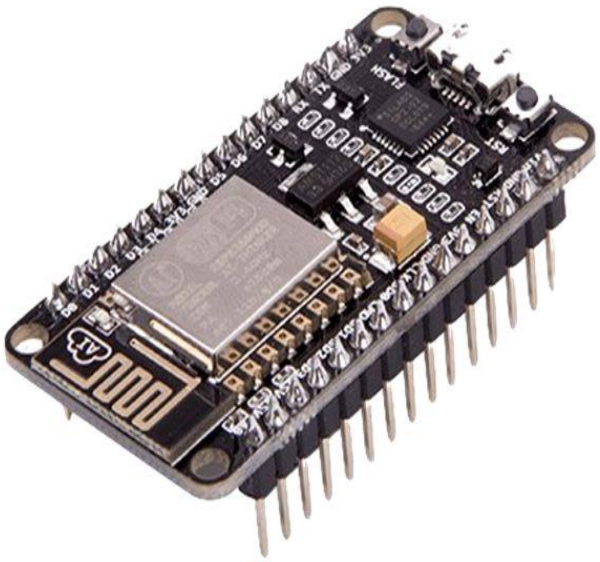
new lecture builds on the one before it at least conceptually. The challenge sets then help to reinforce and evaluate the understanding of the subject at hand.However, after you leave the academic campus, these frameworks are not easily accessible. This implies that it becomes increasingly difficult to sort through the clutter and fully comprehend anything. IoT, or the Internet of Things, has been my experience in this regard.

IoT:

IoT refers to the overall network of devices that are interconnected as well as the equipment that enables interaction among each other as well as with the cloud. Now days a billions of devices linked to the web as a result of the development of inexpensive processors for computers and high speed telephone service. This implies that commonplace gadgets like vacuum cleaners, cars, and robots might employ sensors to gather data and respond wryly to consumers. The Internet of Things connects commonplace "things" to the web. Since the 1990s, computer engineers have started incorporating sensors and CPUs into commonplace items. However, because the chips were large and heavy, progress is first slow.RFID tags, which are small, low-power computer chips, were initially employed to track expensive machinery. These processors evolved throughout time to become smaller, quicker, and smarter as computer devices shrunk in size. The cost of incorporating processing power into tiny items has significantly decreased in recent years. The web can be used by intelligent objects to automatically send and receive information. The term "Internet of Things" refers to both the collection of all these "invisible computing devices" and the related technologies.

Microcontrollers:

An authentic computer on a chip is a micro controller. The architecture comprises all of the microprocessor's components, including the CPU, PC, ALU, SP, and registers. Additionally, it has certain other features required to form a full computer. ROM, serial, RAM, paralleland clock circuits, as well as counters and I/O devices.A micro controller's primary objective is to regulate the functioning of a device using a fixed programme that is kept in ROM and remains constant throughout the lifetime of the system. The microcontroller's design and programming set are optimized to deal with data in bit and byte sizes. Microcontrollers are used in a variety of industries, such as manufacturing, instrumentation, medical, and control processes.



Node MCU:

Accessibility to the GPIO (General Purpose Input/Output) is provided by NodeMCU, and its documentation for the API includes a pin mappings table.Typically, the firmware is referred to as NodeMCU, and the circuit board is referred to as Devkit. The ESP-12E is mounted to a chip as part of the NodeMCU Devkit 1.0, thereby making it easier

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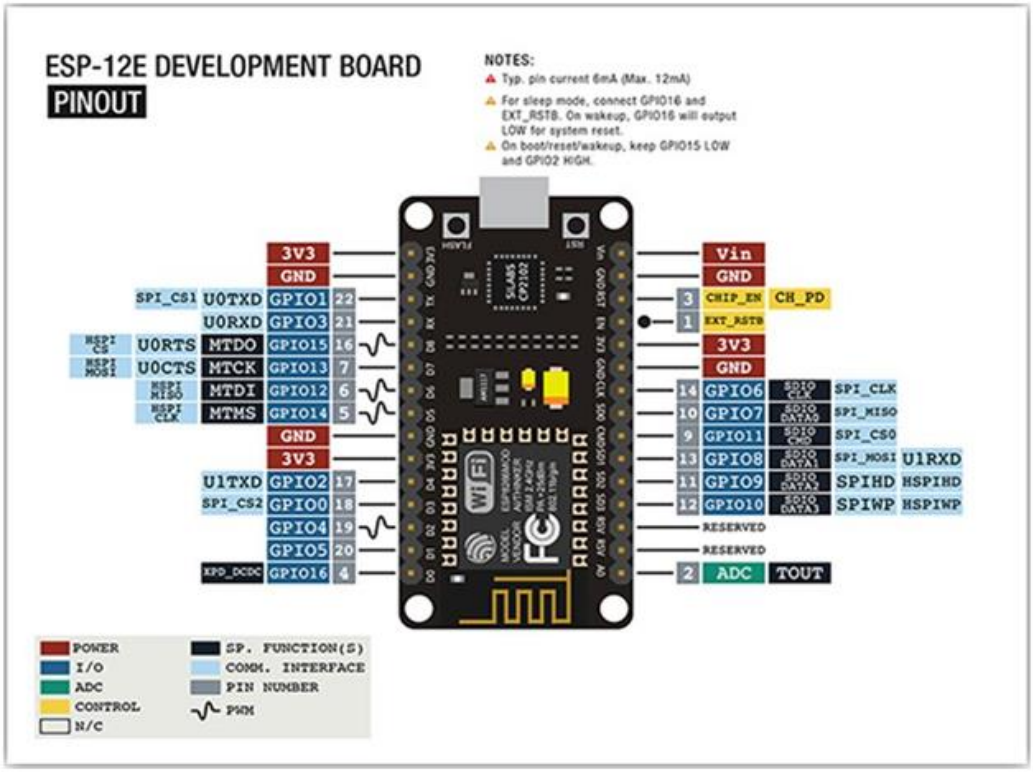
to operate. A USB connection and a voltage controller are also included. The AI-THINKER board known as the ESP-12E contains an ESP8266EX inside of a metal enclosure.



