DROWNING DETECTION SYSTEM USING LRCN APPROACH

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Abstract

This project provides data from a live video surveillance system that can automatically identify drowning incidents in swimming pools. Reliable security measures must be created because drowning ranks as the third most prevalent cause of unintentional fatality. The majority of the pool's security features at the time include CCTV surveillance and lifeguards who can help in drowning emergencies. This technology is inadequate for huge swimming pools like those seen at theme parks. Modern security systems employ artificial intelligence (AI) to detect drowning utilising underwater fixed-position cameras and floating boards with a camera mounted on the underside to record the underwater scene. However, the main problems with these systems arise when there are a lot of people in the pool and they obscure the cameras' field of view.

As CNN retrieves the information from the input given to the model and the LSTM layers subsequently predict the activity of the person whether one is drowning, swimming, or diving, we empirically suggest LRCN technique for the implementation of drowning detection.

PROPOSED METHODOLOGY

Convolutional Neural Networks (cnns), a particular subclass of neural networks, are particularly well adapted for the task of image recognition. Implementing a Long Term Recurrent Convolution Network (LRCN) technique is thus appropriate for action recognition and video classification. Convolutional Neural Network (CNN) and Recurrent Neural Network (RNN) are combined in the Long Term Recurrent using a convolution network. Network neural (RNN). For a wide range of visual understanding tasks, including video description, activity identification, and image captioning, LRCN is completely trainable and suitable. The fundamental concept is

to utilise CNN to extract visual characteristics from video frames, and then LSTM layers to convert a series of picture embeddings into a class label, phrases, probabilities, etc. As CNN retrieves the information from the input given to the model and the LSTM layers then predict the action of the human, whether one is drowning, swimming, or diving, we empirically suggest LRCN technique for the implementation of drowning detection in this segment.

SMART SYSTEM FOR MONITORING AND CONTROL OF SWIMMING   POOL

Author:Goncalo Simoes, Carolina Dionísio, Andre Gloria, Pedro Sebastiao,

    NunoSouto.

Abstract

By utilising a low-cost system based on wireless sensor networks to monitor and regulate the quality of the pool, the unique strategy proposed in this research can reduce the requirement for human intervention in swimming pool management. The major objective of this system is to provide the end user with savings on money and natural resources, hence promoting environmental sustainability. The article also introduces a mobile application for interfacing with the suggested system, enabling users with administrator access to control certain pool activities in order to uphold a pool's quality requirements.

COMPUTER VISION ENABLED DROWNING

DETECTION SYSTEM

Author :UpulieHandalage, NisansaliNikapotha, ChanakaSubasinghe,

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Abstract

At all swimming areas, safety comes first. The current solutions intended to address the problem of maintaining safety at swimming pools have major problems because of their technical qualities, such as underwater cameras, and methodological aspects, such the demand for human intervention in the rescue mission. The adoption of an automatic visual-based monitoring system can effectively reduce drownings and guarantee pool safety. This study suggests a novel system that, upon immediately identifying drowning victims, sends an unmanned drone to assist them. Using convolutional neural network (CNN) models, it can recognise a drowning individual in three stages. If a situation like this is discovered, the self-driven drone fitted on an inflatable tube will initiate a rescue effort and sound an alarm to warn the local lifeguards. The system also keeps an eye out for behaviours that could be dangerous or result in drowning. According to performance assessments of prototype experiments, this technology can save a drowning person in under a minute.

PROPOSED METHODOLOGY

Three key features of the system described in this study include drone delivery to victims, detection of harmful actions, and drowning victim detection. The drowning detection component uses a customised CNN model to identify drowning victims. The algorithm recognises drowning in three stages and promptly alerts the user through audio. The second element is the rescue drone, which is launched in response to the command for drowning detection and directed to the victim's coordinates. To link to GPS coordinates on the ground, this process requires a specially constructed x and y coordinate block structure. The hazard detection component will also use mobile alarms to alert authorised staff on the property to

potentially hazardous activities like running around the pool and drinking.This will prompt authorized personnel (including lifeguards) to make responsible decisions.

DROWNING DETECTION BASED ON BACKGROUND SUBTRACTION

Abstract

The investigation of swimmer detection for pool visual monitoring is the main subject of this paper. An method for detecting drowning with the background removed is presented in this study. The continuous visual surveillance sequence was recorded by the fixed camera that was positioned in the pool wall. Each pixel is described by a Gaussian Mixed Model with timely updates and a self-adapting backdrop model. After separating the foreground objects, it is necessary to get rid of the shadows and noises to produce good results. The results of the studies show how effective this method is at finding drowsiness and removing shadows.

A NOVEL DROWNING DETECTION METHOD FOR SAFETY OF SWIMMERS

Auther: Ajil Roy, Dr. K. Srinivasan

Abstract

Techniques for effectively detecting drowning are essential for swimmers' safety. In this study, a unique type of drowning detection system is proposed that overcomes many of the flaws in current drowning detectors. The suggested strategy ensures early detection and reporting of drowning. The proposed drowning detection system is also an all-encompassing method that functions with a range of bodies of water, from swimming pools to oceans, and it is an effective economic tactic for both low- and middle-income countries. The prototype of the drowning detection method and the system model are both simulated in the Proteus design suite. The results of the hardware simulation and experimentation are also given.

