

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

**PROJECT REPORT**

*Submitted by*

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 PROJECT OVERVIEW**

Life Guard have an important role in saving person if in any trouble on water bodies. To make their role a little less complex, a drowning person detector can be used to alert them if any in trouble. Life Guard saves that drowning person.

This project focused on how Lifeguard can detect suspicious drowning activities over sea or swimming places

### **1.2 PURPOSE**

- To overcome this lacking ability a camera detector can be made and fit in some areas
- These cameras can detect a drowning person and alert the guard
- Help in easing Life Guard job and save many more life
- Life Guard plays important role in security of person in water bodies
- With proper equipment he saves people from danger
- Life Guard should be trained well to help people
- Life Guard lacks ability to see every single area of water body

## **CHAPTER 2**

### **LITERATURE SURVEY**

#### **2.1 EXISTING PROBLEM**

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid. Drowning outcomes are classified as death, morbidity and no morbidity. Agreed terminology is essential to describe the problem and to allow effective comparisons of drowning trends. Thus, this definition of drowning adopted by the 2002 World Congress on Drowning should be widely used. Drowning is a leading killer. The latest WHO Global Health Estimates indicate that almost 236 000 people lost their lives to drowning in 2019. Just over 50% of these deaths occur among those aged under 30 years, and drowning is the sixth leading cause of death worldwide for children aged 5-14 years. Over 90% of drowning deaths occur in low- and middle-income countries. Drowning prevention interventions range from community-based solutions, such as day care for children and barriers controlling access to water, to effective national policies and legislation around water safety, including setting and enforcing boating, shipping and ferry regulations. Much more needs to be done to prevent drowning, and achieving commitments made under the Sustainable Development Goals will not be possible without addressing drowning prevention.

#### **2.2 REFERENCES**

- [1] (Omer & Abdullah, 2013)Omer, E., & Abdullah, M. F. A. (2013). GPS and SMS-Based Child Tracking System Using Smart Phone. *Internasionala Journal of Electrical, Computer, Electronic and Communication Engineering*, 7(2), 171–174.
- [2] (Pawade & Gaikwad, 2015)Pawade, R. H., & Gaikwad, A. N. (2015). *Android Based Children Tracking System*, 4(6), 2088–2092.
- [3] (Pham, Drieberg, & Nguyen, 2013)Pham, H. D., Drieberg, M., & Nguyen, C. (2013). Development of vehicle tracking system using GPS and GSM modem. In 2013 IEEE Conference on Open Systems, ICOS 2013 (pp. 89– 94).  
<https://doi.org/10.1109/ICOS.2013.6735054>

[4] (Rycroft, 1997)Rycroft, M. J. (1997). Understanding GPS. Principles and applications. Journal of Atmospheric and Solar-Terrestrial Physics, 59(5), 598–599.  
[https://doi.org/10.1016/S1364-6826\(97\)83337-8](https://doi.org/10.1016/S1364-6826(97)83337-8)

[5] (Sarjana & Ii, 2012)Sarjana, P., & Ii, M. (2012). GSM & GPS BASED SCHOOL

KIDS TRACKING SYSTEM NG WOON CEA This Report Is Submitted In Partial Fulfilment of Requirements for the Award of Bachelor Degree of Electronic Engineering ( Industrial Electronic ) With Honours Faculty of Electronic Engineering.

[6] (Salihoglu & Widom, 2013)Salihoglu, S., & Widom, J. (2013). Gps. Proceedings of the 25th International Conference on Scientific and Statistical Database Management  
SSDBM, 1. <https://doi.org/10.1145/2484838.2484843>

## 2.3 PROBLEM STATEMENT

Life Guard have an important role in saving person if in any trouble on water bodies. To make their role a little less complex, a drowning person detector can be used to alert them if any in trouble. Life Guard saves that drowning person.

There are many actions to prevent drowning. Installing barriers (e.g. covering wells, using doorway barriers and playpens, fencing swimming pools etc.) to control access to water hazards, or removing water hazards entirely greatly reduces water hazard exposure and risk. Community-based, supervised child care for pre-school children can reduce drowning risk and has other proven health benefits. Teaching school-age children basic swimming, water safety and safe rescue skills is another approach. But these efforts must be undertaken with an emphasis on safety, and an overall risk management that includes a safety-tested curricula, a safe training area, screening and student selection, and student-instructor ratios established for safety. Effective policies and legislation are also important for drowning prevention. Setting and enforcing safe boating, shipping and ferry regulations is an important part of improving safety on the water and preventing drowning. Building resilience to flooding and managing flood risks through better disaster preparedness planning, land use planning, and early warning systems can prevent drowning during flood disasters. Developing a national water safety strategy can raise awareness of safety around water, build consensus around solutions, provide

strategic direction and a framework to guide multisectoral action and allow for monitoring and evaluation of efforts.

