LITERATURE SURVEY OF VIRTUALEYE – LIFEGUARD FOR SWIMMING POOLS TO DETECT ACTIVE DROWNING

Team members:

Mughilvannan.M

Harikarthikeyan.K

Ashok.A

Vigneshwar.T

Mentor:

Sasirekha.R

LITERATURE SURVEY

Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in hotels, and weekend tourist spots and barely people have them in their house backyard. Beginners, especially, often feel it difficult to breathe underwater which causes breathing trouble which in turn causes a drowning accident. Worldwide, drowning produces a higher rate of mortality without causing injury to children. Children under six of their age are found to be suffering the highest drowning mortality rates worldwide. Such kinds of deaths account for the third cause of unplanned death globally, with about 1.2 million cases yearly. To overcome this conflict, a meticulous system is to be implemented along the swimming pools to save human life.

By studying body movement patterns and connecting cameras to artificial intelligence (AI) systems we can devise an underwater pool safety system that reduces the risk of drowning. Usually, such systems can be developed by installing more than 16 cameras underwater and ceiling and analyzing the video feeds to detect any anomalies. but AS a POC we make use of one camera that streams the video underwater and analyses the position of swimmers to assess the probability of drowning, if it is higher then an alert will be generated to attract lifeguards' attention.

SNO:	TITLE OF THE PAPER	DETIALS OF THE PAPER	OBJECTIVE	METHODOLOGY USED	TAKE AWAY
1.	An Improved Detection Method of Human Target at Sea Based on Yolov3.	2021 IEEE	To Search and rescue drowning people at the sea site.	The object detection method is based on deep learning and the Yolov3 algorithm which is a representative algorithm of the object Detection method.	From that journal, we use the YOLO algorithm. Because of its high accuracy and fast detection speed.
2.	A novel drowning detection method for safety of swimmers	2018 IEEE	To ensure detection of drowning and reporting at the earlier stages	Two drowning detection sensors are placed on the side elastic of the goggles. The Alarm transmission module is used to send the alarms when the drowning is detected. It's triggered by a drowning detection unit. The Alarms are transmitted using the underwater Communication.	From this journal, we use the Novel Camera-Based Drowning Detection Algorithm, which could predict the drowning.
3.	Automated Vision-based Surveillance System to Detect Drowning Incidents in Swimming Pools	2020 IEEE	An automated vision-based surveillance system to prevent drowning accidents	The system consists of a Raspberry Pi with the Pixy camera, an Arduino Nano board, an alarm system. The proposed system is based on the color-based algorithm to position and rescue swimmers who are drowning. The device then sends an alarm to the Lifeguards.	From this journal, we had learned that the hybrid system will automatically Detect a drowning person and then set off an alarm to alert lifeguards.

4.	Swimmer motion analysis with application to drowning detection	2002 IEEE	To build an automated video surveillance system to detect potential drowning incidents.	Two event-inference modules have been developed: one evaluates the condition of a swimmer using a set of reasoning rules and triggers alarms after the swimmer remains in 'Possible drowning state' for a period longer than a preset duration and another relies on hidden Markov models (HMMs) to recognize drowning behavioral signs.	From this journal, we had learned that the drowning incidents are detected by examining the sequence of motion and shape features extracted from swimmers in the pools.
5.	IoT Based Safety Enhanced Swimming Pool with Embedded Techniques to reduce drowning accidents.	2020 IEEE	To reduce the drowning accidents and to save human life.	The wearable device on the wrist to monitor moment of human under water is designed. The imaging techniques with robust image smoothing algorithm were proposed for the early detection of drowning. Adaptive robust image smooth algorithm is proposed.	Through this journal, we learned that the portable device can also monitor and detect drowning people in the pool.