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INTRODUCTION

1.1 Project Overview

Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in hotels, and weekend tourist spots and barely people have them in their house backyard. Beginners, especially, often feel it difficult to breathe underwater which causes breathing trouble which in turn causes a drowning accident. Such kinds of deaths account for the third cause of unplanned death globally, with about 1.2 million cases yearly. To overcome this conflict, a meticulous system is to be implemented along the swimming pools to save human life. By studying body movement patterns and connecting cameras to artificial intelligence (AI) systems we can devise an underwater pool safety system that reduces the risk of drowning. Usually, such systems can be developed by installing more than 16 cameras underwater and ceiling and analyzing the video feeds to detect any anomalies. but AS a POC we make use of one camera that streams the video underwater and analyses the position of swimmers to assess the probability of drowning, if it is higher then an alert will be generated to attract lifeguards' attention. The method uses convolution neural network object detector to generate confidence maps of object location in pool and non maximum suppression to extract head pixel coordinate. This project uses CNN architecture to classify different object with their dimension (In general height and width of the object),so we detect human from the video frame ,then we calculate height and width for that object. If the swimmer gets difficulty then the system throw alert for security.

The convolutional layer is the first layer of a convolutional network. While convolutional layers can be followed by additional convolutional layers or pooling layers, the fully-connected layer is the final layer. With each layer, the CNN increases in its complexity, identifying greater portions of the image. Earlier layers focus on simple features, such as colors and edges. As the image data progresses through the layers of the CNN, it starts to recognize larger elements or shapes of the object until it finally identifies the intended object.

1.2 Purpose

WORK PLAN

S.No	MONTH	PROCESS TO BE FINISHED
1	August,2022	Literature Review
2	September,2022	Data Collection
3	October,2022	Algorithm and Pseudocode
4	November,2022	Implementation
5	December,2022	Report Preparation

BUDGET

S.NO	PART	PRICE
1	Data Collection	Rs.1000
2	Material Purchasing	Rs.6,000
3	Testing	Rs.1,000
4	Travel	Rs.1,000
5	Report Preparation	Rs. 1,000
	TOTAL	Rs.10,000

LITERATURE SURVEY

2.1 Existing problem

Recently, there has been growing interest around the topic of drowning detection systems (DDS) in the sport and leisure industry both across the UK and globally. Advancements in technology, coupled with the importance of pool safety, has led to its growing prominence, with mention of DDS now in documents such as HSG179 - the latest UK standards document for health and safety in swimming pools (Health and Safety Executive, 2018). However, the topic is a debated area for various reasons explored in this review. Whilst there are plenty of academic articles dedicated to the technology and design behind these products in the fields of biometrics, computer science and electronic engineering, there is limited academic research investigating their application to real-world scenarios. Furthermore, there is uncertainty around their use alongside traditional lifeguarding; whether international testing standards (ISO standards) are robust enough; and general risks affecting the effectiveness of these products. This includes factors such as water clarity, high pool occupancy, lighting, glare and attractions such as water slides and wave machines. These concerns alongside the lack of research and high installation costs have resulted in a reluctance by some operators to incorporate DDS into their pools. This signifies the importance of independent research into DDS. Along with the specific aims outlined in chapter 2, this literature review intends to support the move towards the shared goal of improved pool safety. This piece will begin with an overview of the different definitions of DDS, followed by an explanation of the aims and methodology of this review. It will then discuss what the current DDS standards are alongside legislation and guidance available around DDS, and provide a summary of the shared responsibilities towards the effective operation of DDS. Following this, the literature review will examine the co-existence between DDS and traditional lifeguarding, provide an analysis of its impact so far, and conclude with recommendations on the direction of future DDS research. The results of the current study have found the predicted advantage for lifeguards in spotting and responding to drowning targets in a swimming pool situation Lifeguards also appear to have a higher threshold for responding to a drowning target. This may reflect their greater sensitivity to visual cues that discriminate between drowning and normal swimming. Additionally, lifeguards may be more aware of the dangers of committing to a potentially drowning target. Once a response is initiated in a pool situation (e.g. entering the water to rescue the drowning swimmer) the lifeguard is limited in their ability to spot secondary drowning targets. Thus lifeguards may need greater evidence before responding, though this did not negatively impact on their time to respond when they chose to do so A second interesting finding lies in the different responses evoked by the active and passive drowning targets. Despite a tendency for a small cluster of predominantly passive-target trials to prompt premature responses, active targets were still more likely to be responded to than passive targets. However, at several levels of the set size factor, these active targets were also responded to more slowly than passive

targets, which differed from the predicted results that active targets would elicit faster and more accurate responses.

2.2 References

1. Ericsson, K. A., Krampe, R. Th., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. Psychological Review, 100, 363–406.

2. Wolfe, J. M., & Friedman-Hill, S. R. (1992). Visual search for oriented lines: the role of angular relations between targets and distractors. Spatial Vision, 6(3), 199-207.

3. Foresti, Gian Luca, Petri Mähönen, and Carlo S. Regazzoni, eds. Multimedia video-based surveillance systems: Requirements, Issues and Solutions. Vol. 573. Springer Science & Business Media, 2012

4. International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Vol.3, Special Issue 2, March 2015.

5. M. Peden, K. McGee, and E. Krug, "Injury: a leading cause of the global burden of disease, 2000," 2002. [2]

6. E. Krug and W. H. Organization, "Injury: a leading cause of the global burden of disease," 1999

2.3 Problem Statement Definition

➤ This images send to the Convolution Nural Network (CNN), then Convolution Nural Network (CNN) check if fattle is occured then alarm, if fattle is not occured then continue for the input process. We are getting upto 85% accuracy with video quality and minimum specs and with a higher video quality and possessing power we are getting upto >90 accuracy.

➤ YOLO-based Convolutional Neural Network family of models for object detection and the most recent variation called YOLOv3.

➤ How to train a YOLO model in a windows environment : One should have knowledge of the following Concepts :YOLO V3(You Only Look Once,Version3) , Flask.

METHODOLOGY:
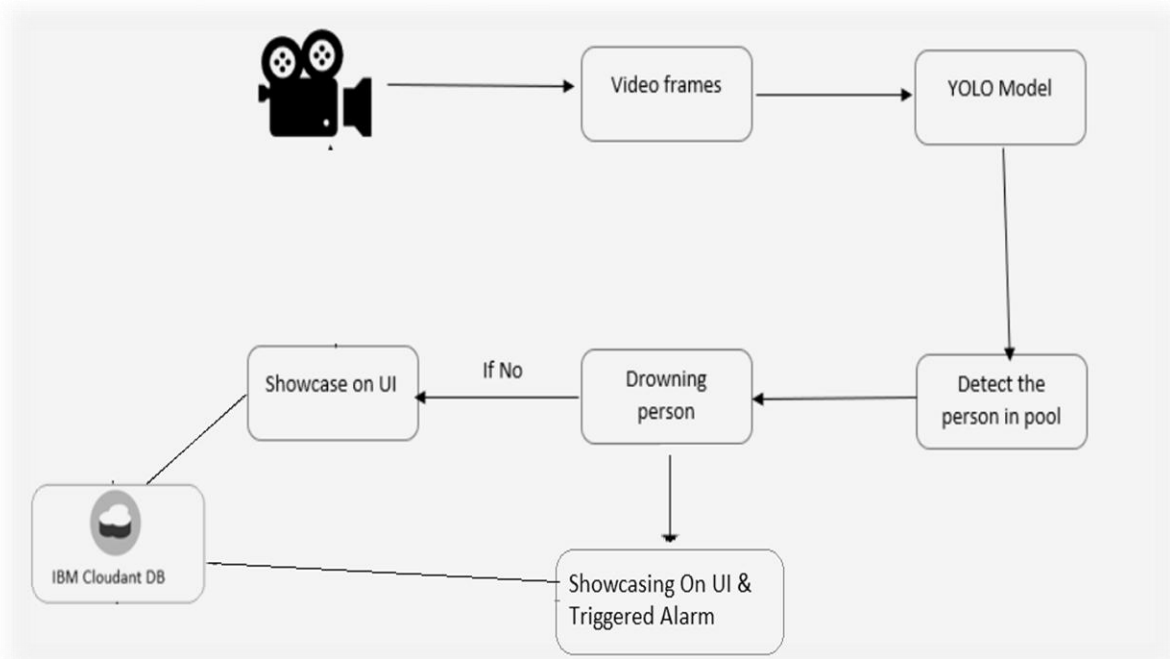
- The object_detection.py python file would detect the different objects such as persons, bicycles, cars, chairs, etc.

- The data folder contains the caffemodel (Caffe (Convolutional Architecture for Fast Feature Embedding) is a deep learning framework that allows users to create image classification and image segmentation, models. Initially, users create and save their models as plain text PROTOTXT files. After a user trains and refines their model using Caffe, the program saves the user's trained model as a CAFFEMODEL file.)

- We are building a Flask Application that needs HTML pages stored in the templates folder and a python script app.py for server-side scripting
- The static folder has the CSS files which are necessary for styling the HTML page and for executing the actions.
- app.py contains the flask code which is used to detect the drowning person in a video input.

- Alarm sounds and demo videos are presented in project folders.

- a **convolutional neural network** (**CNN**, or **ConvNet**) is a class of artificial neuralnetwork (**ANN**), most commonly applied to analyze visual imagery.