#### WHO Response:

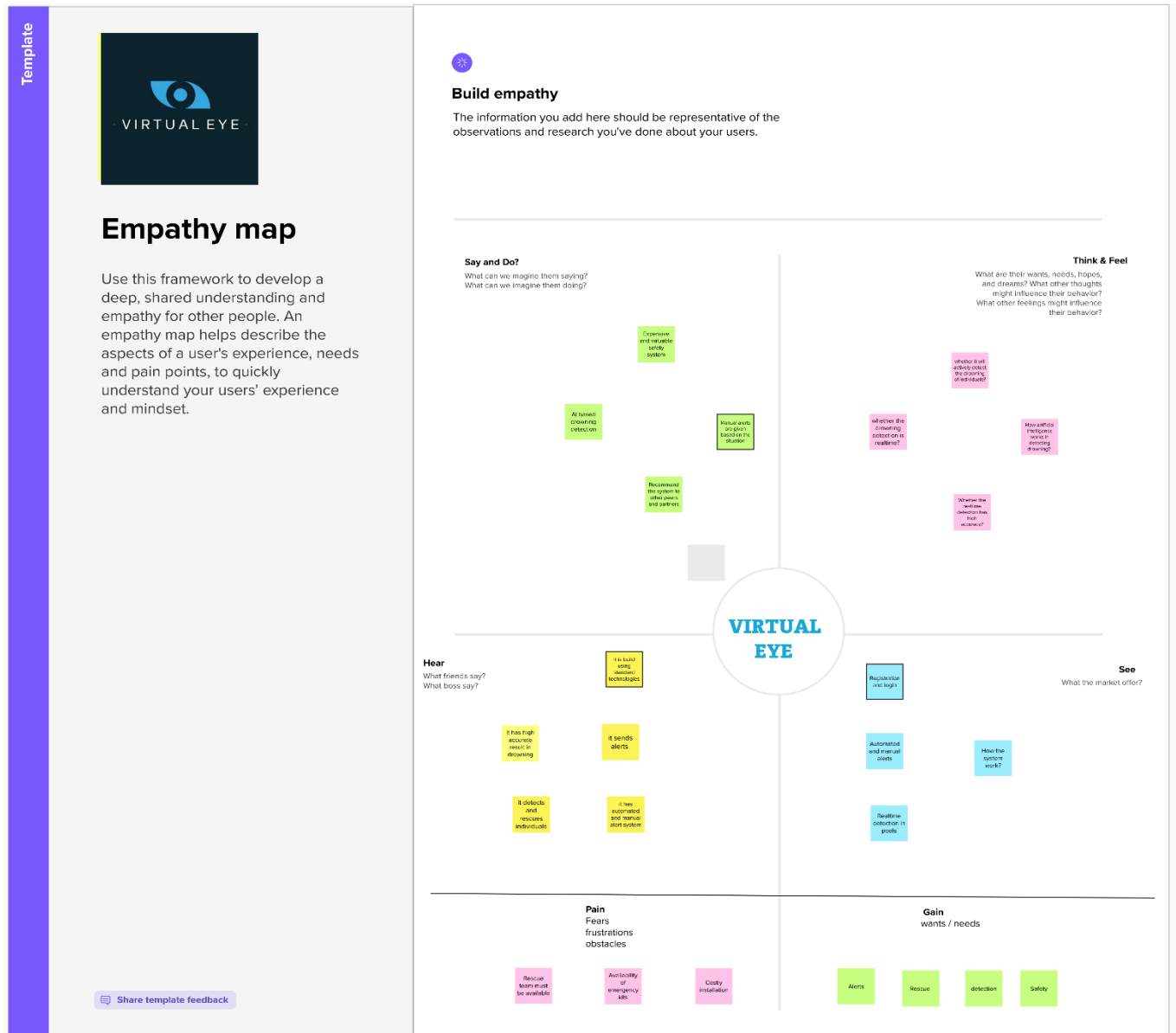
The Global report on drowning provides recommendations to governments to tailor and implement effective drowning prevention programmes to their settings, improve data about drowning, and develop national water safety plans. The report also points out the multisectoral nature of drowning and calls for greater coordination and collaboration among UN agencies, governments, key NGOs and academic institutions to prevent drowning. In May 2017, WHO released Preventing drowning: an implementation guide. This publication builds on the Global report on drowning and provides concrete guidance for drowning prevention practitioners on how to implement drowning prevention interventions. At country level, WHO has worked with Ministries of Health in some low- and middle-income countries to prevent drowning through the use of barriers controlling access to water and the establishment of day care centres for pre-school children. In addition, WHO has also funded research in low-income countries exploring priority questions related to drowning prevention.

At a regional level, WHO organizes training programmes and convenes workshops to draw together representatives of governments, NGOs and UN agencies working on drowning prevention. Life Guard: A lifeguard is responsible for the safety of people in an area of water, and usually a defined area immediately surrounding or adjacent to it, such as a beach next to an ocean or lake. The priority is to ensure no harm comes to users of the area for which they are responsible. Lifeguards often take on this responsibility upon employment, although they can also be volunteers. The conditions resulting in drowning are summarized by the 'drowning chain' in which each link can lead directly to an incident, or contribute to a succession of links.[2] It consists of lack of education about water safety or local conditions, a lack of safety advice (for example, about rip currents at a beach) a lack of protection (like no flotation device for a weak swimmer), lack of safety supervision, or an inability to cope with conditions (strong surf with a weak swimmer).

## CHAPTER 3

### IDEATION AND PROPOSED SOLUTION

#### 3.1 EMPATHY MAP CANVAS






## 3.2 IDEATION AND BRAINSTORMING

### 3.2.1 BRAIN STORMING

Template



### VIRTUL EYE

## Brainstorm & idea prioritization

In this session we aim to achieve a good base for beginning our project with clear understanding of the task in hand, the next step would be to collectively put in our thoughts/ imagination and end with a proper feasibility study

**Ground Rules**

- Be Creative
- Rule out every possible ideas and improvements
- Make your points clear and purposeful
- Don't hesitate
- Arguments are good

[Share template feedback](#)

1

### Choose your best "How Might We" Questions

Share the top 5 brainstorm questions that you created and let the group determine where to begin by selecting one question to move forward with based on what seems to be the most promising for idea generation in the areas you are trying to impact

PROBLEM 1

How might we detect and differentiate active drowning with the least possible error rate?

PROBLEM 2

How might we automate the alert systems so as to provide crucial states and into the rescue team

PROBLEM 3

How might we optimize the detection algorithm to yield results in the least time?

PROBLEM 4

How might we bring more privacy yet use camera for detection?

PROBLEM 5

How might we optimally use minimal hardware to get the most accurate information in an around the environment?

2

### Brainstorm

Write down any ideas that come to mind that address your problem statement.

⌚ 10 minutes

VEERASEKARAN.M

High level testing must be carried out before real world deployment

Requires HD cameras for good quality frames to be processed

systemic and efficient algorithms to be followed

proper hyperparameters must be found for the model

Underwater cameras a possible solution to detect humans under deep water

24/7 power supply is must for the system to run & report

SANTHANALAKSHMI.R

There should be manual alert system in case of detection failure

The system should not annoy others

The AI should be trained with more sample for better results

More cameras should be used to improve accuracy

Cameras can be mounted on the bottom of floating boards for large swimming pools

For privacy purpose the video stream should not be stored

SRIDHAR.J

Optimized feed transfer to achieve live relay will less BW to get the classifiable video of underwater footage

Able to process absolute drowning and also alerting the rescue team of passive possibilities as a probable instance

Using alternative source of energy such as solar to make a green system but making sure to always have backup supply

Ensuring the video feed is not being recorded or saved instead being used only for detection which is later discarded

Setup an ACS and suggestive ways to ensure the information reaches in one or more ways as this deals with critical life saving situation

Having considered the merits and variance of different age groups and also different swimming environment both controlled and leisure

THILAGA.A

The network connectivity should be good for faster alert transmission

power backup should be there in case of power cut.

What happens if animals were encountered in the pool?