Employ the GPIO's front-facing number or the constants A0, D0, D1, D2, D3, D4, D5, D6, D7, and D8. At the end of each pin, we positioned the oscilloscope. This enables us to discover things like whether the NodeMCU's pins are not all the same when it is powered on. By default, some are up and others are down. View the remarks on how each post responded following the boot in the illustration below.

Constante	Valor
D0	16
D1	5
D2	4
D3	0
D4	2
D5	14
D6	12
D7	13
D8	15
A0	17

RF Transceiver:

A range of frequencies or rate of oscillation between about 3 Hz and 300 GHz is referred to as Radio Frequency (RF). This range matches the frequency of the electrical impulses generated by a current alternation that are employed for producing and receive radio waves. RF typically describes vibrations in electrical networks because most of this range is exceeds the vibration rate that most mechanical systems are able to respond well.Direct current signals do not possess the unique characteristics of electrical currents that oscillate at RF. One of these attributes is the

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simplicity with that air can be ionized to produce a conductive channel across air. 'High frequency' units employed for electric arc welding take advantage of this feature. The skin effect, a magnetic field that pushes RF current to the surface of conductors, is another unique characteristic. The capacity to appear to flow via pathways that contain insulating material, such as the dielectric insulator of a capacitor, is another characteristic. The frequency of the signals affects how much of an impact these features possess.

In order to achieve EMC compatibility by reducing unwanted radiation and sensitivity, RF transmitter and receiver are offered for performance in the 868-870MHz band in Europe and the 902-928MHz band in North America. The two components incorporate full screening with inbuilt filtering. In situations including vehicle and construction safety EPOS and tracking of inventory, remotely manufacturing process tracking, and data networks, this RF transmitter and receiver will be suitable for one-to-one and multi-node wireless links. Both Modules are perfect for usage in portable, battery-powered applications like handheld terminals due to their tiny size and low power needs.

Driver:

A relay network is a switch that is activated and deactivated by other electrical circuitry. A relay's coil normally transfers a sizable amount of current 30mA for a 12V relay, but up to 100mA for relays made to work with lower voltages through its circuitry. The ubiquitous 555 timer IC's 200mA highest possible current allows such devices to operate on relaying coils with no amplification.

Buzzer:

A buzzer or beeper is a signaling device that is primarily electronic and is found in cars, home appliances like microwaves, and television programmes. It is usually made up of a number of switches or sensors that are linked to a control module which detects whether button is pressed or if a predetermined amount of time has passed. Upon detection, the control unit typically turns on a light next to the relevant button or control panel and emits an uninterrupted or sporadic buzzing or buzzing sound as a notification. The electromechanical system on which this device was first built was essentially an electric bell minus the metal gong that produces the ringing sound.

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III HARDWARE RESULTS

Figure 2 represents the hardware setup results for proposed system. From the obtained hardware outcomes, it is noted that the recommended is system effectively recognizing the swimming pool accidents. This system comprises the main elements including Node MCU, Driver, buzzer, Microcontroller and WiFi UART.