- **Cloudant is a non-relational, distributed database service. (DbaaS)**

3 . IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in hotels, and weekend tourist spots and barely people have them in their house backyard. Beginners, especially, often feel it difficult to breathe underwater which causes breathing trouble which in turn causes a drowning accident. Such kinds of deaths account for the third cause of unplanned death globally, with about 1.2 million cases yearly. To overcome this conflict, a meticulous system is to be implemented along the swimming pools to save human life. By studying body movement patterns and connecting cameras to artificial intelligence (AI) systems we can devise an underwater pool safety system that reduces the risk of drowning.Usually, such systems can be developed by installing more than 16 cameras underwater and ceiling and analyzing the video feeds to detect any anomalies. but AS a POC we make use of one camera that streams the video underwater and analyses the position of swimmers to assess the probability of drowning, if it is higher then an alert will be generated to attract lifeguards' attention. The method uses convolution neural network object detector to generate confidence maps of object location in pool and non maximum suppression to extract head pixel coordinate. This project uses CNN architecture to classify different object with their dimension ,so we detect human from the video frame ,then we calculate height and width for that object. If the swimmer gets difficulty then the system throw alert for security.
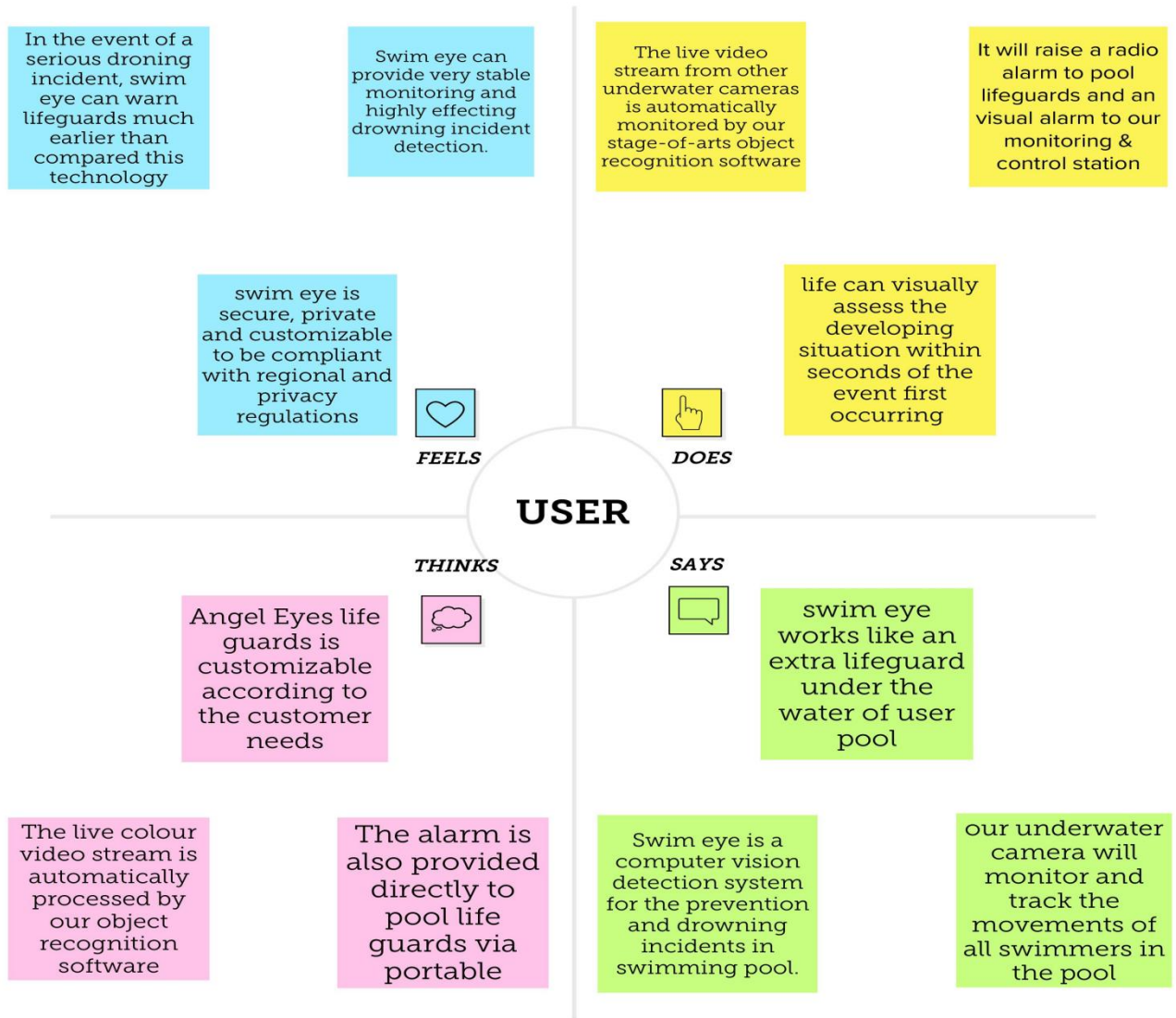
Example:

Reference:https://app.mural.co/t/ibm00821/m/ibm00821/1665478931522/d3ddb1f
10c2aa9243ac5a6
bb5acb61dd3b6b9ce6?sender=u86889080090b6c9e84142019

Empathy Map Canvas

An empathy map is a collaboration tool teams can use to gain a deeper insight into their customers

In the event of a serious droning incident, swim eye can warn lifeguards much earlier than compared this technology

Swim eye can provide very stable monitoring and highly effecting drowning incident detection.

The live video stream from other underwater cameras is automatically monitored by our stage-of-arts object recognition software

It will raise a radio alarm to pool lifeguards and an visual alarm to our monitoring & control station

swim eye is secure, private and customizable to be compliant with regional and privacy regulations

FEELS

life can visually assess the developing situation within seconds of the event first occurring

DOES

USER

THINKS

SAYS

Angel Eyes life guards is customizable according to the customer needs

swim eye works like an extra lifeguard under the water of user pool

The live colour video stream is automatically processed by our object recognition software

The alarm is also provided directly to pool life guards via portable

Swim eye is a computer vision detection system for the prevention and drowning incidents in swimming pool.

our underwater camera will monitor and track the movements of all swimmers in the pool

3.2 Ideation & Brainstorming

Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to

problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

Reference: https://www.mural.co/templates/empathy-map-canvas

Step-1: Team Gathering, Collaboration and Select the Problem Statement

Step-2: Brainstorm, Idea Listing and Grouping

2

Brainstorm

To try to solve a problem or come up with new ideas by having a discussion that includes all members of a group.

⏱ 10 minutes

TIP
Give Your Brain a Refresh.

2

Brainstorm

Participants with different backgrounds, posing a clear problem, question or topic to the group, asking the group to generate solution or ideas with no criticism or attempts to limit the type and number of idea and discussing

⏱ 10 minutes

TIP
Surround yourself with creative people just start somewhere...

Jayashangree

High level testing must be carried out before real world deployment.

Proper hyperparameters must be found for the model

Requires HD cameras for good quality frames to be processed

Make sure the stakeholders know, how the system works.

Joshini

optimized feed transfer to achieve live replay will less HW to get the classifiable video of underwater

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

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

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

Vihashini

The AI should be trained with more samples for better results

There should be manual alert system in case of detection failure

More cameras should be used to improve accuracy

How will be the accuracy level in the system?

Dhviya

system should detect multiple drowning and should report the same

For privacy purpose the video stream should not be stored.

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

The system shouldnt annoy others

Jamuna

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

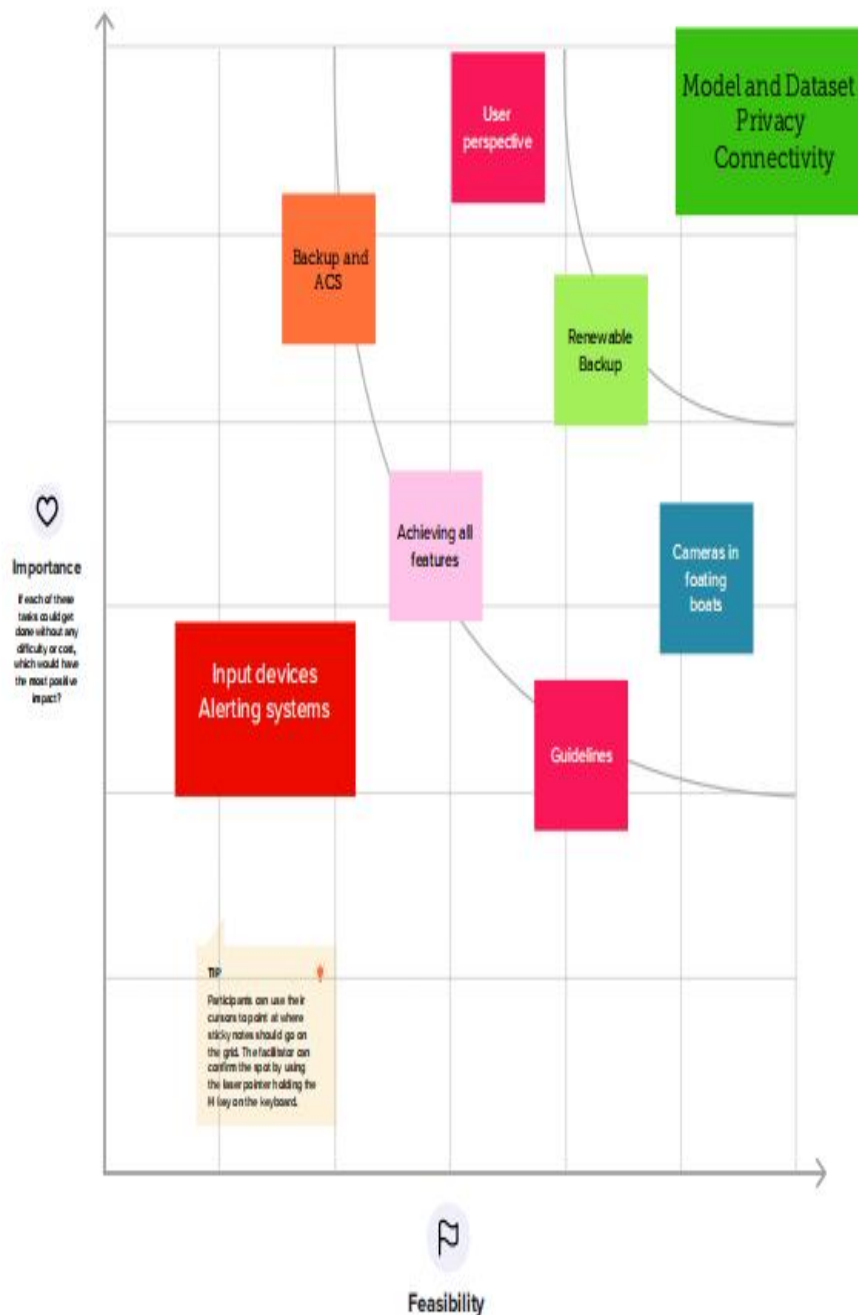The network connectivity should be good for faster alert trasmission.

Step-3: Idea Prioritization

4

Prioritize

To put tasks, problem, etc.in order of importance, so that you can deal with the most important first.

⏱ 20 minutes

Importance

If each of these tasks could get done without any difficulty or cost, which would have the most positive impact?

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the M key on the keyboard.

Cards in the prioritization grid:
- User perspective
- Model and Dataset Privacy Connectivity
- Backup and ACS
- Renewable Backup
- Achieving all features
- Cameras in floating boats
- Input devices Alerting systems
- Guidelines

Feasibility

The state or degree of being easily or conveniently done.

After you collaborate

Project collaboration takes place when a group of people with varying skills and experience come together to tackle a single project

what next...

1. Plan and code an effecient model and train it with the correct hyperparameters to produce a probable and accurate result.

2. Enhance the system to work in a proper environment in an integrated manner to yield a cohesive solution.

3. Create a proper frontend dash to give critial information with atmost clarity and least delay.

4. Comeup with the solution that is minimal, portable less intrusive and cost effective

3.3 Proposed Solution

Project team shall fill the following information in proposed solution template.

| S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	VirtualEye - LifeGuard for Swimming Pools ToDetect Active Drowning.
2.	Idea / Solution description	Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in hotels, and weekend tourist spots and barely people have them in their house backyard. Beginners, especially, often feel it difficult to breathe underwater which causes breathing trouble which in turn causes a drowning accident so In This is project a Accurate Pulse Rate of every individual swimmer is also detected and sent as signal to the LifeGuard through alert message so it help LifeGuard to do earlier prediction of a swimmer pulse rate is reduced or increased By doing this they can get alert in advance and can save more then one person from Drowning
3.	Novelty / Uniqueness	Accurate pulse rate detection using Deeplearning.

4.	Social Impact / Customer Satisfaction	In case of an incident it is possible to extract and store not only the videos but also Pulse rate of a victim so it will be useful to indentify the reason behind his/her drowness.
5.	Business Model (Revenue Model)	Can generate revenue from direct customers,like Lifeguard and collaborate with maritime sector and other swimming pool authorities.
6.	Scalability of the Solution	Deep learning Algorithm for the Pulse ratedetection :It helps the LifeGuard for earlier prediction of drowning along with the Reason behind his/her drowning.

3.4 Problem Solution fit

Customer Problem Statement Template:
Several death happens in several nations due to drowning swimmingpools especially with kids. Due to lack of monitoring and not intimated by drowning many lives are lost.so we have come with solution which detects drowning and rings an alarm and the trainer gets intimated and saves the person who is drowning.