Use powerful algorithm to get trained from various datasets

AI should be trained in such a way that it should detect multiple drowning

Cameras should be maintained properly for good results

## 3.2.2 IDEA PRIORITIZATION

### 3 Brainstorm as a group

Have everyone move their ideas into the group sharing space with in the template and have the team silently read through them. As a team sort and group them by thematic topic or similarities. Discuss and answer any questions that arise, encourage yes and, and build on the ideas of other people along the way.

30 minutes

#### privacy

Knowing the video feed is not being recorded or saved is not being used only for occasion which is been discussed

For privacy purpose the video stream should not be stored

#### User Perspective

Make sure the stakeholders know how the system works and understand the possibility for system work

The system should not annoy the swimmers

#### Power

24/7 power supply and power backup must for the system to run. Important proper alerts to rescue team

Using alternative source of energy such as solar to make a green system but making sure to always have backup supply

#### Features

Having retro reflective indicates given to children and teenagers and teaching them signs to make the drowning detection easy

Having an integration with fitness band companies to get vital states of a swimmer to have better information and predict potential risk of a drowning incident

Will the system detect properly if the pool is clumsy?

#### Cameras & Hardware

Cameras should be maintained properly for good results

System should detect multiple crowding and should report the same

#### Network & Connectivity

The network connectivity should be good for faster alarm transmission

Optimized feed transfer to achieve live relay will have DW to get the classified video of underwater footage

#### AI & ML

Proper hyperparameters need to be found for the model

The AI should be trained with more examples for better results

AI should be trained in such a way that it should detect multiple drowning

### 4 Prioritize

Your team should sit for an hour on the same page about which important moving forward. Place your ideas on the grid to determine which ideas are important and which is feasible.

30 minutes

Importance

Feasibility

1. Cameras in floating boats

1. Input devices  
2. Altering systems  
3. Backup and ACS

1. Achieving all features

1. Model and Dataset  
2. Privacy  
3. Renewable Backup  
4. Connectivity

1. User perspective  
2. Guidelines

Keep the original template for 10 minutes on time. Look at the list of ideas, then take a group photo.

### 5 Decide your focus

Give each person two icons to vote which ideas they'd like to focus on & assign the duties & responsibilities

<b>VEERASEKARAN</b> Backend and Integration on	<b>SANTHANAKSHMI</b> Backend and ML
<b>SRIDHAR</b> Frontend and Design	<b>THILAGA</b> UI/UX

What's Next...

- Plan and code an efficient model and train it with the correct hyperparameters to produce a probable and accurate result.
- Compare with the solution that is minimal, accurate, less intrusive and cost effective.

### 3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Swimming pools are generally places of fun and healthy exercise, but they can be deadly as well. Even with a lifeguard observer on duty, swimmers may still have trouble in underwater or in parts of the pool beyond the lifeguard's field of view.
2.	Idea / Solution description	In this project, we use Artificial Intelligence. We install the cameras in underwater to detect the drowning people. Using deep learning, image can be recognized. If the image is detected, it triggers the alarm to alert the Life Guard who rescue the drowning peoples.
3.	Novelty / Uniqueness	The uniqueness of our system software to track the position and the location of a drowning person. We use YOLO Algorithm. Because of its high accuracy and fast detection speed. So it helps lifeguard to save people within seconds.
4.	Social Impact / Customer Satisfaction	Drowning globally has a higher death rate and is also the third leading cause of unexpected deaths worldwide, especially among children under the age of six. To overcome this conflict our drowning detection system will have an impact on society.
5.	Business Model (Revenue Model)	We can introduce the software-based approach for making a good income. It is extremely useful to lifeguards, swimmers and business operators. The number of features makes it attractive for end users to use our software system.
6.	Scalability of the Solution	Our software system can be used by the company driver who manages the pools. We use the IBM cloud server to collect and maintain the data. We will ensure the safety of the swimmers.

### 3.4 PROBLEM SOLUTION FIT

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> <small>Who is your customer? i.e. working parents of 0-5 y.o. kids</small> <b>CS</b> <p>Tourists, Swimmers, Divers</p>	<b>6. CUSTOMER CONSTRAINTS</b> <small>What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.</small> <b>CC</b> <p>Unable to swim</p>	<b>5. AVAILABLE SOLUTIONS</b> <small>Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros &amp; cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking</small> <b>AS</b> <p>Call for help</p>	Explore AS, differentiate
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <small>Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.</small> <b>J&amp;P</b> <p>Wear Safe Suits, Life Guards</p>	<b>9. PROBLEM ROOT CAUSE</b> <small>What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.</small> <b>RC</b> <p>Rise in Sea Level</p>	<b>7. BEHAVIOUR</b> <small>What does your customer do to address the problem and get the job done? (<b>CS</b> directly involved: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace))</small> <b>BE</b> <p>Use Notice or Alert Lines in Sea</p>	
Focus on J&P, fit into BE, understand RC	<b>3. TRIGGERS</b> <small>What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.</small> <b>TR</b> <p>Panic when Things go bad</p>	<b>10. YOUR SOLUTION</b> <small>If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.</small> <b>SL</b> <p>Be on safe zone while swimming</p>	<b>8. CHANNELS of BEHAVIOUR</b> <b>8.1 ONLINE</b> <small>What kind of actions do customers take online? Extract online channels from #7</small> <p>None</p> <b>8.2 OFFLINE</b> <small>What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.</small> <p>Poor Security</p>	Focus on J&P, fit into BE, understand RC
	<b>4. EMOTIONS: BEFORE / AFTER</b> <small>How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure &gt; confident, in control - use it in your communication strategy &amp; design.</small> <b>EM</b> <p>secure/insecure</p>			

**CHAPTER-4**  
**REQUIREMENT ANALYSIS**

**4.1 FUNCTIONAL REQUIREMENTS**

<b>FR No.</b>	<b>Functional Requirement (Epic)</b>	<b>Sub Requirement (Story / Sub-Task)</b>
FR-1	Installation	Needed to be fixed under the water without creating any disturbance to the people in the swimming pool.
FR-2	Deduction	Either horrified or in unconscious
FR-3	Audio	Ask for help or stay quiet if the person is unconscious
FR-4	Support	Take swim tubes or take the help of rescuer
FR-5	Prior Alert	Send alert message to the lifeguard

