Literature Survey

Virtual Eye – Life Guard For Swimming Pools To Detect Active Drowning

PROBLEM DEFINITION

- Swimming is a great urban stress-reliever. Hotels and tourist spots have more swimming pools than private homes. Beginners have trouble breathing underwater, causing breathing problems and drowning.
- Drowning increases global mortality without harming children. Under-6-year-olds have the highest drowning mortality rates globally.
- These deaths are the third cause of unplanned death globally, with 1.2 million cases yearly.
- To save lives, a meticulous system must be implemented along swimming pools.
- By studying body movement patterns and connecting cameras to AI systems, we can create a safer underwater pool.
- Installing 16 underwater and ceiling cameras and analysing video feeds can create such systems.
- As a POC, we use one camera that streams underwater video and analyses swimmers' positions to assess drowning risk; if it's high, an alert is generated to alert lifeguards.

OBJECTIVE

To design a system in an economically viable and easily accessible way that acts as a virtual eye to detect the drowning person in the swimming pool and alert the lifeguard using alarms to save the drowning person.

- **NAME OF THE PAPER :** A Survey of Drowning Detection Techniques
- **NAME OF THE AUTHOR :** Nagato Konishi ;
  Yo Ishigaki
  Seizi linuma
  Tsubasa Nakada
  Taisuke Hoshino
  Wataru Nemoto
  Kazunori Ohkawara
- **JOURNAL PUBLISHED :** 2021 International Mobile, Intelligent,and Ubiquitous Computing Conference (MIUCC)
- **MONTH AND YEAR PUBLISHED :** 09 June 2021
- **OBJECTIVE OF THE PROJECT :** To track swimmers in a pool using machine learning techniques and prevent drowning accidents
- **TECHNOLOGY USED :** The concepts of image and video processing are used along with machine learning paradigms
- **ACCURACY :** Better accuracy levels with the help of identification of the swimmer's position

- **NAME OF THE PAPER :**Automated Vision-based Surveillance System to Detect Drowning Incidents in Swimming Pools
- **NAME OF THE AUTHOR :** Abdel llah N. Alshbatat,
  Shamma Alhameli
  Shamsa Almazrouei
  Salama Alhameli
  Wadhha Almarar
- **JOURNAL PUBLISHED :** 2020 Advances in Science and Engineering Technology International Conferences (ASET)
- **MONTH AND YEAR PUBLISHED :** 16 June 2020
- **OBJECTIVE OF THE PROJECT :** To track swimmers in a pool using machine learning techniques and prevent drowning accidents
- **TECHNOLOGY USED :** Raspberry Pi with the Raspbian operating system,based on the color based algorithm
- **ACCURACY :** The system has a unique capability to monitor and track swimmers

- **NAME OF THE PAPER :** Computer Vision Enabled Drowning Detection System
- **NAME OF THE AUTHOR :** Upulie Handalage ,
  Nisansali Nikapotha
  Chanaka Subasinghe
  Tereen Prasanga
  Thusithanjana Thilakarthna
- **JOURNAL PUBLISHED :** 2021 3rd International Conference on Advancements in Computing (ICAC)
- **MONTH AND YEAR PUBLISHED :** 11 January 2022
- **OBJECTIVE OF THE PROJECT:** To reduce drowning and assure pool safety effectively using an automated visual based monitoring system
- **TECHNOLOGY USED :**Using convolutional neural network (CNN) models, it can detect a drowning person in different stages
- **ACCURACY :** A higher degree of accuracy is achieved by identifying the swimmer's 3D position.

- **NAME OF THE PAPER :** A novel drowning detection method for safety of Swimmers
- **NAME OF THE AUTHOR :** Ajil Roy
  K. Srinivasan
- **JOURNAL PUBLISHED :** 2018 20th National Power Systems Conference (NPSC)
- **MONTH AND YEAR PUBLISHED :** 25 July 2019
- **OBJECTIVE OF THE PROJECT:** To ensure detection of drowning and reporting at the earlier stages by providing generic solution that suites different water bodies from pools to oceans
- **TECHNOLOGY USED :** A method simulated in Proteus design suite.
- **ACCURACY :** Economically viable providing good results;useful for both low and middle income countries and also maintains good accuracy levels

CRITICAL FINDINGS

- These visual monitoring systems make much of a positive contribution.
- It provides a way for the earliest detection of drowning persons through alarms
- It also serves for an easy installation in swimming pools
- Installation of camera(virtual eye) in the swimming pools are not so expensive
- Low maintenance of the installed camera
- Although it offers certain benefits, there are some drawbacks as well.
- There is a possibility of machine misunderstanding the situations
- Requirement of manual monitoring even though visual systems are placed