Reference: https://miro.com/app/board/uXjVPNBovFM=/
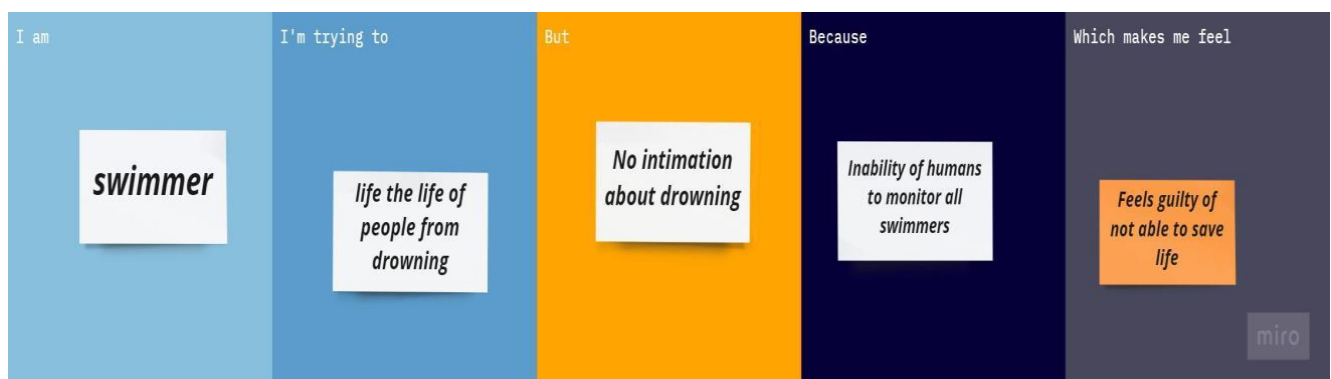
Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	Swimmer (Beginner)	Learn swimming	I am afraid of drowning	Lack of Training	Insecure
PS-2	Lifeguard	Monitor &save swimmers	It is a difficulttask to monitor	I can't able to monitor all the people at the same time	Burden & stress
PS-3	Swimmer	Practice swimming	I am afraid of drowning	Loss of balance or consciousness sometimes	Panic
PS-4	Trainer	Teach swimming	I can't able to pay attention to all learners	I can't monitor all the learners at the same time	Anxious

4. REQUIREMENT ANALYSIS

4.1 Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Requirements	Detect and Protect people from drowning by virtualeye
FR-2	User Registration	Manual Registration Registration through webpage Registration through Form Registration through Gmail
FR-3	User Confirmation	Confirmation via Phone Confirmation via Email Confirmation via OTP

| FR-4	**Payment Options**	Cash on DeliveryNet Banking/UPI Credit/Debit/ATM Card
FR-5	**Product Delivery andInstallation**	Door Step delivery Take away Free Installation and 1 year Warranty
FR-6	**Product Feedback**	Through Webpage Through Phone Calls Through Google forms

4.2 Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Have a clear and self-explanatory manual. Easier to use. Easily accessible by everyone.
NFR-2	**Security**	Are inspected monthly by the Technician.Inspected and tagged by a contractor annually.
NFR-3	**Reliability**	Hardware requires a regular checking and service .Software may be updated periodically. Immediate alert is provided in case of any system failure.
NFR-4	**Performance**	The equipment must have a good user interface It should have a minimal energy requirement It must save lives of people and things
NFR-5	**Availability**	All the features will be available when the user requires. It depends on the need of the user and the customizationof the user has done.
NFR-6	**Scalability**	The product must cover all the space of industry irrespective of the size or area.

5. PROJECT DESIGN

5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.
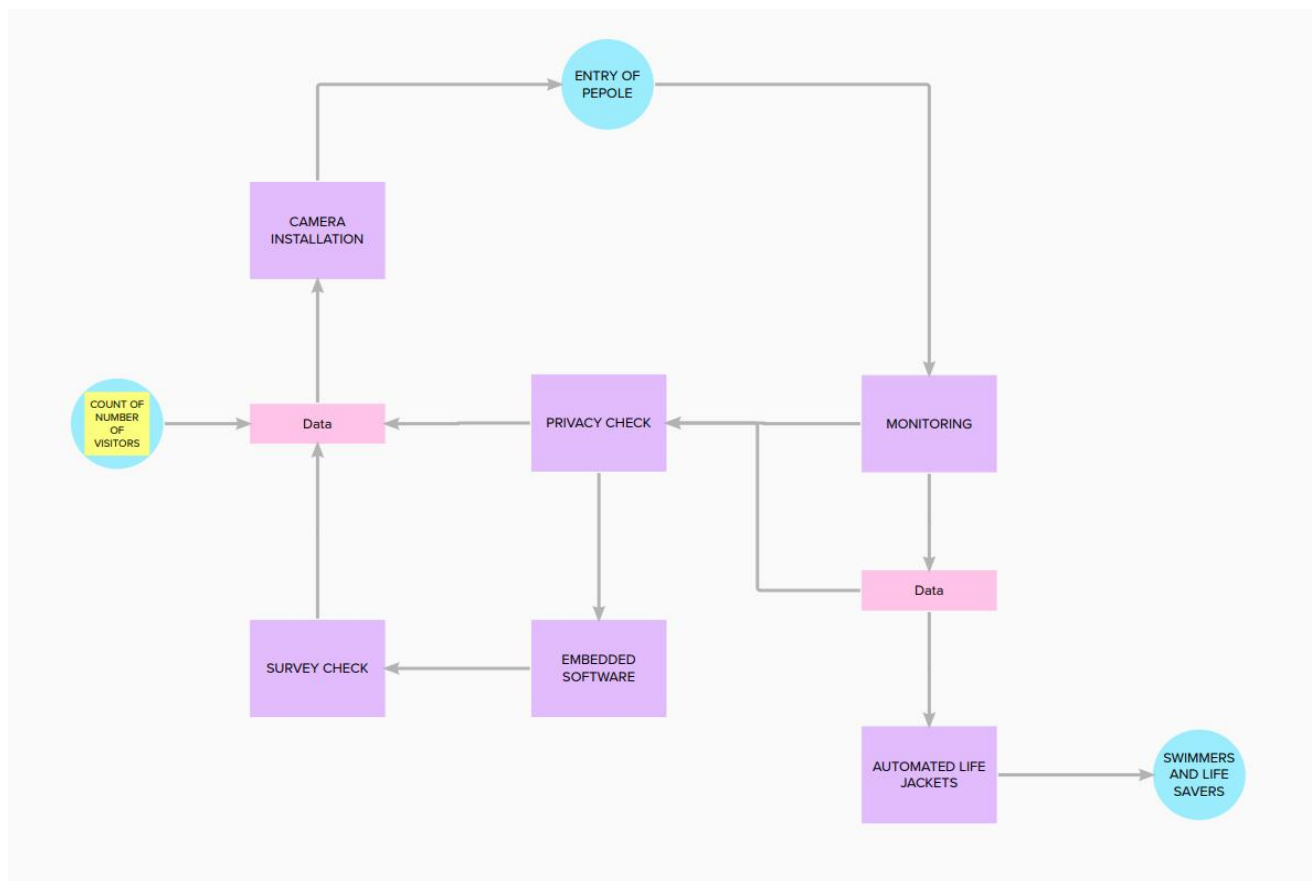

5.2 Solution & Technical Architecture

Solution architecture is a complex process – with many sub-processes – that bridgesthe gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing businessproblems.
- Describe the structure, characteristics, behaviour, and other aspectsof thesoftware to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which thesolution is defined, managed,and delivered.
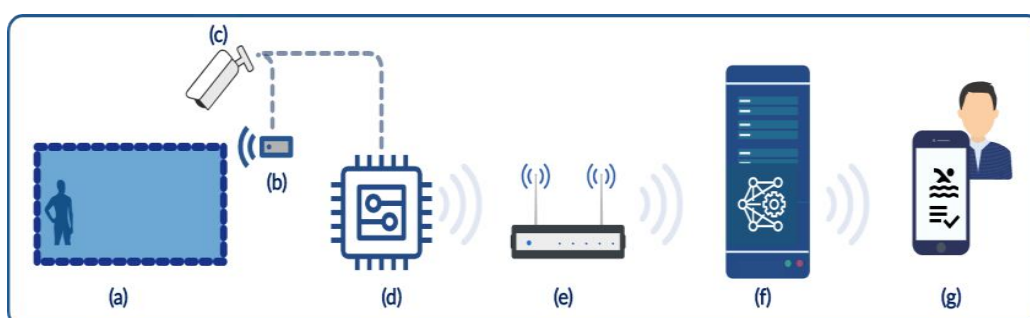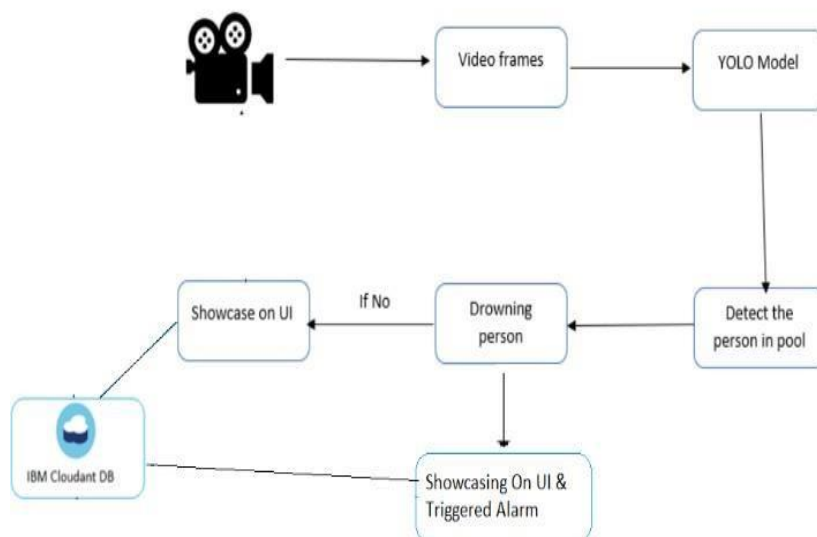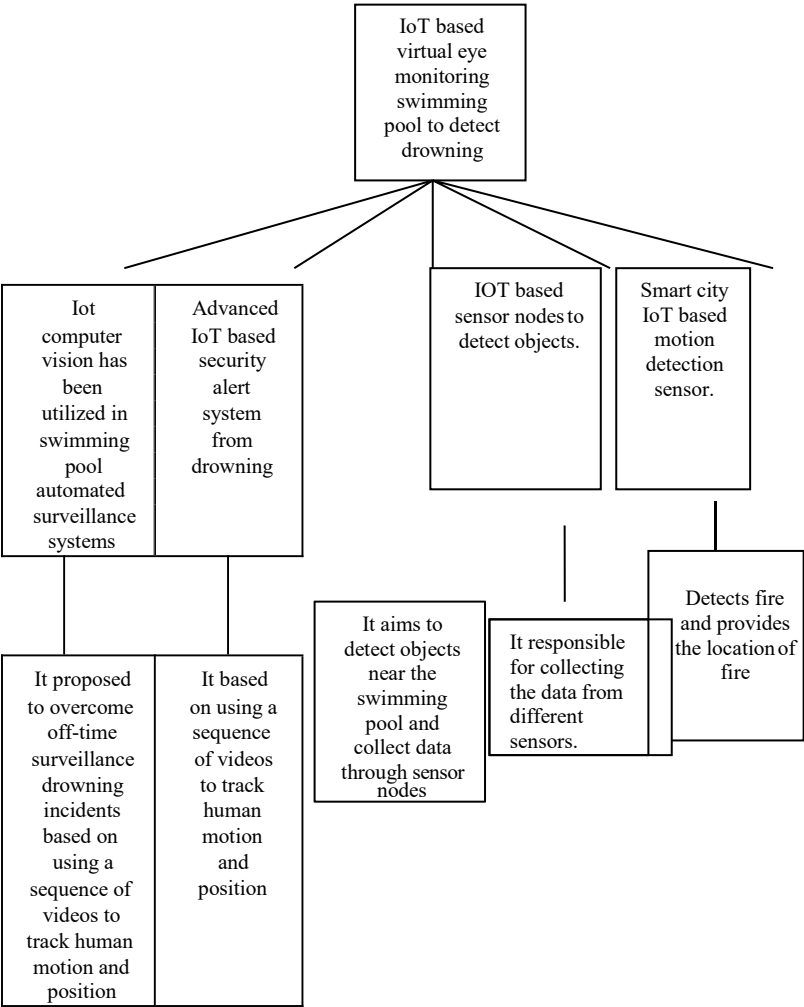
Example - Solution Architecture Diagram:
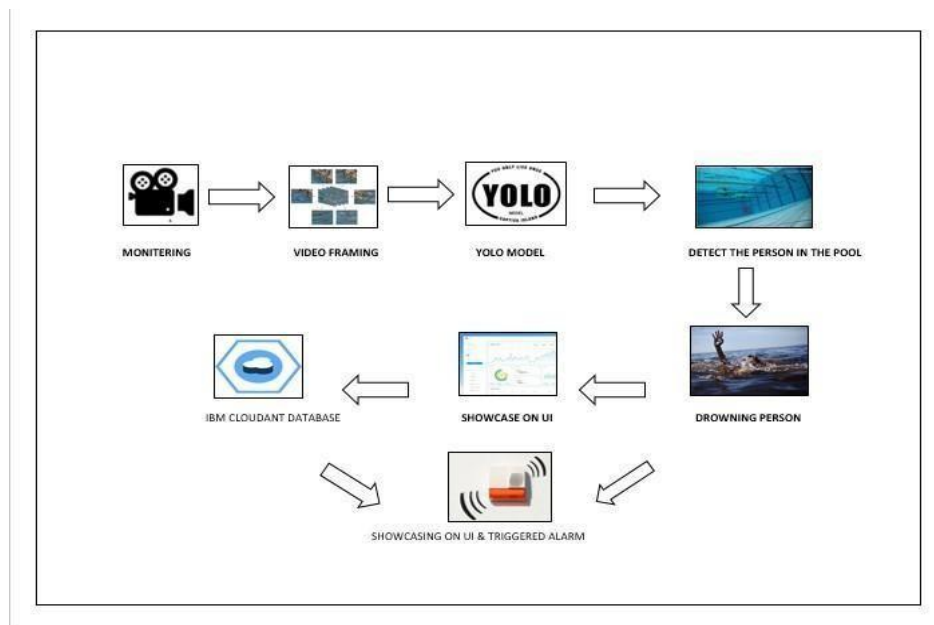
Architecture and data flow of the patient who drowns in swimmingpools

