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ijircce@gmail.com



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# Virtual Eye-Life Guard for Swimming Pool to Detect Active Drowning

Mr.K.Rajeshkumar<sup>1</sup>, C.Usha<sup>2</sup>, D.Varshini<sup>3</sup>, T.Vijayalakshmi<sup>4</sup>, V.Yazhini<sup>5</sup>

Professor, Department of Electronics and Communication Engineering, Adhiyamaan College of Engineering,  
Hosur, Krishnagiri, Tamilnadu, India. <sup>1</sup>

UG Students, Department of Electronics and Communication Engineering, Adhiyamaan College of  
Engineering, Hosur, Krishnagiri, Tamilnadu, India<sup>2,3,4,5</sup>

**ABSTRACT:** Safety in natatorium may be a crucial issue. Effective drowning detection strategies square measure essential for the protection of the swimmers. during this project, a unique variety of drowning detection technique addressing several limitations of prevailing drowning detectors is planned. The planned technique ensures detection of drowning and news at the sooner stages. The planned drowning detection technique is additionally a generic answer that suits totally different water bodies from pools to oceans, associate degreed an economically technique helpful for each low and middle-income countries. The results of the simulation and software system are reported in computer science. The bestowed software system will notice drowning person in indoor natatorium and sends a voice notification to the attender rescues if the antecedently detected person is missing for a particular quantity of your time. The bestowed rule for this technique is tested on a many video sequences in swimming pools in real conditions and therefore the results square measure of high accuracy with high capability of pursuit people in real time. in step with the analysis results, the amount of false notifications generated by the system is stripped and therefore the most voice delay reported by the system is which may comparatively be reliable compared to the suitable time for rescue and revitalisation.

**KEYWORDS:** Drowning Detection, Contour, Colour Space Analysis, Real-Time Image Processing.

## I.INTRODUCTION

Effective drowning detection strategies ar essential for the security of swimmers. during this paper, a unique form of drowning detection technique addressing several limitations of prevailing drowning detectors is projected. The projected technique ensures detection of drowning and news at the sooner stages. The image of the drowning detection technique is developed and incontestible and model of the system is simulated in Proteus style suite. The results of the simulation and hardware experimentation also are reportable in computer science. By finding out body movement patterns associated connecting cameras to computer science (AI) systems we are able to devise an underwater pool safety system that reduces the chance of drowning. Usually, such systems is developed by putting in quite sixteen cameras underwater and ceiling and analyzing the video feeds to find any anomalies. however as a POC we have a tendency to create use of 1 camera that streams the video underwater and analyses the position of swimmers to assess the likelihood of drowning, if it's higher then associate alert are generated to draw in lifeguards' attention.

## II.OBJECTIVE

Swim Eye works like AN “extra lifeguard” beneath the water of your pool. Our seeing computer code tracks the movements of all swimmers in an exceedingly pool. And within the event of a significant drowning incident, Swim Eye can offer AN alarm to pool lifeguards. this may facilitate lifeguards improve their reaction-time, as they initiate a rescue.To prepare info to sight drowning system for natatorium. To propose AN rule for natatorium to sight the drowning. To implement the projected rule exploitation python libraries. to investigate the results.

### III.LITERATURE REVIEW

1. **Fe i, Lei, Wang Xueli, and Chen Dongsheng.** In pool watching intelligent systems, totally different approaches are projected. Most ways perform backgrounding on input video frames. Some apply background subtraction and image de-noising to notice the drowning person.
2. **Khartoum, Mohamed, et al.** in an exceedingly Gaussian Mixture Model is employed for describing the pixels and also the parameters of the model area unit updated with the EM rule. Also, neural networks are often trained to classify near- drowning and traditional swimming patterns.
3. **Wang, Hua, and Sing Kiong Nguang.** within the YCbCr color model is chosen for detection of the athletic game players in water wherever luminescence is separated and also the Cb and Cr elements area unit analyzed. Moreover, underwater supersonic sensors will notice drowning folks up to seventy meters below water within the pool together with a underwater video detection unit that locates and finds the victims.
4. **Kim, Alvin H., Wenmiao Lu, and Wei-Yun Yau.** Pattern recognition algorithms also are terribly helpful in swimmer detection. in an exceedingly background model that has previous data regarding swimming pools is utilized. This hierarchic model operates on behavioural traits common in the majority troubled swimmers.
5. **Chan, Kwok Leung.** However, this needs to own an outsized dataset of each teams of behavior. The dataset is obtained by attaching a pressure detector to a swimmer imitating drowning behavior and traditional swimming.
6. **Menoud,** an outside police work drawback, that involves human behavior watching at intervals hostile aquatic surroundings, is taken into account. On prime of some new insights into issues two-faced for common outside environments, issues distinctive to human detection at intervals dynamic aquatic surroundings also are elaborate.

### IV .PLANNED TECHNIQUES

In order to quickly facilitate lifesavers decide whether or not folks square measure drowning within the swimming bath, this paper proposes one economical behavior recognition approach by suggests that of video sequences of underwater.