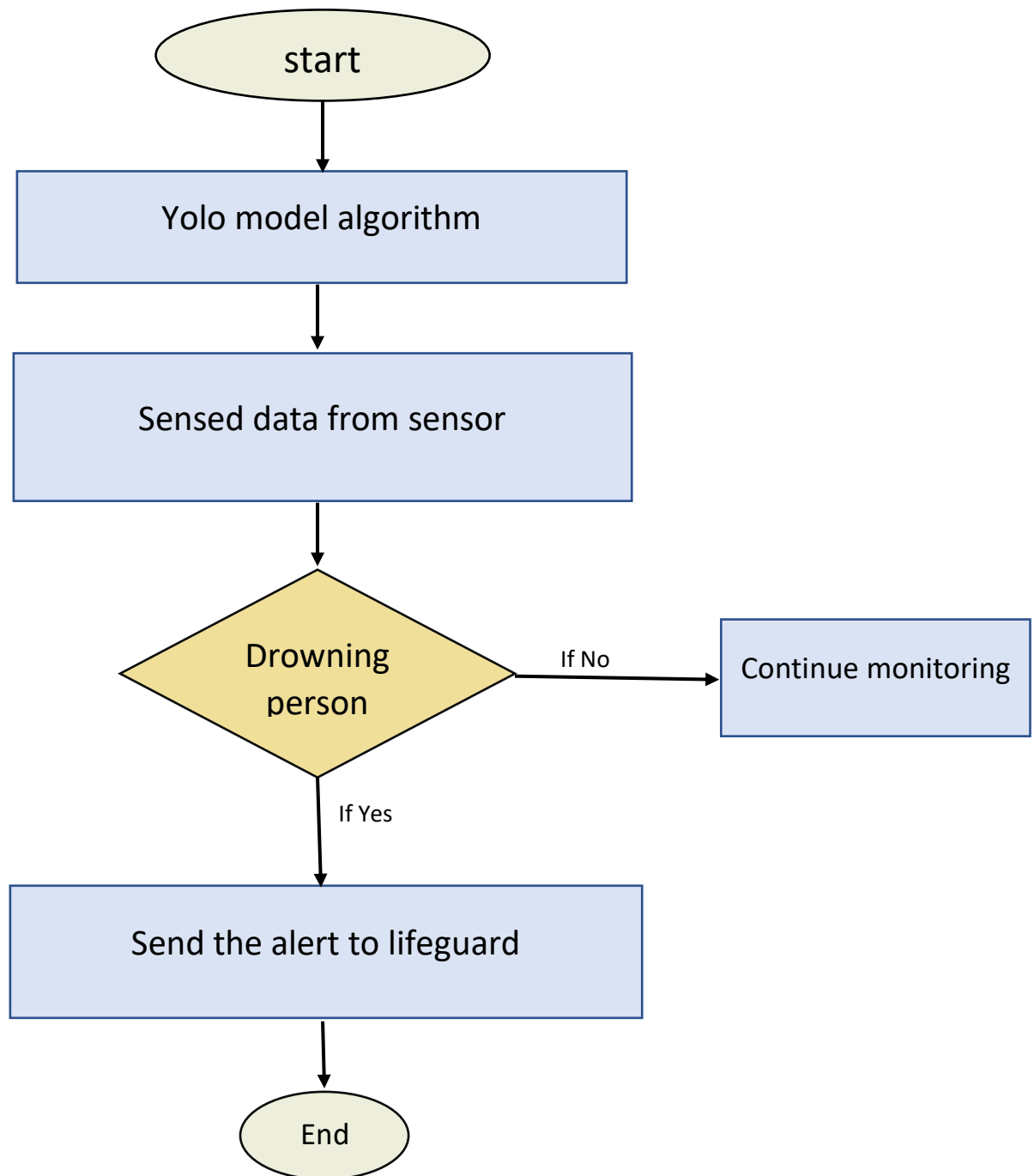
## 4.2 NON-FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	To ensure the safety of each and every person present in the pool. A Lifeguard should be present all the time in the pool.
NFR- 2	Security	Lifeguards should be aware of the alert message to save the life of the swimmer
NFR- 3	Reliability	Virtual eye lifeguard triggers an immediate prior alarm if a swimmer is in peril, helping to avoid panic even in critical situations.
NFR-4	Performance	The alarm is triggered when the swimmer's pulse rate is decreasing
NFR-5	Availability	Equipment and accessories include lifesaver rings, inflatable vests, a Shepherd's Crook, life hooks, spine boards, rescue tubes, and a first aid kit. Remember to keep them accessible to quickly pull someone from the water safely.
NFR- 6	Scalability	Virtual eye lifeguard detects potential drownings and promptly notifies you. It features the latest artificial intelligence technology and adapts to the needs of the user.