Reference: **https://www.angeleye.tech/us/us-lifeguard/**

Technology Architecture

Architecture and Data flow of the IOT Based Industry -

```
                        ┌─────────────────┐
                        │    IoT based    │
                        │   virtual eye   │
                        │   monitoring    │
                        │    swimming     │
                        │  pool to detect │
                        │     drowning    │
                        └─────────────────┘
```

IoT based virtual eye monitoring swimming pool to detect drowning

Iot computer vision has been utilized in swimming pool automated surveillance systems

Advanced IoT based security alert system from drowning

IOT based sensor nodes to detect objects.

Smart city IoT based motion detection sensor.

It proposed to overcome off-time surveillance drowning incidents based on using a sequence of videos to track human motion and position

It based on using a sequence of videos to track human motion and position

It aims to detect objects near the swimming pool and collect data through sensor nodes

It responsible for collecting the data from different sensors.

Detects fire and provides the location of fire

5.3 User Stories

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	VIR-1	As a user, I can register for the applicationby entering my email, password, and confirming my password.	2	High	Joshini
Sprint-1	Registration	VIR-2	As a user, I will receive confirmation emailonce I have registered for the application	1	High	Jamuna
Sprint-2	Registration	VIR-3	As a user, I can register for the application through Facebook	2	Low	Jayashangaree
Sprint-1	Registration	VIR-4	As a user, I can register for the application through Gmail	2	Medium	Vihasini
Sprint-1	Registration	VIR-5	As a user, I can log into the application by entering email & password	1	High	Dhivya
Sprint-2	Dataset Collect	VIR-7	Collect number of datasets and getaccuracy	4	High	Joshini
Sprint-2	Pre-processing	VIR-8	The dataset is extracted	4	Medium	Jamuna
Sprint-2	Train the model	VIR-9	Test the model	5	High	Jayashangaree
Sprint-2	Test the model	VIR-10	Train the model	5	High	Vihasini
Sprint-3	Detection	VIR-12	Load the trained model.	5	High	Jamuna
Sprint-3	Detection	VIR-13	Identify the person by collecting real-timedata through a webcam.	9	Medium	Joshini
Sprint-3	Detection	VIR-14	classify it by using a trained model to predict the output	3	Medium	Dhivya
Sprint-4	Detection	VIR-15	If person is drowning, the system will ringan alarm to give signal	4	Medium	Jayashangaree

| Sprint-4 | Detection | VIR-16 | As a User,I can detect the drowningperson. | 8 | High | Dhivya |
| Sprint-4 | Logout | VIR-17 | As a User,I can logout the application. | 2 | High | Vihasini |

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (ason Planned End Date)	Sprint Release Date (Actual)
Sprint-1	6	7 Days	24 Oct 2022	31 Oct 2022	5	29 Oct 2022
Sprint-2	20	7 Days	31 Oct 2022	07 Nov 2022	18	07 Nov 2022
Sprint-3	17	7 Days	07 Nov 2022	14 Nov 2022	15	14 Nov 2022
Sprint-4	14	7 Days	14 Nov 2022	21 Nov 2022	14	21 Nov 2022

6.2 Sprint Delivery Schedule

Velocity:
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

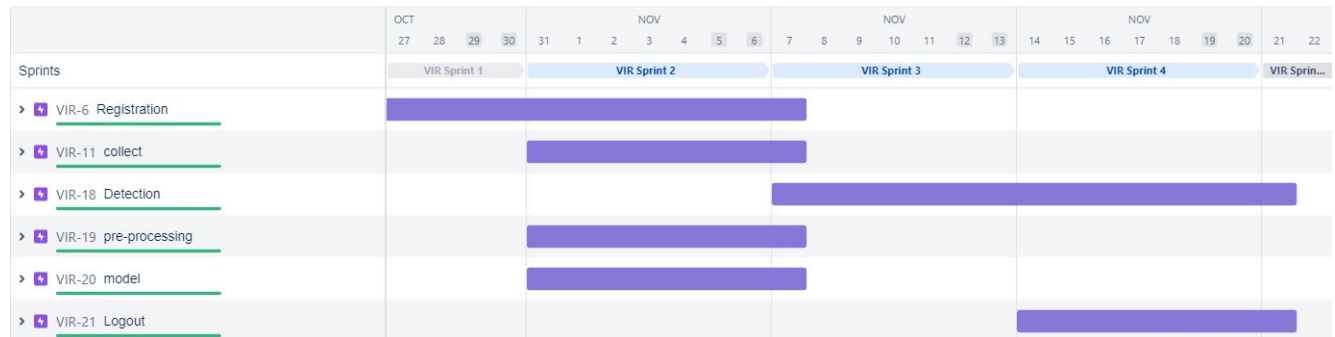$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

For Sprint-1 AV = sprint duration/velocity = 6/7 = 0.8
For Sprint-2 AV = sprint duration/velocity = 20/7 = 2.8
For Sprint-3 AV = sprint duration/velocity = 17/7 = 2.4
For Sprint-4 AV = sprint duration/velocity = 14/7 = 2

6.3 Reports from JIRA

7. CODING & SOLUTIONING (Explain the features added in the project along with code)

7.1 Feature 1

Login.html

```html
<!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;
```

```css
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;
}
```

```css
button {
background-color: #28272c;
color: white;
padding: 14px 20px;
margin-bottom: 8px;
border: none;
cursor: pointer;
width: 100%;
font-weight: bold;
}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" style="padding-top: 0.5%">
<a href="{{ url_for('index')}}">Home</a>
<a class="active" href="{{ url_for('login')}}">Login</a>
<a href="{{ url_for('register')}}">Register</a>
</div>
</div>
<div id="login" class="login">
<form action="{{url_for('afterlogin')}}" method="post">
<div class="imgcontainer">
<img
style=""
src="https://cdn.digitalhealth.net/wp-
content/uploads/2017/03/eye_image_generic_555.jpg"
alt="Avatar"
class="avatar"
/>
</div>
<div class="container">
<input
type="email"
placeholder="Enter registered email ID"
name="_id"
required
/><br />
<input
```
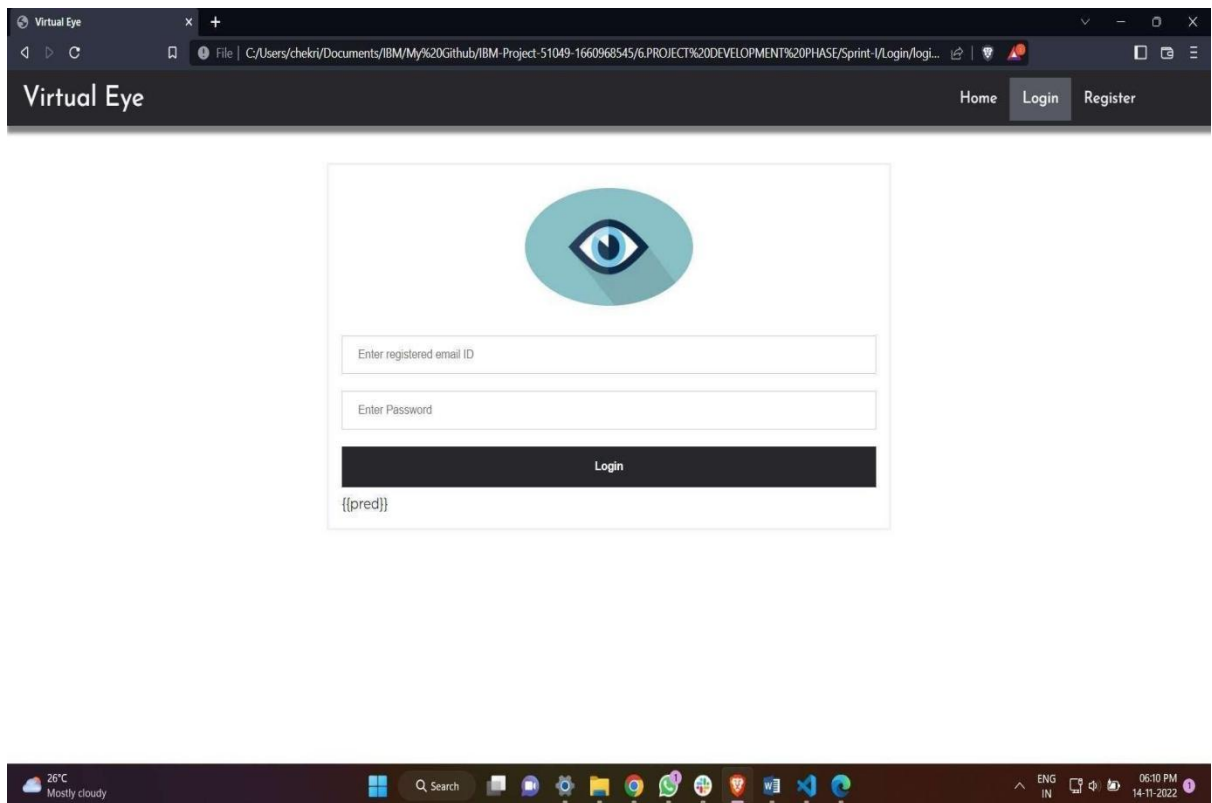
```
type="password"
placeholder="Enter Password"
name="psw"
required
/>
<button type="submit">Login</button><br />
{{pred}}
</div>
</form>
</div>
</body>
</html>
```


