



Automated Vision Based Surveillance System To Detect Drowning Activities

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Abstract— Nowadays drowning incidents are growing at significant level. In spite of the fact that there have been different guidelines established to decrease suffocating mishaps in certain nations, networks actually experience many suffocating occurrences. A framework is proposed to distinguish the suffocating exercises and forestall it utilizing PC vision and AI methods. Raspberry Pi, a Pixy camera, a hooter, a power source, a drive, and other components make up the framework. The device then warns the lifeguards after being discovered. An experiment has been developed, carried out, and tried in order to evaluate the presentation of the suggested framework. Test results show that the framework has an intriguing ability to screen and follow swimmers, which enables it to reduce and regulate the number of passages by smothering.

Keywords— Raspberry pi, Drowning Detection, Alert System, Real -Time image processing.

I. INTRODUCTION

Over the past few years the drowning incidents are increasing areday by day and the interest to minimize these activities is increasing day by day. Automating such processes will make it easier to save lives as well as reduce the risks of such incidents. The existing technology for such use can be classified as: vision-based system and a sensor-based wearable system.

Vision based system can be classified into two types the underwater cameras, water cameras. The above water cameras have limitation that they do not cover the entire swimming surface and processing the full swimming or aquatic surface with a single camera is challenging.

The wearable system has their own benefits they monitor the individual depth in water, how much time they spend in water, heart rate pressure. Various devices are used for this process some of them will be wristbands, headbands. Under present values, will alert the lifeguards using wireless means. These devices use the electrocardiographic (ECG) signals, have been proposed. These devices also have a slight discomfort as wearing them restricts the movement as well as has a little bit of load on the part.

Deep Machine learning algorithm under computer vision literature is also used during this process. Various algorithms are used in this process to make the code shorter

as well as effective. The overall detection process can be improved by adding features from image processing. On the other hand, the image processing can be used for other activities such as face recognition, object detection, vehicle detection etc. This is the best solution for detecting drowning activities as the drowning level is specified as well as the activities are continuously monitored. The image processing can be used for security purposes also. Using such type of system is a reliable choice for saving time, dependency on human, save money and provide an accurate result according to the situation. The project made with this technology is really beneficial as well as economical and less chances of errors are possible.

For this project, a system will automatically recognise a drone operator and notify local individuals as well as the lifeguards when one is there. The system is programmed by using various technology of computer vision and machine learning as well as using hardware like raspberry pi etc. The project will detect drowning activities as well as it will detect position, velocity, path of the person. This is responsible for initiating the rescue by sending an alarm alerting the lifeguards and people nearby.

The fundamental commitment of this undertaking is to foster a framework for checking suffocating exercises and to forestall drowning exercises. The rest of this essay is structured as follows: The study of recent research on the technologies used with the intention of employing vision-based systems to identify drowning accidents will open the following part. Section III represents an overview of the proposed approach. The proposed system is described in section IV. Experimental Results are present in section V. Finally, conclusions and plans for future projects are drawn in section VI.

II. RELATED WORK

One of the most efficient ways to keep an eye out for any unexpected activity in aquatic regions is to automate vision-based surveillance systems. Processing the background on input video frames has been suggested in this context. The authors create a pool drowning incidence detection system through video monitoring[4].

The system is based on modelling the background and then the detection of swimmer is performed to prevent drowning incidents. The authors used Drowning Detection, Alert System which used Real-Time Image Processing techniques [5]. In proposed system object detection and object tracking is done. In order to address the background and crowded pool

III. OVERVIEW OF THE PROPOSED APPROACH

IV. SYSTEM DESCRIPTION

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graph LR
    Source[Source] --> Camera[Camera]
    Camera --> Raspberry[Raspberry pi]
    Raspberry --> Hooter[Hooter]
    Raspberry --> LED[LED]
    Power[Power] --> Raspberry
  
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The hardware requires a HDMI cable which will be connected from one end to the laptop and from other end it will be connected to the raspberry pi for storing them.

The labelled diagram of Raspberry Pi module used is shown as follows:



h69

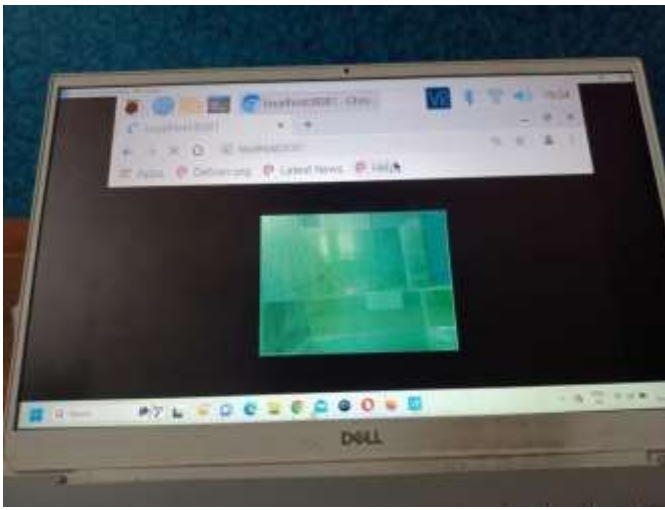


Figure 4- Result View

The code is written in python as it tends to be utilized for a great many applications, including web development, information examination, man-made reasoning, AI, and logical computing. Python is a high-level language, and that implies that it is nearer to regular language as compared to low-level dialects like C and assembly. This makes it simpler to compose code rapidly and with less blunders. Python code can be run on various platforms, including Windows, Mac OS, and Linux, making it easy to deploy and distribute applications.

Pixy camera is a quick vision sensor you can rapidly "educate" to track down items, and it interfaces straightforwardly to Arduino and different regulators. Incredible for advanced mechanics or some other application requires PC vision. To distinguish between items, Pixy uses a tint-based variety separation calculation. Most of us are familiar with RGB (red, green, and blue) and how it applies to tones. Pixy uses them as the primary shifting boundaries by computing the colour and saturation of each RGB pixel from the image sensor. Changes in illumination and openness typically have no effect on the colour of an article. Tone separation calculations can be annoyingly broken by changes in lighting and transparency. In comparison to previous iterations of the CMU cam, pixy shifting algorithm is resistant to changes in lighting and openness.

V. CONCLUSION AND FUTURE WORK

This exploration presents a mechanized vision-based observation framework to distinguish suffocating occurrences in swimming pools. The item in the pool is identified and followed utilizing the pixy camera. When the item stays under a specific level for in excess of a decided timeframe, Raspberry Pi will ascertain that item position, speed, as well as shadow and send an alert to the system operator. For future development, the robotic arm stage will straightforwardly move to the casualty area with a snare joined to it. The hook will assist with buoyancy by pulling the swimmer upwards. In the interim, an admonition ringer will flag the lifeguard of an up- and-coming risk. With such a framework, the quantity of drownings would be decreased. For future turn of events, the framework is at present being moved along by connecting an infrared prompted the swimmer's vest as well as infrared cameras are likewise in the works.

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