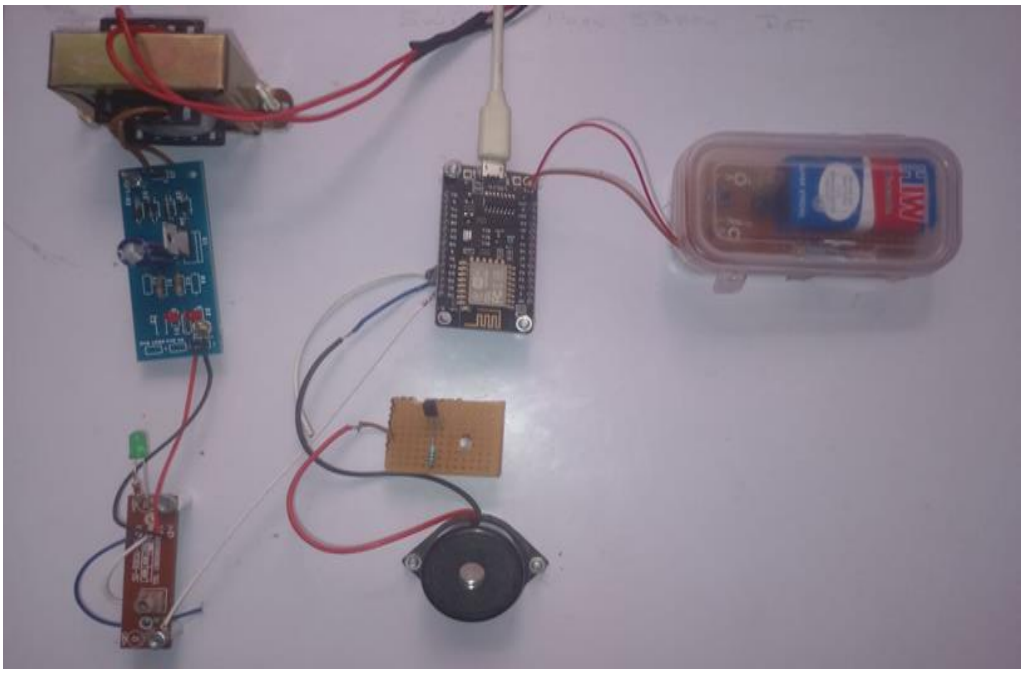

Figure 2 Hardware View

IV CONCLUSION

In this research, an IoT-based swimming security tracking system is developed.By transmitting signals to the detector circuit via a sensor, the Dip sensor is capable of determining whether a person is standing above or below the water.The inbuilt timer of the microcontroller begins when the sensor is in a dip condition. The signal is picked up by the RF transmitter after being amplified. As soon as the RF receiver detects the signal that transmits data to the Node MCU, the sensor transmits the equivalent voltage signal to the transmitter. The microcontroller calculates the received signal. The microcontroller in this instance is an adaptable flash-type microcontroller that has previously been configured with an IOT cloud server link. When contrasted with various conventional methods, the suggested approach provides the most effective outcomes.

REFERENCES

[1] Nuhu Kontagora, Bello, et al. "Development of a Smart Wearable Anti-drowning System." (2022).

[2] Alotaibi, Aziz. "Automated and intelligent system for monitoring swimming pool safety based on the IoT and transfer learning." *Electronics* 9.12 (2020): 2082.

DOI: 10.17148/IJIREEICE.2023.11605

[3] Karthik, S., et al. "IoT Based Safety Enhanced Swimming Pool with Embedded Techniques to reduce drowning accidents." *2020 International Conference on Smart Electronics and Communication (ICOSEC)*. IEEE, 2020.

[4] Hariharan, Balaji, and Riji N. Das. "Wieyetnb: A wireless sensor based drowning detection system for enhanced parental care." *Wireless Internet: 6th International ICST Conference, WICON 2011, Xi'an, China, October 19-21, 2011, Revised Selected Papers 6*. Springer Berlin Heidelberg, 2012..

[5]] Chaudhari T et al (2018) Anti Drowning system using remote alert. IOSR Journal of Engineering(IOSRJEN) 1:38-42.

[6] Clevelandclinic (2021) Cerebral hypoxia. https://my.clevelandclinic.org/health/diseases/6025-cerebral-hypoxia. Accessed 21 April 2022

[7] Hemalatha S et al (2017) Automated Drowning Detection and Security in Swimming Pool. International Research Journal of Engineering and Technology(IRJET) 4(6):17-21.

[8] ILF (2014) Drowning. https://www.ilsf.org/wp-content/uploads/2019/01/LPS-17-2016-Definition-of-Drowning.pdf. Accessed 5 March 2020

[9] John SN et al (2019) Design of a drowning rescue alert system. InternationalJournal of Mechanical Engineering and Technology 10(1):1987-1995

[10] Jose A, Udupa G (2020) Gantry robot system for preventing drowning accidents in swimming pools. Materials Today: Proceedings 46:4975-4981.

[11] Leonard J (2018) what to know about hypoxia. https://www.medicalnewstoday.com/articles/322803. Accessed 19 Aug 2021

[12] Patricia CG (2019) Drowning.https://emedicine.medscape.com/article/772753-overview#a2. Accessed 20 Aug 2021

[13] Roy A, Srinivasan K (2018) A novel drowning detection method for safety of Swimmers. Paper presented at the 2018 20th National Power Systems Conference (NPSC), Tamilnadu, India, 14-16 Dec 2018

[14] Salehi N, Keyvanara M, Monadjemmi SA (2016) An Automatic Video-based Drowning Detection System for Swimming Pools Using Active Contours. InternationalJournal of Image, Graphics and Signal Processing 8(8):1-8

[15] Hayat, Muhammad Aftab, et al. "Comprehensive and comparative study of drowning person detection and rescue systems." *2019 8th International Conference on Information and Communication Technologies (ICICT)*. IEEE, 2019.