Register.html

```
<!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"
```

```html
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;
```

```css
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;
```

```css
}
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
```
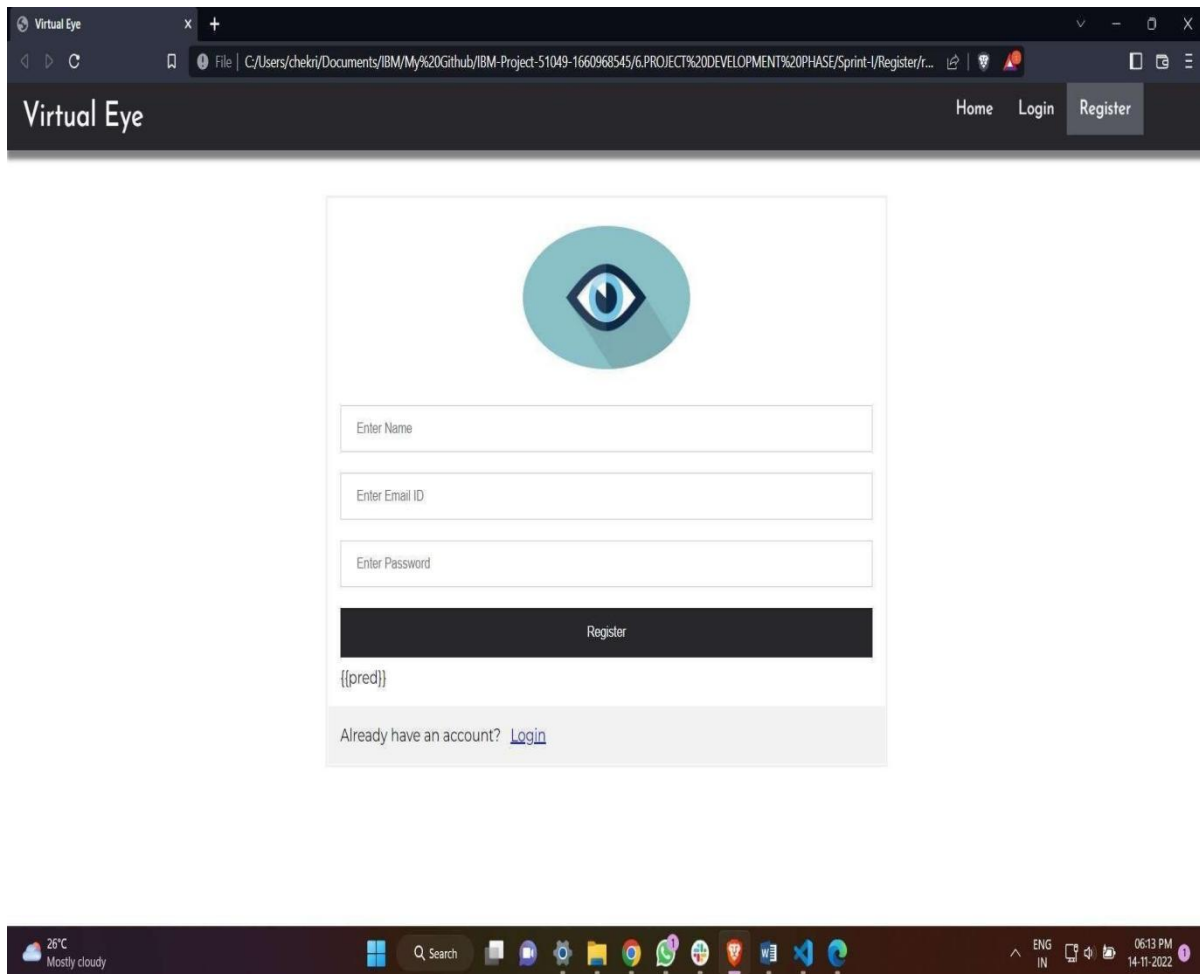
```
{ padding:
16px;
}
span.psw
{ float:
right;
padding-top: 16px;
}
/* Change styles for span and cancel button on extra small screens */
@media screen and (max-width: 300px) {
span.psw
{ display:
block;float:
none;
}
.cancelbtn
{ width: 100%;
}
}
</style>
</head>
<body style="font-family: Montserrat">
<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">
```

```html
<img
style=""
src="https://cdn.digitalhealth.net/wp-
content/uploads/2017/03/eye_image_generic_555.jpg"
alt="Avatar"
class="avatar"
/>
</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?   <a
href="{{ url_for('login') }}"
>Login</a>
</div>
</div>
</form>
</div>
</body>
</html>
```

Sprint 2

Base.html
```
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initialscale=1.0">
<meta http-equiv="X-UA-Compatible" content="ie=edge">
<title>High Quality Facial Recognition</title>
<link
href="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css"
rel="stylesheet">
<script
src="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.j
s"></script>
<script
src="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script
```

```html
>
<script
src="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js
"></script>
<link href="{{ url_for('static', filename='css/main.css') }}"
rel="stylesheet">
<style>
.bg-dark {
background-color: #42678c!important;
}
#result {
color: #0a1c4ed1;
}
</style>
</head>
<body style="background-color:black";>
<header id="head" class="header">
<section id="navbar">
<h1 class="nav-heading"></i>Virtual Eye</h1>
<div class="nav--items">
<ul>
<li><a href="{{ url_for('index')}}">Home</a></li>
<li><a
href="{{ url_for('logout')}}">Logout</a></li>
<!-- <li><a href="#about">About</a></li>
<li><a href="#services">Services</a></li> -->
</ul>
</div>
</section>
</header>
<div class="container">
<div id="content" style="margin-top:2em">
<div class="container">
<div class="row">
<div class="col-sm-6 bd" >
<h2><em style="color:white;">High
QualityFacial Recognition</em></h2>
<br>
<p><h5><i style="color:white;">Emotion
Detection Through Facial Feature Recognition</i></h5></p>
<img src="https://130e178e8f8ba617604b-
8aedd782b7d22cfe0d1146da69a52436.ssl.cf1.rackcdn.com/facialrecognition-use-
triggers-gdpr-fine-showcase_image-10-a-
```

```html
12991.jpg" style="height:240px"class="img-rounded"
alt="Gesture">
</div>
<div class="col-sm-6">
<div>
<h4 style="color:white;">Upload
Image Here</h4>
<form action = "http://localhost:5000/"
id="upload-file" method="post" enctype="multipart/form-data">
<label for="imageUpload" class="uploadlabel">
Choose Image
</label>
<input type="file" name="image"
id="imageUpload" accept=".png, .jpg, .jpeg,.pdf">
</form>
<div class="image-section" style="display:none;">
<div class="img-preview">
<div id="imagePreview">
</div>
</div>
<div>
<button type="button" class="btn btninfo btn-lg " id="btn-predict">Analyse</button>
</div>
</div>
<div class="loader" style="display:none;"></div>
<h3>
<span id="result"> </span>
</h3>
</div>
</div>
</div>
</body>
</div>
</div>
</div>
<footer>
<script src="{{ url_for('static', filename='js/main.js') }}"
type="text/javascript"></script>
</footer>
</html>
Index.html
<!DOCTYPE html>
<html lang="en">
```

```html
<head>
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initialscale=1.0">
<!--Bootstrap -->
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/boo
tstrap.min.css" integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGg
FAW/dAiS6JXm" crossorigin="anonymous">
<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js"
integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCkRr/rE9/Qpg6aAZGJwFDMVNA/GpG
FF93hXpG5KkN" crossorigin="anonymous"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/
popper.min.js" integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPsk
vXusvfa0b4Q" crossorigin="anonymous"></script>
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/js/bootst
rap.min.js" integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5
+76PVCmYl" crossorigin="anonymous"></script>
<script src="https://kit.fontawesome.com/8b9cdc2059.js"
crossorigin="anonymous"></script>
<link
href="https://fonts.googleapis.com/css2?family=Akronim&family=
Roboto&display=swap" rel="stylesheet">
<link rel="stylesheet" href="../static/style.css">
<!-- <script defersrc="../static/js/main.js"></script> -->
<title>Virtual Eye</title>
</head>
<body>
<headerid="head" class="header">
<section id="navbar">
<h1 class="nav-heading"></i>Virtual Eye</h1>
<div class="nav--items">
<ul>
<li><a
href="{{ url_for('index')}}">Home</a></li>
<li><a
href="{{ url_for('login')}}">Login</a></li>
```

```html
<li><a
href="{{ url_for('register')}}">Register</a></li>
<li><a href="{{ url_for('login')}}">Demo</a></li>
</ul>
</div>
</section>
<section id="slider">
<div id="carouselExampleIndicators" class="carousel" dataride="carousel">
<ol class="carousel-indicators ">
<li data-target="#carouselExampleIndicators" data-slideto="0" class="active "></li>
<li data-target="#carouselExampleIndicators" data-slideto="1"></li>
<li data-target="#carouselExampleIndicators" data-slideto="2"></li>
</ol>
<div class="carousel-inner">
<div class="carousel-item active">
<img class="d-block w-100" src="../static/img/1.png"
alt="First slide">
</div>
<div class="carousel-item">
<img class="d-block w-100"
src="../static/img/second.jpg" alt="Second slide">
</div>
<div class="carousel-item">
<img class="d-block w-100" src="../static/img/third.jpg"
alt="Third slide">
</div>
</div>
<a class="carousel-control-prev"
href="#carouselExampleIndicators" role="button" dataslide="prev">
<span class="carousel-control-prev-icon" ariahidden="true"></span>
<span class="sr-only">Previous</span>
</a>
<a class="carousel-control-next"
href="#carouselExampleIndicators" role="button" dataslide="next">
<span class="carousel-control-next-icon" ariahidden="true"></span>
<span class="sr-only">Next</span>
</a>
</div>
</section>
</header>
<section id="about">
<div class="top">
<h3 class="title text-muted">
```