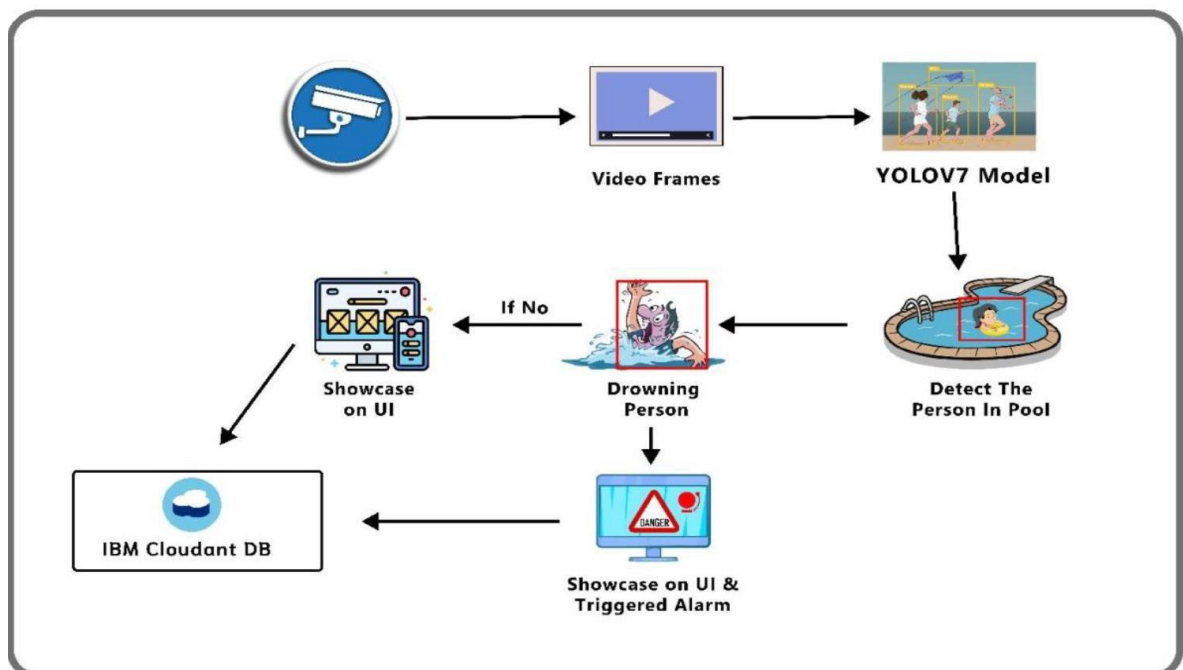
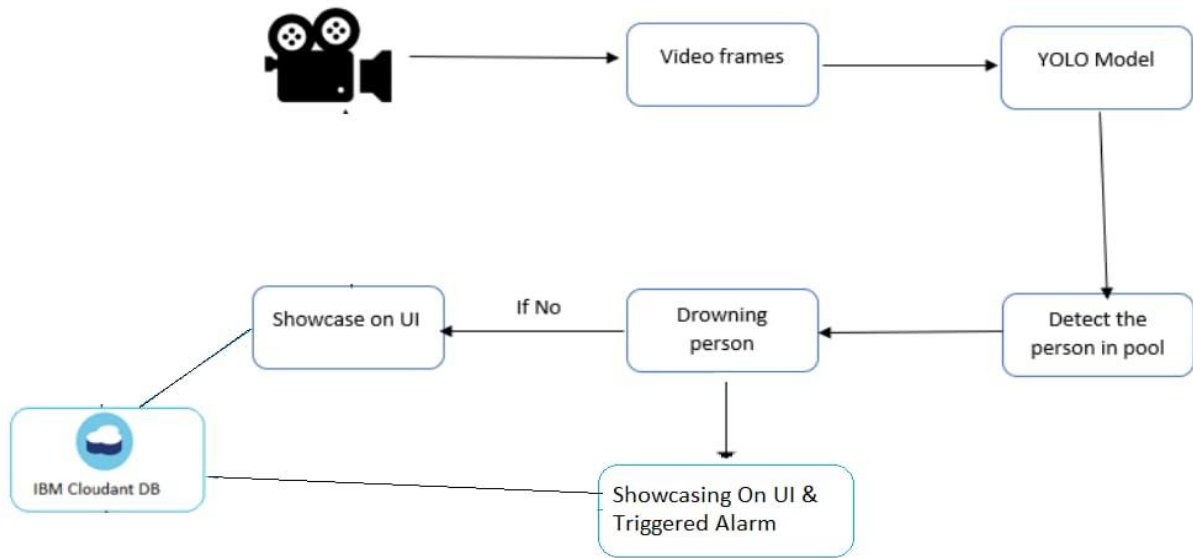
## CHAPTER 5

### PROJECT DESIGN

#### 5.1 DATA FLOW DIAGRAM



## 5.2 SOLUTION AND TECHNICAL ARCHITECTURE





### 5.3 USER STORIES

User Story Number	User Story / Task
USN-1	As a user, I can register and login IBM cloud using institute Id.
USN-2	As a user, I will create a service instance I have registered for the application
USN-3	As a user, I can create service credentials
USN-4	As a user, I can launch cloudant DB
USN-5	As a user, I can create a database
USN-6	Building the index.html page
USN-7	Building the base.html page
USN-8	Building the register.html page.
USN-9	Building the login.html page
USN-10	Building the prediction.html page
USN-11	Building the logout.html page
USN-12	Building a app.py python code
USN-13	Building a detect.py code
USN-14	Building object detection.py code
USN-15	python file is executed the localhost is activated. Open the browser and navigate to <a href="http://127.0.0.1:5000">http://127.0.0.1:5000</a> to check your application
USN-16	As a User, I can detect the drowning person
USN-17	If person is drowning, the system will ring an alarm to give signal.
USN-18	As a User, I can logout the application.

## CHAPTER 6

### PROJECT PLANNING AND SCHEDULING

#### 6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	CloudantDB	USN-1	As a user, I can register and login IBM cloud using institute Id.	2	High	Veerasekaran M Santhanalakshmi R
Sprint-1	CloudantDB	USN-2	As a user, I will create a service instance I have registered for the application	1	High	Veerasekaran M Santhanalakshmi R
Sprint-1	CloudantDB	USN-3	As a user, I can create service credentials	2	Low	Veerasekaran M Santhanalakshmi R
Sprint-1	CloudantDB	USN-4	As a user, I can launch cloudant DB	2	Medium	Veerasekaran M Santhanalakshmi R
Sprint-1	CloudantDB	USN-5	As a user, I can create a database	1	High	Veerasekaran M Santhanalakshmi R
Sprint-2	Build HTML Pages	USN-6	Building the index.html page	2	Medium	Sridhar J Thilaga A
Sprint-2	Build HTML Pages	USN-7	Building the base.html page	2	High	Sridhar J Thilaga A
Sprint-2	Build HTML Pages	USN-8	Building the register.html page.	4	High	Sridhar J Thilaga A
Sprint-2	Build HTML Pages	USN-9	Building the login.html page	6	High	Sridhar J Thilaga A
Sprint-2	Build HTML Pages	USN-10	Building the prediction.html page	6	High	Sridhar J Thilaga A
Sprint-2	Build HTML Pages	USN-11	Building the logout.html page	1	Low	Sridhar J Thilaga A

<b>Sprint</b>	<b>Functional Requirement (Epic)</b>	<b>User Story Number</b>	<b>User Story / Task</b>	<b>Story Points</b>	<b>Priority</b>	<b>Team Members</b>
Sprint-3	Build Python Code	USN-12	Building a app.py python code	3	High	Sridhar J Santhanalakshmi R
Sprint-3	Build Python Code	USN-13	Building a detect.py code	5	Medium	Sridhar J Santhanalakshmi R
Sprint-3	Build Python Code	USN-14	Building object detection.py code	8	High	Sridhar J Santhanalakshmi R
Sprint-4	Run the Application	USN-15	python file is executed the localhost is activated. Open the browser and navigate to <a href="http://127.0.0.1:5000">http://127.0.0.1:5000</a> to check your application	3	Medium	Veerasakaran M Thilaga A
Sprint-4	Run the Application	USN-16	As a User, I can detect the drowning person	7	High	Veerasakaran M Thilaga A
Sprint-4	Run the Application	USN-17	If person is drowning, the system will ring an alarm to give signal.	7	High	Veerasakaran M Thilaga A

## 6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	12	06 Nov 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	18	07 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	15 Nov 2022

### Velocity:

For Sprint-1 the Average Velocity (AV) is:  $AV = \text{Sprint Duration} / \text{velocity} = 12 / 6 = 2$