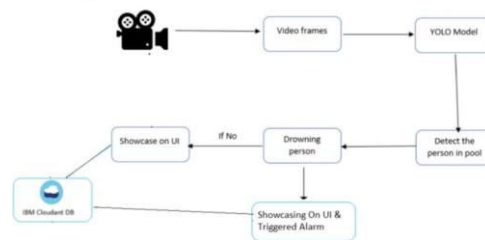


Fig 1: Block Diagram

First, by analyzing the abstraction distribution of swimming bath once swimmers square measure unremarkably swimming, the info labeling and swimmer detection ways square measure determined. DDM developed for pools needs millions of customisation work to form it work for the ocean. E.g. A video police investigation methodology employed in the pool might not be helpful to observe drowning in oceans with high waves.

#### A .Video frames

The background of most swimming pools, not like natural scenes, area unit comparatively straightforward, consisting of only a few distinct classes, as an example cherish the water and lane dividers. Regions cherish every background category but expertise goodly boundary movements from frame to border because of water ripples. an honest strategy for building a possible model of the background is to 1st perform associate degree unsupervised segmentation of the empty pool scene so as (i) to see the amount of distinct categories among the scene and (ii) build a worldwide applied mathematics model of the color properties of every category.

**B.YOLO Model**

YOLO rule employs convolution al neural networks (CNN) to discover objects in time period. because the name suggests, the rule needs solely one forward propagation through a neural network to discover objects. this suggests that prediction within the entire image is finished during a single rule run. The CNN is employed to predict varied category possibilities and bounding boxes at the same time. The YOLO rule consists of assorted variants. a number of the common ones embrace small YOLO and YOLOv3.



Fig 3: Detection

**C.Detection in DDM with Alarm Transceiver :-**

If we will able to} develop a system which will trigger alarm just in case each mouth and nose are below the water, on the far side the breath holding time, we are able to predict the drowning. The swimmers, particularly youngsters get simply disturbed by inserting any sensors terribly nearer to the mouth and nose.



Fig 4: Alarm transceiver

**V.DATA FLOW DIAGRAM**

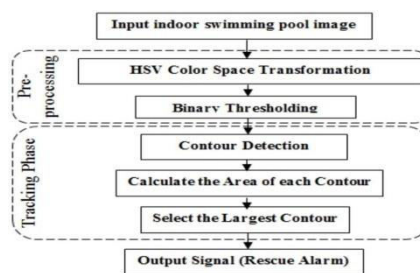


Fig 5: Data flow diagram

A Data flow sheet (DFD) may be a ancient visual illustration of the knowledge flows inside a system. A neat and clear DFD will depict the proper quantity of the system demand diagrammatically. It shows however information enters and leaves the system, what changes the knowledge, and wherever information is hold on.

**5.1 Resolution and technical designs:-**

The HSV color model describes colours in step with their Hue, Saturation, and Value. In some lighting tricks programs, it's used as an alternate to the RGB system to quantify colours. In HSV, hue could be a range within the interval [0, 360). A color's hue is its general position on a color chart, wherever red is at 0°, inexperienced is at 120°, and blue is at240°. as an example the RGB code of a yellow/orange color has high red and inexperienced parts and a coffee blue element, with the red level slightly over the inexperienced. Value, in HSV, is that the highest worth among the 3 R, G, and B numbers. This range is split by 255 to scale it between zero and one a saturation level of zero.

Brighter, purer colours have a saturation close to one. In different color models that embrace a saturation element, the precise mathematical definition of S might vary.

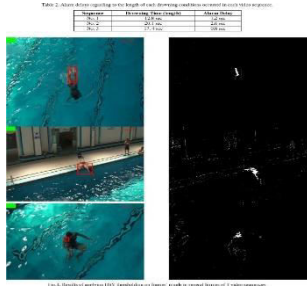


Fig 6: Drowning video sequence

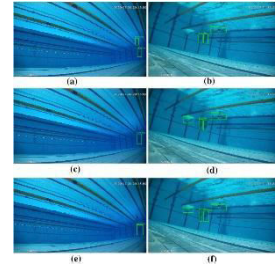


Fig 7: Alarm Methodology

### 5.1.2 YOLO algorithmic rule works:-

YOLO algorithmic rule works mistreatment the subsequent 3 techniques:

- Residual blocks
- Bounding box regression
- Intersection Over Union (IOU)

## VI .SOFTWARE REQUIRED

### 6.1 PyCharm

PyCharm IDE is primarily utilized in net and application development mistreatment Python. It helps programmers develop applications expeditiously in less time. a number of the common edges of mistreatment it are:

- Auto-completion of code
- Excellent debugging
- Project navigation
- Database tools
- Support for net development

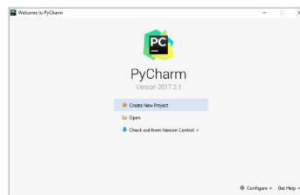


Fig 8: PYCHARM APPLICATION



Fig 9: Testing



Fig 10: Drowning in pool

## VII .PERFORMANCE METRICES

### A.Smart code editor:

It highlights the syntax in several colours. This helps in understanding the code simply. Auto-indentation is associate degree other feature that mechanically adds an indent on a replacement line. The editor additionally detects

and analyzes duplicate/copy-pasted programs. This helps in creating correct changes within the code in order that it becomes distinctive. Then, this good code editor additionally suggests the insertion of matching braces and quotes.