ABOUT PROJECT
</h3>
<div class="line"></div>
</div>
<div class="body">
<div class="left">
<h2>Problem:</h2>
<p>
Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in the hotels, weekend touristspots and barely people have in their house backyard. Beginners, especially often feel it difficult to breathe under water and causes breathing trouble which in turn cause a drowning accident. Worldwide, drowning produces a higher rate of mortality without causing injury to children. Children undersix of their age are found to be suffering the highest drowning mortality rates worldwide..Such kinds of deaths account for the third cause of unplanned death globally, with about 1.2 million cases yearly.
</p>
</div>
<div class="left">
<h2>Solution:</h2>
<p>
To overcome the conflict, a meticulous system is to be implemented along the swimming poolsto save the human life. By studying body movement patterns and connecting cameras to an artificial intelligence (AI)system we can devise an underwater pool safety system that reduces the risk of drowning. Usually such systems can be developed by installing more than 16 cameras underwater and ceiling and analysing the video feeds to detect any anomalies . but AS a POC we make use of one camera that streams the video underwater and analyses the position of swimmers to assessthe probability of drowning ,if it is higher than an alert will be generated to attract lifeguards attention.
</p>
</div>
</div>
<div class="bottom">
<p >
Note : The system is not designed to replace a lifeguard or other human monitor, but to act as an additional tool. â€œIt helps the lifeguard to detect the underwater situation where they

canâ€™t easily observe.
</p>
</div>
</section>
<section id="footer">
<p>Copyright Â© 2022. All Rights Reserved</p>
<div class="social">
<i class="fab fa-2x fa-twittersquare"></i>

<i class="fab fa-2x fa-linkedin"></i>

<i class="#"></i>

</div>
</section>
</body>
</html>
Logout.html
<!DOCTYPE html>
<html >
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initialscale=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+Conde
nsed:300' rel='stylesheet' type='text/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;

```css
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 {
```

```css
background-color:#ffffff;
background-repeat: no-repeat;
background-size:cover;
background-position: 0px 0px;
}
.main{
margin-top:100px;
text-align:center;
}
form { 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: 20%;
}
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%;
```

```html
}
.container {
padding: 16px;
}
span.psw {
float: right;
padding-top: 16px;
}
/* Change stylesforspan 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;textalign:left;color:white; padding-
top:1%">Virtual eye</div>
<div class="topnav-right" style="padding-top:0.5%;">
<a href="{{ url_for('home')}}">Home</a>
<a href="{{ url_for('login')}}">Login</a>
<a href="{{ url_for('register')}}">Register</a>
</div>
</div>
<div class="main">
<h1>Successfully Logged Out!</h1>
<h3 style="color:#4CAF50">Login for more information<h3>
<a href="{{ url_for('login') }}"><button
type="submit">Login</button></a>
</form>
</div>
</body>
</html>
Prediction.html
<!DOCTYPE html>
<html lang="en">
<head>
```

```html
<meta charset="UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta name="viewport" content="width=device-width, initialscale=1.0">
<!--Bootstrap -->
<link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/boo
tstrap.min.css" integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGg
FAW/dAiS6JXm" crossorigin="anonymous">
<script src="https://code.jquery.com/jquery-3.2.1.slim.min.js"
integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCkRr/rE9/Qpg6aAZGJwFDMVNA/GpG
FF93hXpG5KkN" crossorigin="anonymous"></script>
<script
src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/
popper.min.js" integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPsk
vXusvfa0b4Q" crossorigin="anonymous"></script>
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/js/bootst
rap.min.js" integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5
+76PVCmYl" crossorigin="anonymous"></script>
<script src="https://kit.fontawesome.com/8b9cdc2059.js"
crossorigin="anonymous"></script>
<link
href="https://fonts.googleapis.com/css2?family=Akronim&family=
Roboto&display=swap" rel="stylesheet">
<link rel="stylesheet" href="../static/style.css">
<script defersrc="../static/js/JScript.js"></script>
<title>Prediction</title>
</head>
<body>
<headerid="head" class="header">
<section id="navbar">
<h1 class="nav-heading"></i>Virtual Eye</h1>
<div class="nav--items">
<ul>
<li><a href="{{ url_for('index')}}">Home</a></li>
<li><a
href="{{ url_for('logout')}}">Logout</a></li>
<!-- <li><a href="#about">About</a></li>
<li><a href="#services">Services</a></li> -->
```

```html
</ul>
</div>
</section>
</header>
<!-- dataset/Training/metal/metal326.jpg -->
</br>
<section id="prediction">
<h2 class="title text-muted">Virtual Eye- LifeGuard for
Swimming Poolsto Detect Active Drowning</h1>
<div class="line" style="width: 900px;"></div>
</section>
</br>
<section id="about">
<div class="body">
<div class="left">
<p>
Swimming is one of the best exercises that helps people to
reduce stress in this urban lifestyle. Swimming pools are found
larger in number in the hotels, weekend touristspots and barely
people have in their house backyard. Beginners, especially often
feel it difficult to breathe under water and causes breathing
trouble which in turn cause a drowning accident. Worldwide,
drowning produces a higher rate of mortality without causing
injury to children. Children undersix of their age are found to be
suffering the highest drowning mortality rates worldwide..Such
kinds of deaths account for the third cause of unplanned death
globally, with about 1.2 million cases yearly.
</p>
</div>
<div class="left">
<div class="prediction-input">
<img class="d-block w-100" src="../static/img/second.jpg"
alt="Second slide">
</br>
<form id="form" action="/result" method="post"
enctype="multipart/form-data">
<inputtype="submit" class="submitbtn" value="Click
Me! For a Demo">
</form>
</div>
<h5 style="text-color:Red">
<b style="text-color:Red">{{prediction}}<b>
</h5>
```
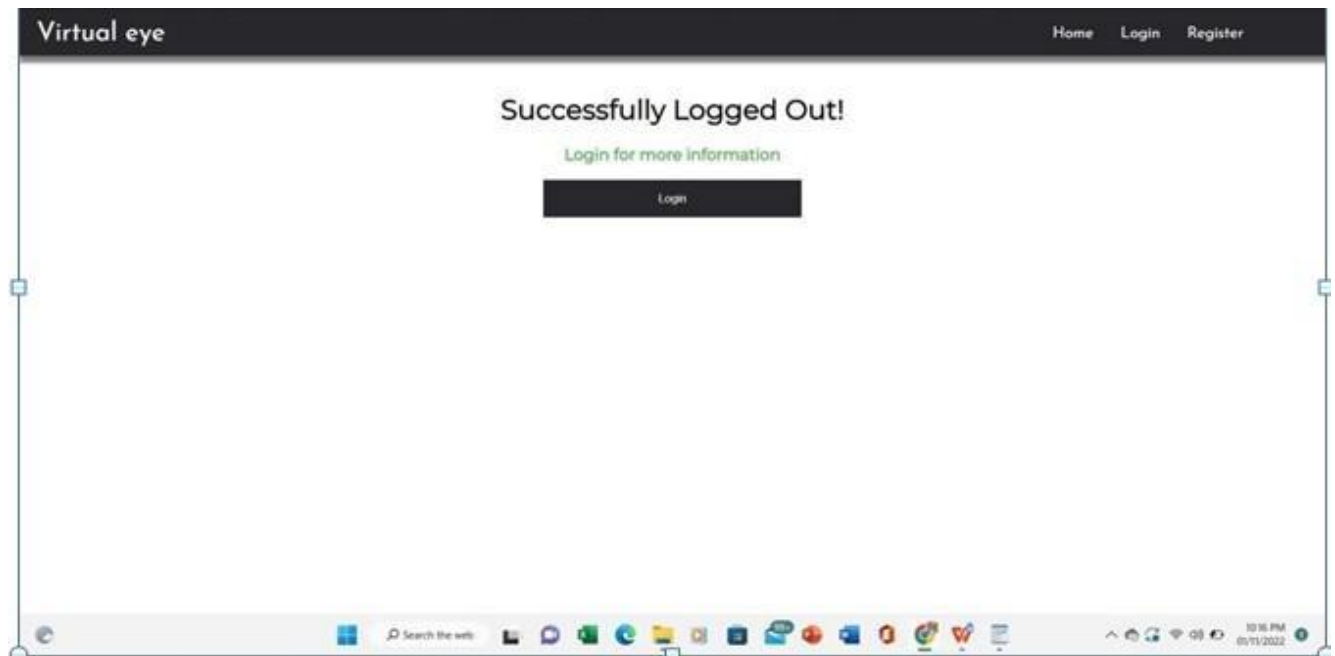
```
</div>
</div>
</section>
</br></br>
<section id="footer">
<p>Copyright Â© 2021. All Rights Reserved</p>
</section>
</body>
</html>
```

Virtual Eye

ABOUT PROJECT

Problem:

Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in the hotels, weekend tourist spots and barely people have in their house backyard. Beginners, especially often feel it difficult to breathe under water and causes breathing trouble which in turn cause a drowning accident. Worldwide, drowning produces a higher rate of

Solution:

To overcome the conflict, a meticulous system is to be implemented along the swimming pools to save the human life. By studying body movement patterns and connecting cameras to an artificial intelligence (AI)system we can devise an underwater pool safety system that reduces the risk of drowning. Usually such systems can be developed by installing more than 16 cameras underwater and ceiling and analysing

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

Swimming is one of the best exercises that helps people to reduce stress in this urban lifestyle. Swimming pools are found larger in number in the hotels, weekend tourist spots and barely people have in their house backyard. Beginners, especially often feel it difficult to breathe under water and causes breathing trouble which in turn cause a drowning accident. Worldwide, drowning produces a higher rate of mortality without causing injury to children. Children under six of their age are found to be suffering the highest drowning mortality rates worldwide. Such kinds of deaths account for the third cause of unplanned death globally, with about 1.2 million cases yearly.