For Sprint-2 the Average Velocity (AV) is:  $AV = \text{Sprint Duration} / \text{velocity} = 18 / 6 = 3$

For Sprint-3 the Average Velocity (AV) is:  $AV = \text{Sprint Duration} / \text{velocity} = 20 / 6 = 3.3$

For Sprint-4 the Average Velocity (AV) is:  $AV = \text{Sprint Duration} / \text{velocity} = 20 / 6 = 3.3$

TOTAL TEAM AVERAGE VELOCITY = 2.9



## 6.3 Reports from JIRA

### Backlog

The screenshot displays the JIRA Backlog for the project 'Virtual eye lifeguard for swimming pools to detect active drowning'. The interface includes a sidebar with navigation options like Roadmap, Backlog, Board, and Code. The main area shows two sprints:

- Sprint 1** (24 Oct – 29 Oct, 5 issues):
  - USN-1: As a user, I can register and login IBM cloud using institute Id. Label: CLOUDANTDB. Status: TO DO.
  - USN-2: As a user, I will create a service instance I have registered for the application. Label: CLOUDANTDB. Status: TO DO.
  - USN-3: As a user, I can create service credentials. Label: CLOUDANTDB. Status: TO DO.
  - USN-4: As a user, I can launch cloudant DB. Label: CLOUDANTDB. Status: TO DO.
  - USN-5: As a user, I can create a database. Label: CLOUDANTDB. Status: TO DO.
- Sprint 2** (31 Oct – 5 Nov, 6 issues):
  - USN-6: Building the index.html page. Label: BUILD HTML PAGES. Status: TO DO.
  - USN-7: Building the base.html page. Label: BUILD HTML PAGES. Status: TO DO.
  - USN-8: Building the register.html page. Label: BUILD HTML PAGES. Status: TO DO.
  - USN-9: Building the login.html page. Label: BUILD HTML PAGES. Status: TO DO.
  - USN-10: Building the prediction.html page. Label: BUILD HTML PAGES. Status: TO DO.
  - USN-11: Building the logout.html page. Status: TO DO.

The bottom of the image shows a Windows taskbar with the date 20-11-2022 and time 07:47.

JIRA [USN-22] As a user, I can lo: x Virtual eye lifeguard for swimmin x +

team-16683208112955.atlassian.net/jira/software/projects/USN/boards/4/backlog

Gmail YouTube Maps IBM WhatsApp

Jira Software Your work Projects Filters Dashboards People Apps Create Search 8 ? ? SR

Projects / Virtual eye lifeguard for swimming pools to detect active drowning

## Backlog

SR VS S T Epic Insights

**Sprint 3** 7 Nov – 12 Nov (3 issues) 16 0 0 Start sprint

- USN-12 Building a app.py python code BUILD PYTHON CODE 3 TO DO SR
- USN-13 Building a detect.py code BUILD PYTHON CODE 5 TO DO S
- USN-14 Building object detection.py code BUILD PYTHON CODE 8 TO DO SR

+ Create issue

**Sprint 4** 14 Nov – 19 Nov (4 issues) 19 0 0 Start sprint

- USN-15 python file is executed the localhost is activated and open the browser and navigate to url to check your application RUN THE APPLICATION 3 TO DO VS
- USN-16 As a User, I can detect the drowning person RUN THE APPLICATION 7 TO DO T
- USN-17 If person is drowning, the system will ring an alarm to give signal RUN THE APPLICATION 7 TO DO VS

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## Roadmap

JIRA [USN-22] As a user, I can lo: x Virtual eye lifeguard for swimmin x (4) WhatsApp x +

team-16683208112955.atlassian.net/jira/software/projects/USN/boards/4/roadmap?timeline=MONTHS

Gmail YouTube Maps IBM WhatsApp

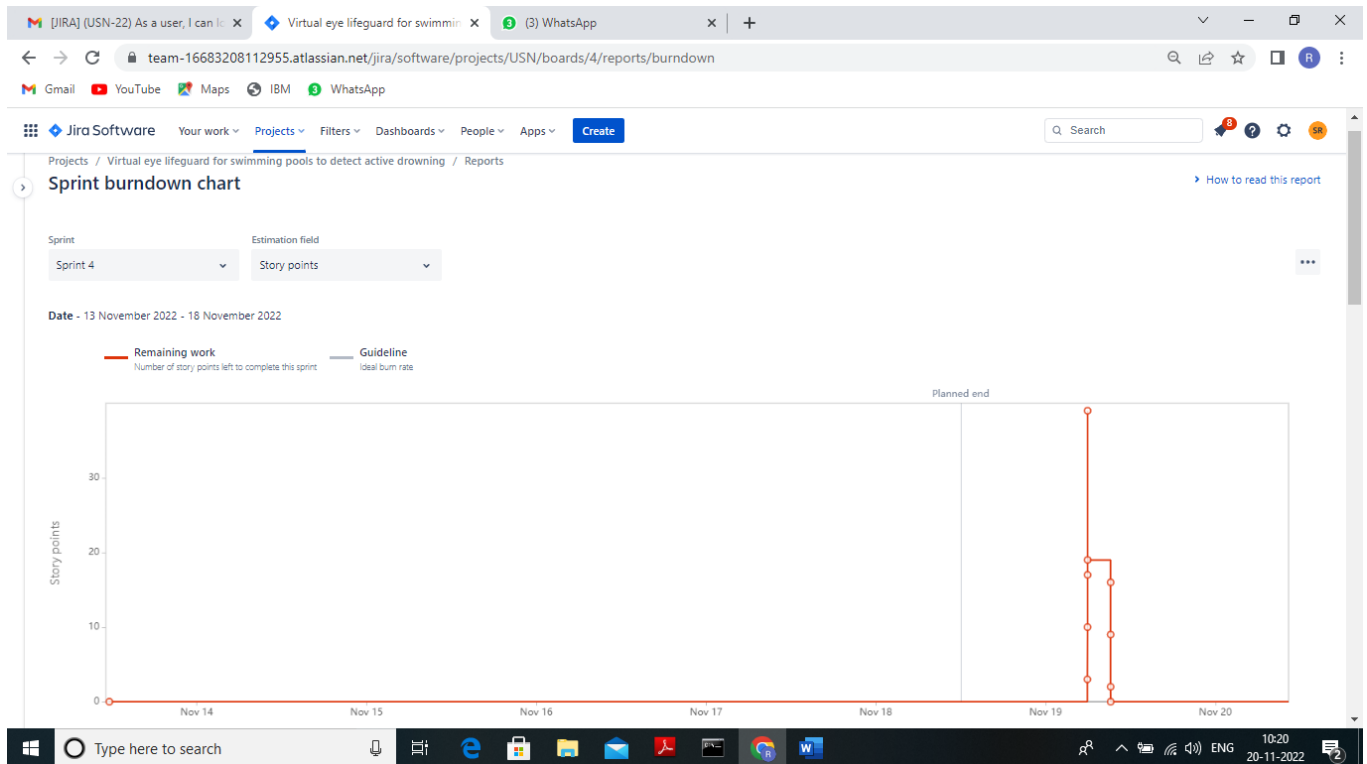
	T	NOV	DEC	JAN '23	FEB '23	MAR '23
Sprints		Sprint 1 Sprint 2 Sprint 3 Sprint 4				
USN-18 CloudantDB						
USN-19 Build HTML Pages						
USN-20 Build Python Code						
USN-21 Run the Application						
+ Create Epic						