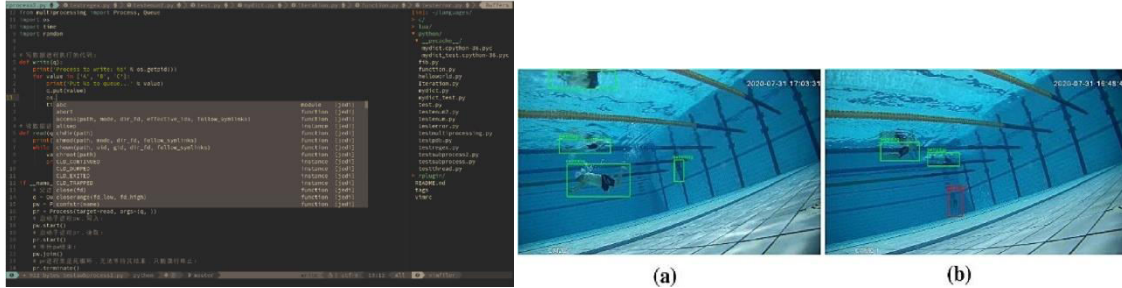


Fig 11: CODING TO DETECT THE VICTIM

### VIII .ADVANCEMENT A LIFEGUARD’S SCOPE

As we have a tendency to all might or might not apprehend, the EMS system normally is in crisis. we have a tendency to are amidst a world pandemic, EMS agencies face closures, we have a tendency to ar undermanned, overworked, and underappreciated. The trade lacks funding, unity, and support. Imagine if Lifeguards may well be the key to determination this international issue. Train incorporate Lifeguards on the far side their current scope of follow. give them education and hands on learning to advanced attention skills learned in Emergency Medical Response coaching and Emergency Medical Technician coaching. Why? so Lifeguards will do additional once EMS agencies cannot respond quickly enough to associate degree emergency. we have a tendency to ar at some extent wherever might not show up once known as. Why the delay? No personnel, no trucks, and additional vital emergencies that take up priority resources. Lifeguards aren't simply, "first responders" they're the, "FIRST, initial responders

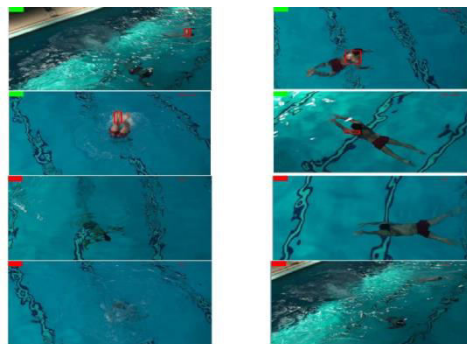


Fig 12:Swimming detection

### IX .UTILIZING AND STANDARDIZING AUGMENTED SYSTEM

Lifeguards want higher quality, additional realistic, and additional frequent coaching. Imagine associate degree immersive expertise wherever lifeguards might learn to reply to emergencies in virtual reality? No expensive instrumentality to buy. No want for multiple employees to be gift to run coaching .

### X.RESULT

"As the Aquatics trade focuses on the longer term, there ar 3 parts that ar vital to success of Lifeguards". The Aquatics trade has modified quite an bit since its early origin. Life-guarding has modified. The technology has modified, the culture has modified, and also the standards have modified. What has not modified is associate degree trade packed with folks that need to create their mark within the field. the longer term of lifeguards within the aquatics trade lies in development.

### XI.CONCLUSION

Life safety in water has been a priority for several centuries. Latest technology advancements has enabled US to return up with effective drowning detection systems. but several of these solutions ar expensive and restricted to few. Survey reports

show US that highest numbers of deaths are according in low and middle financial gain countries. The survey report conjointly mentions the kids have the most important death magnitude relation compared to adults. conjointly the deaths according in these incidents are additional from open water the answer represented higher than are ready to address these problems. The swimming glasses with drowning detection unit will be economically viable resolution

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#### BIOGRAPHY



Mr K. Rajesh kumar,  
Assistant Professor,  
Electronics and Communication Engineering Department,  
Adhiyamaan College of Engineering,  
Anna University.



C.Usha,  
Bachelor of Engineering (student),  
Adhiyamaan College of Engineering,  
Anna University.



D.Varshini,  
Bachelor of Engineering(student),  
Adhiyamaan College of Engineering,  
Anna University.



T.Vijiyalakshmi,  
Bachelor of Engineering(student),  
Adhiyamaan College of Engineering,  
Anna University.



V.Yazhini,  
Bachelor of Engineering(student),  
Adhiyamaan College of Engineering, Anna University.



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