Click Me! For a Demo

((prediction))
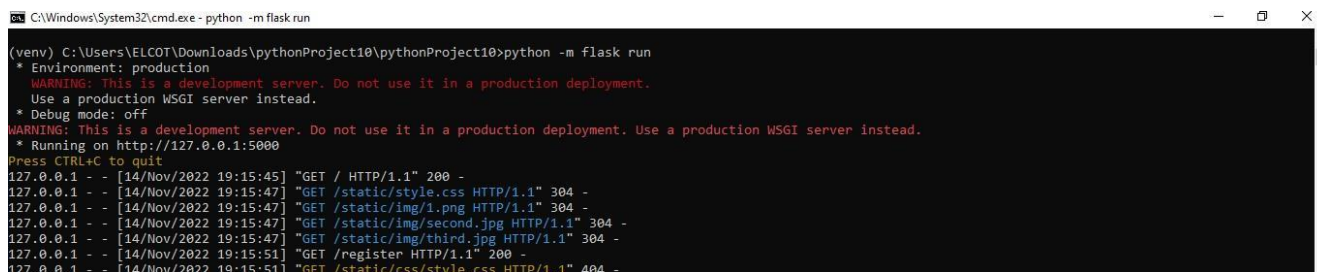
7.2 Feature 2
Sprint 3
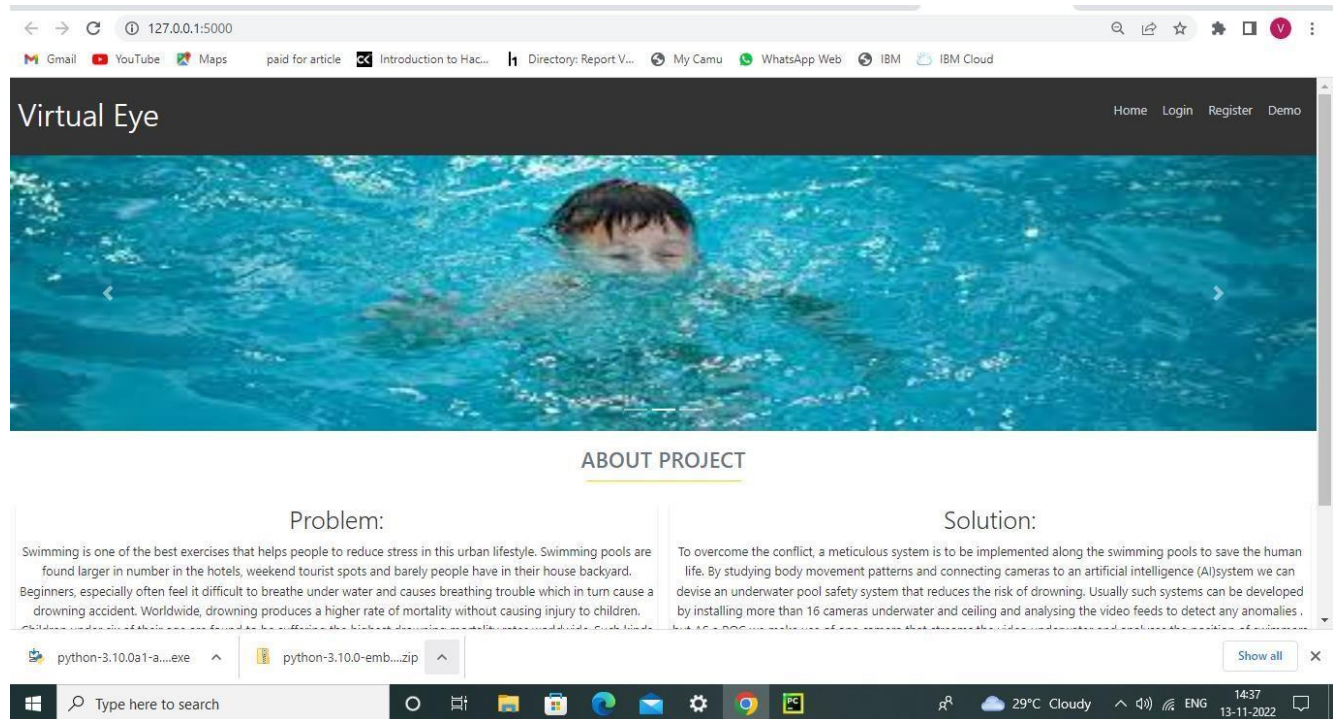
Detection
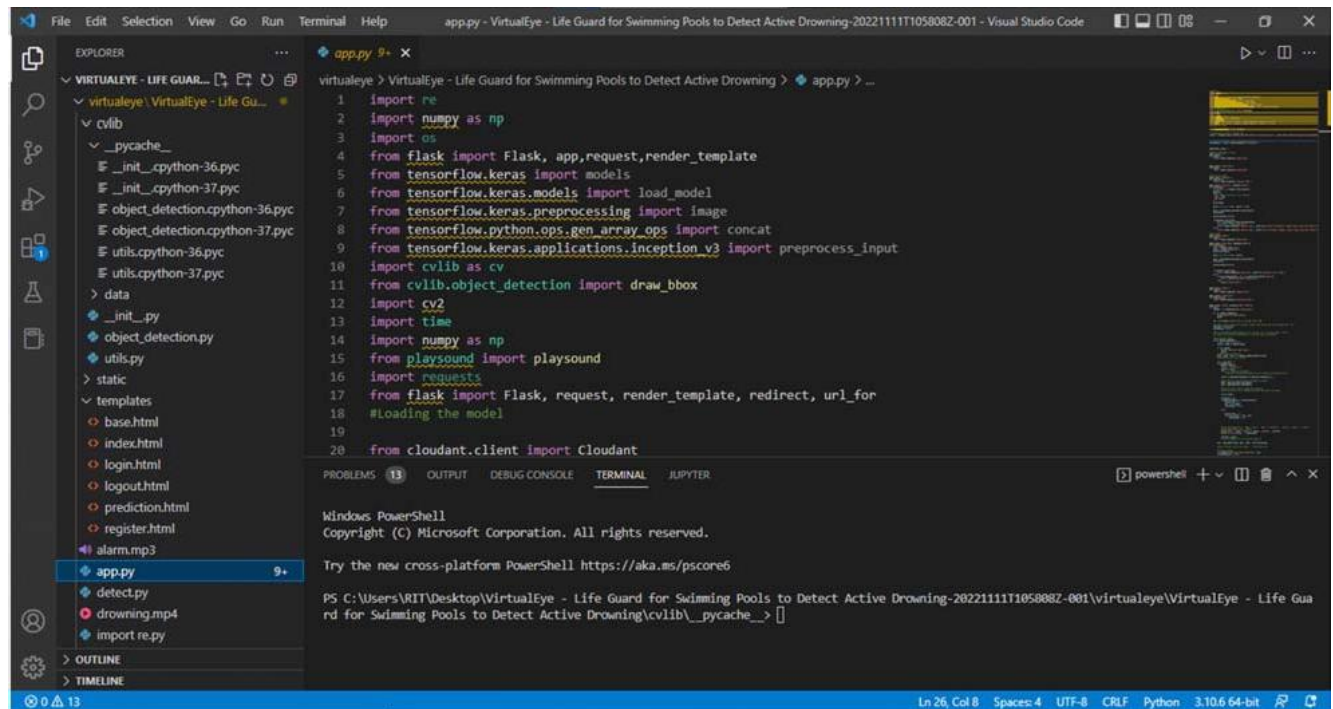
Sprint 4

1: Run the application
In the command prompt, navigate to the folder in which the flask app is present. When the python file is executed the localhost is activated on 5000 port and can be accessed through it.
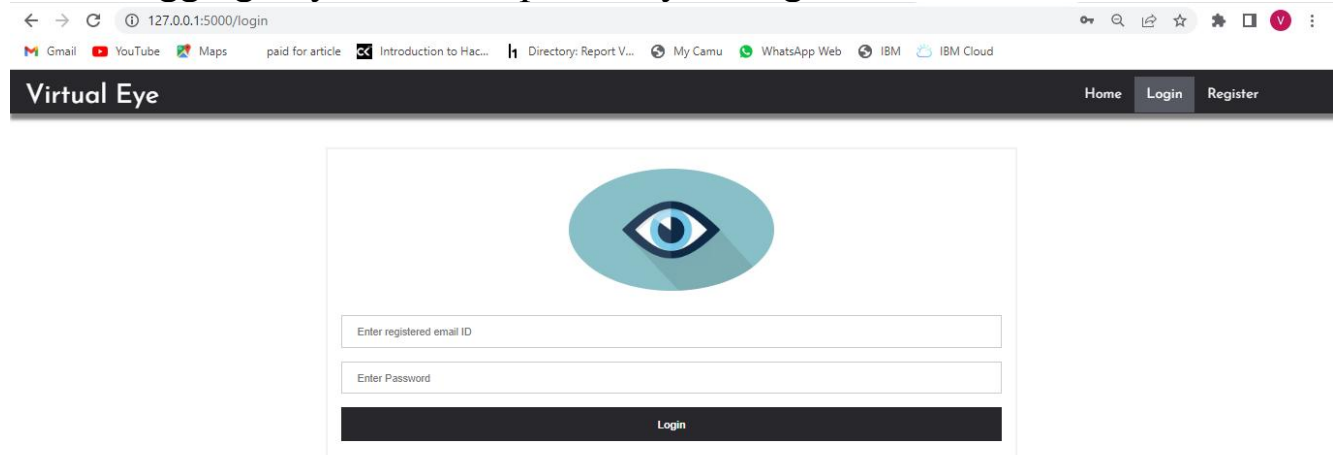

2: Open the browser and navigate to http://127.0.0.1:5000 to check your application
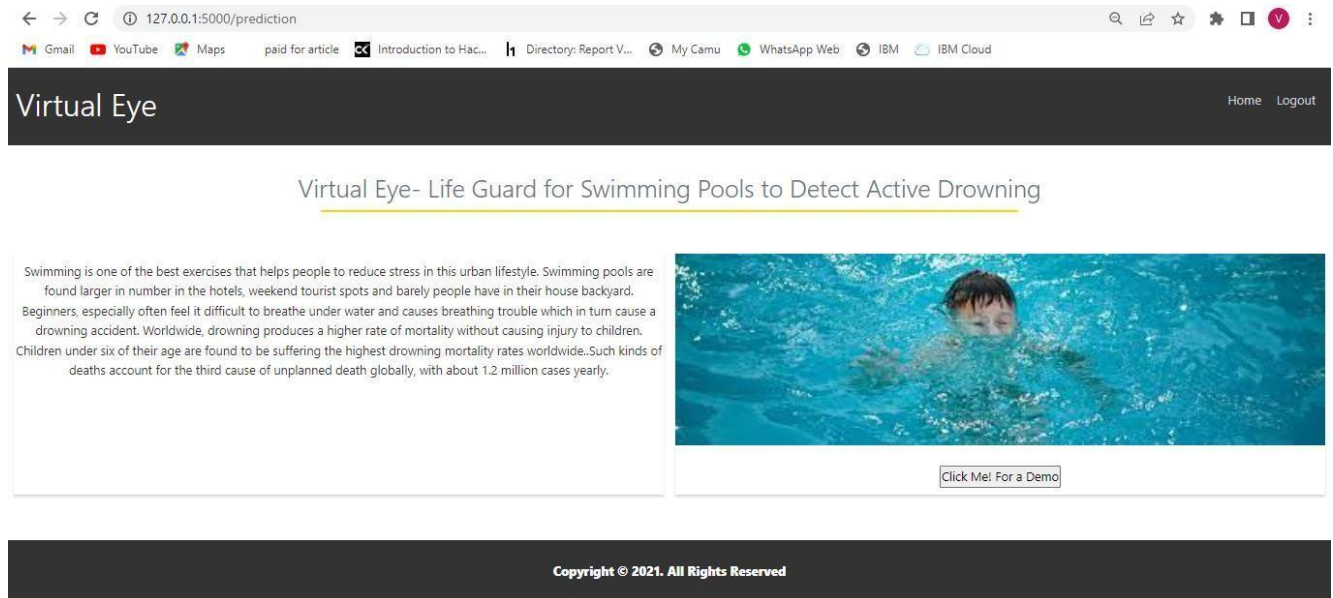The home page looks like this. You can click on login or register

While logging in you need to provide your registered credentials

After successfully login you will redirect to the prediction page where we have to click on the demo button to launch the open cv window for video analysis.

Output:


```
127.0.0.1 - - [14/Nov/2022 19:16:41] "POST /afterlogin HTTP/1.1" 302 -
127.0.0.1 - - [14/Nov/2022 19:16:41] "GET /prediction HTTP/1.1" 200 -
127.0.0.1 - - [14/Nov/2022 19:16:42] "GET /static/style.css HTTP/1.1" 304 -
127.0.0.1 - - [14/Nov/2022 19:16:42] "GET /static/js/JScript.js HTTP/1.1" 304 -
127.0.0.1 - - [14/Nov/2022 19:16:42] "GET /static/img/second.jpg HTTP/1.1" 304 -
5.816675424575806 s
bbox:  [[114, 112, 804, 372]] centre: [459.0, 242.0] centre0: [0. 0.]
Is he drowning:  False
4.5444793701171875 s
bbox:  [[114, 112, 804, 372]] centre: [459.0, 242.0] centre0: [459.0, 242.0]
Is he drowning:  False
8.752950429916382 s
bbox:  [[114, 112, 804, 372]] centre: [459.0, 242.0] centre0: [459.0, 242.0]
Is he drowning:  False
12.785400867462158 s
bbox:  [[120, 112, 800, 372]] centre: [460.0, 242.0] centre0: [459.0, 242.0]
Is he drowning:  True
```

7.3 Database Schema (if Applicable)

YOLO V3:
YOLOv3 Object detection:

YOLOv3 (You Only Look Once, Version 3) is a real-time object detectionalgorithmthatidentifies specific objects in videos, live feeds, or images. The YOLOmachinelearningalgorithm uses features learned by a deep convolution neural network to detect an object.YOLOv3isthemost recent variation of the You Only Look Once (YOLO) approaches. This familyof modelsis popular for real-time object detection which in 2015 was introduced in the paper "You OnlyLookOnce:Unified, Real-Time Object Detection" by Joseph Redmon et al.