Today Weeks Months Quarters 2 new notifications

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# Reports

## Burdown chart





## CHAPTER 7

### CODING & SOLUTIONING

#### 7.1.1 FEATURE 1: LOGIN

**Algorithm:**

1. Enter the credentials and hit enter (email and password).
2. If already logged in user is taken to home page
3. If wrong credentials entered, notification displayed to user and user stays in login page.
4. On correct credentials, user is taken to home page.

#### 7.1.2 FEATURE 2: SIGNUP

**Algorithm:**

1. Enter the signup form fields (name, email , password ) and hit enter.
2. All credentials are validated at client side.
3. Email is checked if already registered or not in the database.
4. If already registered, notification displayed. Or else, the user is taken to the successful signup page.

**Code:**

```
<!DOCTYPE html>
<html >
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <title>Virtual Eye</title>
  <link href='https://fonts.googleapis.com/css?family=Pacifico' rel='stylesheet' type='text/css'>
  <link href='https://fonts.googleapis.com/css?family=Arimo' rel='stylesheet' type='text/css'>
  <link href='https://fonts.googleapis.com/css?family=Hind:300' rel='stylesheet' type='text/css'>
  <link href='https://fonts.googleapis.com/css?family=Open+Sans+Condensed:300' rel='stylesheet'
  type='text/css'>
  <link rel="stylesheet" href="{{ url_for('static', filename='css/style.css') }}">
```

```
<link href='https://fonts.googleapis.com/css?family=Merriweather' rel='stylesheet'>
<link href='https://fonts.googleapis.com/css?family=Josefin+Sans' rel='stylesheet'>
<link href='https://fonts.googleapis.com/css?family=Montserrat' rel='stylesheet'>
```

```
<style>
```

```
.header {
    top:0;
    margin:0px;
    left: 0px;
    right: 0px;
    position: fixed;
    background-color: #28272c;
    color: white;
    box-shadow: 0px 8px 4px grey;
    overflow: hidden;
    padding-left:20px;
    font-family: 'Josefin Sans';
    font-size: 2vw;
    width: 100%;
    height:8%;
    text-align: center;
}

.topnav {
    overflow: hidden;
    background-color: #333;
}
```

```
.topnav-right a {
    float: left;
    color: #f2f2f2;
    text-align: center;
    padding: 14px 16px;
    text-decoration: none;
    font-size: 18px;
```

```
}
```

```
.topnav-right a:hover {  
  background-color: #ddd;  
  color: black;  
}
```

```
.topnav-right a.active {  
  background-color: #565961;  
  color: white;  
}
```

```
.topnav-right {  
  float: right;  
  padding-right:100px;  
}
```

```
.login{  
margin-top:-70px;  
}
```

```
body {
```

```
  background-color:#ffffff;  
  background-repeat: no-repeat;  
  background-size:cover;  
  background-position: 0px 0px;  
}
```

```
.login{  
margin-top:100px;  
}
```

```
form {border: 3px solid #f1f1f1; margin-left:400px;margin-right:400px;}
```

```
input[type=text], input[type=email],input[type=number],input[type=password] {  
  width: 100%;
```

```
padding: 12px 20px;
display: inline-block;
margin-bottom: 18px;
border: 1px solid #ccc;
box-sizing: border-box;
}
```

```
button {
background-color: #28272c;
color: white;
padding: 14px 20px;
margin-bottom: 8px;
border: none;
cursor: pointer;
width: 100%;
}
```

```
button:hover {
opacity: 0.8;
}
```

```
.cancelbtn {
width: auto;
padding: 10px 18px;
background-color: #f44336;
}
```

```
.imgcontainer {
text-align: center;
margin: 24px 0 12px 0;
}
```

```
img.avatar {
width: 30%;
```

```
border-radius: 50%;  
}
```

```
.container {  
  padding: 16px;  
}
```

```
span.psw {  
  float: right;  
  padding-top: 16px;  
  
}
```

```
/* Change styles for span and cancel button on extra small screens */  
@media screen and (max-width: 300px) {  
  span.psw {  
    display: block;  
    float: none;  
  }  
  .cancelbtn {  
    width: 100%;  
  }  
}
```

```
</style>
```

```
</head>
```

```
<body style="font-family:Montserrat;">
```

```
<div class="header">
```

```
<div style="width:50%;float:left;font-size:2vw;text-align:left;color:white; padding-top:1%">Virtual  
Eye</div>
```

```
<div class="topnav-right" >
```

```

<a href="{{ url_for('home')}}">Home</a>
<a href="{{ url_for('login')}}">Login</a>
<a class="active" href="{{ url_for('register')}}">Register</a>

</div>
</div>
<div id="login" class="login">

<form action="{{url_for('afterreg')}}" method="post">
    <div class="imgcontainer">
        
    </div>

    <div class="container">
        <input type="text" placeholder="Enter Name" name="name" required><br>
        <input type="email" placeholder="Enter Email ID" name="_id" required><br>
        <input type="password" placeholder="Enter Password" name="psw" required>

        <button type="submit">Register</button><br>

        {{pred}}
    </div>
    <div class="container" style="background-color:#f1f1f1">
        <div class="psw">Already have an account?&nbsp; &nbsp;<a href="{{ url_for('login')
}}">Login</a></div>
    </div>
</form>

</div>

</body>
</html>

```

## 7.2 FEATURE 3: DETECT DROWNING

### Algorithm:

1. Detect a object using yolo model
2. Check whether its person or not
3. If its a person,check if person moving or not
4. If not moving for 10 secs,alert the life guard