DROWNING DETECTION SYSTEMS

Abstract

There is currently little impartial study on the effectiveness of drowning detecting devices (DDS). The word DDS refers to electronic systems that can aid with pool and swimmer surveillance. The paucity of evidence supporting the application and effectiveness of DDS, together with the high installation costs, have made it more difficult to implement in public and private pools even if it must adhere to stated standards. DDS are not meant to entirely replace lifeguards; rather, they are meant to assist them in identifying and finding swimmers who may be drowning. The development of artificial intelligence (AI), which is employed in many other kinds of systems, has accelerated the development of the DDS technology in recent years. The UK Active Study Institute received funds from Sport England to carry out this study project in 2019. We gathered a sizable quantity of data, independently tested the DDS systems, and looked at attitudes toward lifeguarding and DDS. The study was disclosed to the four systems' manufacturers, and it was agreed that specific findings from each system wouldn't be made public. This study was conducted to examine the general performance of various DDS in test environments, not to compare or evaluate different systems. As a result, just the total results of all tests are shown. The pools used in this experiment were all tiled 25-meter pools.

PROPOSED METHODOLOGY

This review's technique started with creating a search strategy. Making a list of important search terms was required for this. DDS are a universal notion, thus it was crucial to take into account the several names and abbreviations that they go by. Following the identification of the sources, they were prioritised based on their applicability and assessed, keeping in mind the possibility of bias in market-driven literature or literature derived from funded research that could undermine its impartiality. The literature study pulls from a variety of sources, including papers, academic articles, books, web articles, news items, and standards documents from international and national agencies.

ANTI DROWNING SYSTEM WITH REMOTE ALERT

Abstract

This device can prevent drowning when a person is in the water. The lifeguard is informed of each swimmer's heart rate to achieve this. Our technology will monitor the heart rate. When submerged, the RF transmission range will be 2-4 metres or between 5 and 6 metres. For this, the system has a receiver and transmitter circuit. To notify the lifeguard of the swimmer's heart rate, the transmission circuit is with the swimmer, while the receiving circuit is with the lifeguard. An LCD display is coupled to an AVR microprocessor, which is used in the transmitter circuit. The UK Active Study Institute received funds from Sport England to carry out this study project in 2019. We gathered a sizable quantity of data, independently tested the DDS systems, and looked at attitudes toward lifeguarding and DDS. The study was disclosed to the four systems' manufacturers, and it was agreed that specific findings from each system wouldn't be made public. This study was conducted to examine the general performance of various DDS in test environments, not to compare or evaluate different systems. As a result, just the total results of all tests are shown. The pools used in this experiment were all tiled 25-meter pools. As a result, this technology helps the lifeguard be informed as soon as the heartbeat level deviates from the normal range, potentially saving a life.

DROWN ALERTING, PREVENTING AND AUTONOMOUS RESCUE SYSTEM USING ARDIUNO, TACTICLE SWITCHE (WEIGHT SENSORS) AND ARTIFICIAL INTELLIGENCE

Author :Pillalamarri. Laxman, Prof.Anuj Jain

Abstract

This study suggests a ground-breaking technique for automatic lifesaving swimming pool design to save a drowning victim in a helpless position by using the most recent Arduino(IoT) processor board and the framework. This method combines linked specific warning devices, such as a loudspeaker, to prevent drowning victims from dying. It also uses artificial intelligence to stop drowning victims from dying. The current study proposes a swimming pool structure with a responsive elevator assembly surface that spans the entire pool bottom and has numerous weight-sensitive waterproof tactical switches intended to sense any person or item. Drowning occurs silently because the victim's mouth is constrained by the water. Once the drowning victim has ingested enough water, gained enough weight, and reached the bottom, gravity will cause their body to collapse to the pool floor. The corpse will eventually start to float on water as bacteria grows in the stomach and lungs. This drifting could take several hours or several days, depending on the condition of the sea. If the drowning victim is plucked out of the water in the first five or six minutes, there is a better chance that they may survive without suffering serious brain or organ damage.

LIFE GUARD FOR SWIMMING POOLS TO DETECT ACTIVE DROWNING

Abstract

Swimming is one of the best exercises for stress reduction in the contemporary urban lifestyle. Swimming pools are less widespread in backyards; they are more prevalent in hotels and weekend tourist attractions. Particularly for beginners, it can be difficult to breathe underwater, which can cause respiratory problems and, eventually, a drowning catastrophe. Without injuring children, drowning has a higher mortality rate globally. Children under the age of six have the greatest mortality rates from drowning in the world, according to research. These kinds of fatalities are the third most frequent among all unexpected deaths worldwide, with about 1.2 million events each year. To settle this conflict, a thorough mechanism must be put in place around swimming pools to save lives. By examining body movement patterns and incorporating cameras with artificial intelligence (AI) systems, we can create an underwater pool safety system that reduces the likelihood of drowning. Such systems are frequently built by installing more than 16 underwater and ceiling cameras, evaluating the video streams, and checking for any anomalies. But as a POC, we use a single camera that sends underwater footage while analysing swimmer positioning to assess the risk of drowning. If the risk is higher, an alarm will be generated to call the attention of lifeguards.

SAFETY ENHANCED SWIMMING POOL WITH EMBEDDED TECHNIQUES TO REDUCE DROWNING ACCIDENTS

Author :S. Karthik, DhivyaPriya E L , GokulAnand K R , A Sharmila

Abstract

Swimming has been a common form of exercise since ancient times for many people. Beginners typically struggle to breathe underwater, which causes them to suffocate in the water and eventually lose their equilibrium, which can cause a catastrophic drowning. Globally, drowning causes a higher proportion of fatalities without injury, especially in children. To stop these kinds of accidents and preserve lives, swimming pools should be equipped with an intelligent system. The suggested procedure sets off the alarm and raises the person with a plate to prevent drowning in a pool. An ultrasonic sensor can assess whether someone drowns in the water or at a higher, safer level by establishing a threshold value.