YOLO model in a windows environment:

Create yolov3 and training folders on your Desktop Open a command prompt and navigate to the **"yolov3"** folder Create and copy the **darknet.exe** file

Create & copy the files we need for training (i.e. **"obj"** dataset, **"yolov3-custom.cfg"**, **"obj.data"**, **"obj.names"** and **"process.py"**) to your yolov3dir

Copy the **"yolov3-custom.cfg"**, **"obj.data"**, **"obj.names"**, and **"process.py"**filesand the **"obj"** folder from the **yolov3** directory to the **darknet** directory

Run the **process.py** python script to create the **train.txt &test.txt** files Download the pre-trained **YOLOv3** weights

Train the detector
Check performance
Test your custom Object Detector

Flask:

Introduction to Flask:

Flask is a web application framework written in python It is developed by Armin
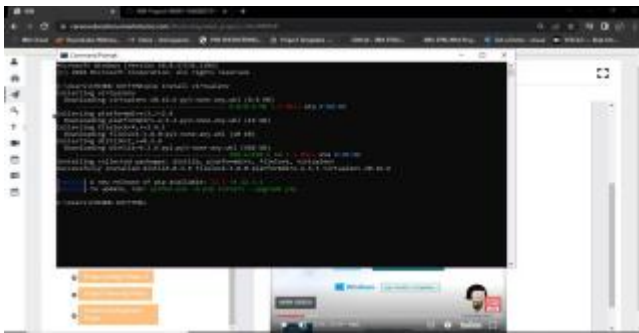
Ronacher, who leads an international group of Python enthusiasts named Pocco. Flask is based on the WerkzeugWSGItoolkit and Jinja2 template engine. Both are Pocco projects.

Installing & Working with Flask:

Install Flask

Virtual python Environmental Builder

Overview of Flask:

Flask is a web application framework written in Python. It is developed by Armin Ronacher, who leads an international group of Python enthusiasts named Pocco. Flask is based on the WerkzeugWSGItoolkit and Jinja2 template engine. Both are Pocco projects.

WSGI -Web Server Gateway Interface (WSGI) has been adopted as a standard for Python web application development. WSGI is a specification for a universal interface between the webserver and the web applications.

Werkzeug It is a WSGI toolkit, which implements requests, response objects, and other utility functions.This enables building a web framework on top of it. The Flask framework uses Werkzeugas oneofits bases.

Jinja2 is a popular templating engine for Python. A web templating system combine template with a certain data source to render dynamic web pages. Flask is often referred to as a micro framework.
It aims to keep the core of an application simple ye textensible. Flask does not have built-in abstraction layer for database handling, nor does it have form avalidation support.
Instead, Flask supports the extensions to add such functionality to the application.

Someof the popular Flask extensions are discussed later in the tutorial.

Practical approach:
Write simple code:

```
flask_blog/hello.py                                    Copy

from flask import Flask

app = Flask(__name__)


@app.route('/')
def hello():
    return "Hello, World!"
```

Flask -HTML

```
flask_blog/app.py                                      Copy

from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def index():
    return render_template('index.html')
```

8. TESTING

8.1 Test Cases

Date	18-Nov-22
Team ID	PNT2022TMID18651
Project Name	Virtual Eye - Lifeguard For Swimming Pool To Detect
Maximum Mark	4 marks

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation (Y/N)	BUG ID	Executed By
LoginPage_TC_O	Functional	HomePage	Verify user is able to see the Login		1. Enter URL and click go 2. Click on My Account dropdown button 3. Verify login/Sign up popup displayed or not	file:///C:/Users/LGOT/Downloads/Proj ect% 20Structure/te mplates/login. html	Login/Signup popup should display	Working as expe	Pass				Jayashankar ee.S, Joshini.M, Vihasini.M, Dhivya.R, Jamuna.S
LoginPage_TC_O	UI	HomePage	Verify the UI elements in login/Si		1. Enter URL and click go 2. Click on My Account dropdown button 3. Verify login/Sign up popup with below UI elements: a. email textbox b. password text box c. Login button d. New customer? Create account link e. Lost password? Recovery password link	file:///C:/Users/LGOT/Downloads/Proj ect% 20Structure/te mplates/login- html	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. Lost password? Recovery password link	Working as expe	Fail	Steps are not clear to allow		BUG-1234	Jayashankaree.S, Joshini.M, Vihasini.M, Dhivya.R, Jamuna.S
LoginPage_TC_O	Functional	Homepage	Verify user is able to log into web		1. Enter URL(https://shopname.com/) and click go 2. Click on My Account dropdown button 3. Enter Valid username/email in Email textbox 4. Enter valid password in password text box 5. Click on login button	Username: jannetdj.dr41 4@gmail.com	User should navigate to user account homepage	working as					Jayashankaree.S, Joshini.M, Vihasini.M, Dhivya.R, Jamuna.S
LoginPage_TC_O	Functional	Login page	Verify user is able to log into web		1. Enter URL(https://shopname.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: joshinimana@ gmail.com	Application should show "Incorrect email or password" validation message.	working as					Jayashankaree.S, Joshini.M, Vihasini.M, Dhivya.R, Jamuna.S
PredictionPage_TC_007		PredictionPage	Page should display whether the		1. Camera should take pictures of people swimming in pools 2.	video of the draw	If people are dro	working as					

8.2 User Acceptance Testing

- **Purpose of Document**

  The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

- **Defect Analysis**

  This report shows the number of resolved or closed bugs at each severitylevel, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	1	4	2	3	10
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	2	2	1	1	6
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	2	2	1	5
Totals	6	11	10	7	34

Test Case Analysis

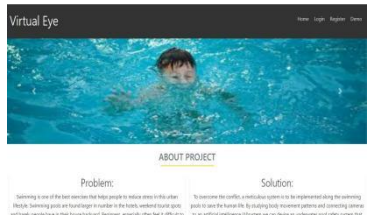This report shows the number of test cases that have passed, failed, anduntested

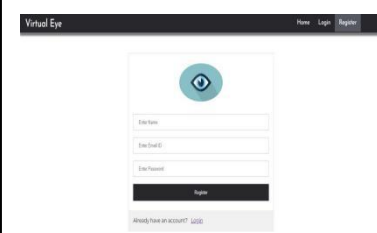| Section	Total Cases	Not Tested	Fail	Pass
Print Engine	2	0	0	2
Client Application	2	0	1	1

Security	1	0	0	1
Outsource Shipping	1	0	0	1
Exception Reporting	2	0	1	1
Final Report Output	1	0	0	1
Version Control	1	0	0	1

9. RESULTS

The immense potential that AI holds can be understood by the various other technologies that are covered under the umbrella of AI. Some of the examples of such technologies include self-improving algorithms, Machine Learning, Pattern Recognition, Big Data, and many others. In the next few years, it is predicted that there will hardly be any industry left untouched by this powerful tool. This is the reason why AI has so much potential to grow in India. Once we have the working drowning detection model we can feed live video footage of the swimming pool to it so that it can keep detecting continuously for any drowning activities. If drowning is detected it will be highlighted on the system screen as well as alarms will be raised to alert security guards so that they can initiate rescue .

9.1. Performance Metrics

S.No.	Parameter	Values	Screenshot
1.	Model Summary	-	

2.	Accuracy	Training Accuracy - 28 Validation Accuracy - 45	
3.	Confidence Score (Only Yolo Projects)	Class Detected - 25 Confidence Score - 50	

10. ADVANTAGES & DISADVANTAGES

Positive

"Can not emphasise the added benefit of the reassurance to our team"

"Since installing from both a lifeguard and management point of view it's invaluable and would highly
recommend to anyone to install to assist the lifeguard team but not to
replace"

"I found it very useful and didn't realise how much we rely on it until it broke for two weeks. It was
manic and meant we needed more lifeguards available on each shift even
from 04:45"

"Fully support any actions and activities to help me in my role, DDS can only be positive"

Mixed/ neutral

"They are helpful but the detecting isn't very good"

"They're good and bad"

"The algorithm needs to be improved to differentiate different type of swimmers in different type of
pools"

"Rarely had a genuine activation that hasn't already been seen/avoided however since using DDS,
its not made much difference"

Negative

"Concern about the number of false alarms... lifeguards get frustrated with the system and assume it
is always wrong"

"Lifeguards rely on the system and become lazy with standard lifeguarding practices"

"The reset button constantly breaks. It notices way to many drowning tiles"

"Greatly hinders how effective a lifeguard can be"

11. CONCLUSION

Drowning incidents are increasing and are considered the third leading cause of unintentional injury and death. Several researches have explored and utilized AI technologies, to prevent drowning incidents. This paper proposes an efficient and reliable system that utilizes AI technologies and transfer learning, to prevent the occurrence of these incidents. A specialized deep learning model was proposed and developed, utilizing only a single image to detect and classify the drowning object into three categories: human, animal, and object. This system has the ability to process and notify a swimming-pool owner through a mobile application, to overcome off-time surveillance drowning incident. A prototype experiment was designed to evaluate the performance of the proposed system, and the system obtained a higher accuracy of 99% in the overall classification, a precision of 100%, and a sensitivity of 100%, as compared to the human detection rate. Thus, the specialized model has outperformed other deep learning algorithms and can achieve impressive results in human drowning incident detection. In the future, a generative adversarial network will be applied to generate synthesis data, in order to increase the size of the training dataset. In addition, more classes will be added to explore and to investigate the efficiency of the proposed system.

12. FUTURE SCOPE

Artificial Intelligence can be seen as the intelligence of machines through which they try to mimic human intelligence. Artificial Intelligence is an emerging technology that has the ability to change how we interact with the world around us. With the increasing scope of artificial intelligence, machines could be trained in certain circumstances to decide on their own.

The scope of Artificial Intelligence in India is promising. Artificial Intelligence has immense potential to change each sector of the economy for the benefit of society.

Despite the design achieving a high performance on automated drowning detection, the proposed system was only tested on images that were captured during the daytime and have only one object. In the future, both daytime and nighttime images will be investigated. In addition, the system will be tested by utilizing images that have two or more objects and validate the robustness of the
system.

13. APPENDIX

Source Code

PYTHON CODE:

```python
import json

import wiotp.sdk.device

import time


myConfig = {
    "identity": {
        "orgId": "hj5fmy",
        "typeId": "NodeMCU",

        "deviceId":"12345"
    },
    "auth": {
      "token": "12345678"
    }
}
client = wiotp.sdk.device.DeviceClient(config=myConfig,

logHandlers=None) client.connect()
```

```python
while True:
    name ="smartbridge" #in

area location


    #latitude=17.4219272

    #longitude=78.5488783


    #out area location

    latitude=17.4219272

    longitude=78.5488783

    myData={'name':name,'lat':latitude,'log':longitude}

    client.publishEvent(eventId="status",msgFormat="json",

    data=myData,qos=0,onpublish=None) print("Data published to IBM IOT

    platform:",myData)time.sleep(5)


client.disconnect()
```

GitHub & Project Demo Link

https://github.com/IBM-EPBL/IBM-Project-34874-1660278685