### Code:

```
import cvlib as cv
from cvlib.object_detection import draw_bbox
import cv2 import time import numpy as np
#for PiCamera
#from picamera Import PiCamera
#camera = PiCamera
#camera.start_preview() # open
webcam webcam =
cv2.VideoCapture(0)

if not webcam.isOpened():
    print("Could not open webcam") exit() t0 =

time.time() #gives time in seconds after 1970

#variable dcount stands for how many seconds the person has been standing still for
centre0 = np.zeros(2) isDrowning = False

#this loop happens approximately every 1 second, so if a person doesn't move,
#or moves very little for 10seconds, we can say they are drowning

#loop through frames
while webcam.isOpened():
```

```

# read frame from webcam
status, frame = webcam.read()

if not status:
    print("Could not read frame")
    exit()

# apply object detection
bbox, label, conf = cv.detect_common_objects(frame)
#simplifying for only 1 person

#s = (len(bbox), 2)

if(len(bbox)>0): bbox0 =
    bbox[0] #centre =
    np.zeros(s) centre =
    [0,0]

centre =[(bbox0[0]+bbox0[2])/2,(bbox0[1]+bbox0[3])/2 ]

#make vertical and horizontal movement
variables hmov = abs(centre[0]-centre0[0]) vmov
= abs(centre[1]-centre0[1])

#there is still need to tweek the threshold
#this threshold is for checking how much the centre has moved
x=time.time()

threshold = 10 if(hmov>threshold or
vmov>threshold): print(x-t0, 's') t0 =
time.time() isDrowning = False

else:

```



```

print(x-t0, 's')
if((time.time() - t0) > 10):
    isDrowning = True

#print('bounding box: ', bbox, 'label: ' label , 'confidence: ' conf[0], 'centre: ', centre)
#print(bbox,label ,conf, centre)
print('bbox: ', bbox, 'centre:', centre, 'centre0:', centre0)
print('Is he drowning: ', isDrowning)

centre0 = centre
# draw bounding box over detected objects

out = draw_bbox(frame, bbox, label, conf,isDrowning)

#print ('Seconds since last epoch: ', time.time()-t0)

# Display output
cv2.imshow("Real-time object detection", out)
# press "Q" to stop if cv2.waitKey(1)
& 0xFF == ord('q'): break

# release resources
webcam.release()
cv2.destroyAllWindows()

```

## **CHAPTER 8**

### **TESTING**

#### **8.1 TEST CASES**

1. Login button click with wrong credentials entered.
2. Signup with already registered mail ID.
3. Signup with wrong form data entered.
4. Entering home page with logged out session.
5. Clicking home page buttons with logged out session.
6. Invalid data entered in change password page and requested for change in password.

## 8.2 USER ACCEPTANCE TESTING

	Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status
5	LoginPage_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popup when user clicked on My account button	pc with Internet connection Required scripts	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup displayed or not	<a href="#">login.html</a>	Login/Signup popup should display	Working as expected	Pass
6	LoginPage_TC_OO2	UI	Home Page	Verify the UI elements in Login/Signup popup	pc with Internet connection Required scripts	1.Enter URL and click go 2.Click on My Account dropdown button 3.Verify login/Signup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	<a href="#">login.html</a>	Application should show below UI elements: a.email text box b.password text box c.Login button with orange colour d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Fail
7	LoginPage_TC_OO3	Functional	Home page	Verify user is able to log into application with Valid credentials	pc with Internet connection Required scripts	1.Enter URL(login.html) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: veerasakaran.ece19@mamcet.com password: Testing123	User should navigate to user account homepage	Working as expected	Pass
8	LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with Invalid credentials	pc with Internet connection Required scripts	1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: thilaga@gmail.com password: demo123	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass
9	LoginPage_TC_OO4	Functional	Login page	Verify user is able to log into application with Invalid credentials	pc with Internet connection Required scripts	1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter Valid username/email in Email text box 4.Enter Invalid password in password text box 5.Click on login button	Username: sridhar@gmail.com password: Testing1236786876876	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass
10	LoginPage_TC_OO5	Functional	Login page	Verify user is able to log into application with Invalid credentials	pc with Internet connection Required scripts	1.Enter URL(https://shopenzer.com/) and click go 2.Click on My Account dropdown button 3.Enter Invalid username/email in Email text box 4.Enter Invalid password in password text box 5.Click on login button	Username: santhanaakshmi@gmail.com password: Testing1236786876876	Application should show 'Incorrect email or password ' validation message.	Working as expected	Pass
11										

## **CHAPTER 9**

### **RESULTS**

#### **9.1 PERFORMANCE METRICS**

1. Planned value: Rs.4000
2. Actual value: Rs.1300
3. Hours worked: 50 hours
4. Stick to Timelines: 100%
5. Stay within budget: 100%
6. Consistency of the product: 75%
7. Efficiency of the product: 80%
8. Quality of the product: 80%

## **CHAPTER 10**

### **ADVANTAGES AND DISADVANTAGES**

#### **ADVANTAGES:**

1. Low cost.
2. Simple UI.
3. Faster response
4. Capability of adding many features with ease and less cost.

#### **DISADVANTAGES:**

1. Lack of UI
2. Consistency of the product is not 100%.
3. Detecting person who is drowning is not accurate

## **CHAPTER 11**

### **CONCLUSION**

To overcome this lacking ability a camera detector can be made and fit in some areas. These cameras can detect a drowning person and alert the guard. Help in easing Life Guard job and save many more life.

## **CHAPTER 12**

### **FUTURE SCOPE**

The product can include many other additional features like checking the weather forecast of the child location, interacting with the child etc. If we improve the efficiency of the code and reduce the size of our product, the market will be able to find a new child tracker gadget with low cost and high

## **CHAPTER 13 APPENDIX**

### **SOURCE CODE LINK:**

[https://drive.google.com/drive/folders/1AuAXNGJLzqdF3aZZt4zwt-RjEdoKFdb2?usp=share\\_link](https://drive.google.com/drive/folders/1AuAXNGJLzqdF3aZZt4zwt-RjEdoKFdb2?usp=share_link)

### **GitHub Link:**

[IBM-EPBL/IBM-Project-43945-1660720788 - github.com](https://github.com/IBM-EPBL/IBM-Project-43945-1660720788)

### **Project Demo Link:**

[https://drive.google.com/file/d/15\\_PrmF7HxBp\\_DPDw11TEYIBqgDzBVekW/view?usp=share\\_link](https://drive.google.com/file/d/15_PrmF7HxBp_DPDw11TEYIBqgDzBVekW/view?usp=share_link)