GOVERNMENT COLLEGE OF ENGINEERING(FORMERLY "IRTT")

ERODE

Certified that this project titled **“VIRTUAL EYE-LIFEGAURD FOR SWIMMING POOLS TO DETECT ACTIVE DROWNING”** is the bonafide work of **“AGALYA R(731119104002), BHARATHI S(731119104007), JAYASWETHA J (731119104021), MADHUMETHA R (731119104024)”** who carried out the project work under my supervision.

SIGNATURE OF HOD
Dr.A.SARADHA,M.E.,Ph.D.,
HEAD OF THE DEPARTMENT
DEPARTMENT OF CSE,
GOVERNMENT COLLEGE OF
ENGINEERING, ERODE – 638316

SIGNATURE OF SPOC
Dr.G.GOWRISON, M.E.,Ph.D.,
ASSISTANT PROFESSOR(SR)
DEPARTMENT OF ECE,
GOVERNMENT COLLEGE OF
ENGINEERING,ERODE - 638316

SIGNATURE OF FACULTY MENTOR
EVALUATOR
Dr.N.MAGESHNALLASAMY,M.E.,Ph.D.,
ASSISTANT PROFESSOR(SR)
DEPARTMENT OF CSE,
GOVERNMENT COLLEGE OF
ENGINEERING, ERODE – 638316

SIGNATURE OF FACULTY
Dr.A.SARADHA
ASSISTANT PROFESSOR(SR)
DEPARTMENT OF CSE,
GOVERNMENT COLLEGE OF
ENGINEERING, ERODE - 638316

1.INTRODUCTION

1.1Overview

In Modern metropolitan lifestyle,swimming in one of the best activity for stress reduction. Worldwide,drowning results in a higher mortality rate without harming children .The highest global drowning fatality rates are observed to be among children under the age of six.With around 1.2 million incident each year .These types of deaths rank third among all unexpected deaths worldwide

1.2Purpose

The aim this project is to design a meticulous system which can be implemented among the swimming pools to save human life.An alarm will be issued to call he attention of the lifeguards .When the video is being streamed underwater and swimmer position is the being examined to determine the likehood of drowning .This will help in the reducing drowning .This will help in reduncing drowning rates and create a self environment

2.LITERATURE SURVEY

2.1Existing Problem

Beginners,in particular,frequently struggle to breathe underwater,resulting in respiratory issues and,eventually ,a drowning disaster .Drowning causes a higher mortality rate worldwide while causing no harm to children.Children under the age of six are found to have the highestglobal drowning fatality rates.these types of deaths rank third among all unexpected deaths worldwide,with approximately 1.2 million incident each year.

2.2 Reference

NAME OF THE PAPER : A Survey of Drowning Detection Techniques.
NAME OF THE AUTHOR : Nagato Konishi ,Yo Ishigaki ,Seizi linuma ,Tsubasa Nakada,Taisuke Hoshino ,Wataru Nemoto ,Kazunori Ohkawara.
JOURNAL PUBLISHED : 2021 International Mobile, Intelligent,and Ubiquitous Computing Conference (MIUCC).
MONTH AND YEAR PUBLISHED : 09 June 2021.

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

2.3 Problem Statement definition

Swimming is a great urban stress-reliever. Hotels and tourist spots have more swimming pools than private homes. Beginners have trouble breathing underwater, causing breathing problems and drowning.

Drowning increases global mortality without harming children. Under-6-year-olds have the highest drowning mortality rates globally.These deaths are the third cause of unplanned death globally, with 1.2 million cases yearly.

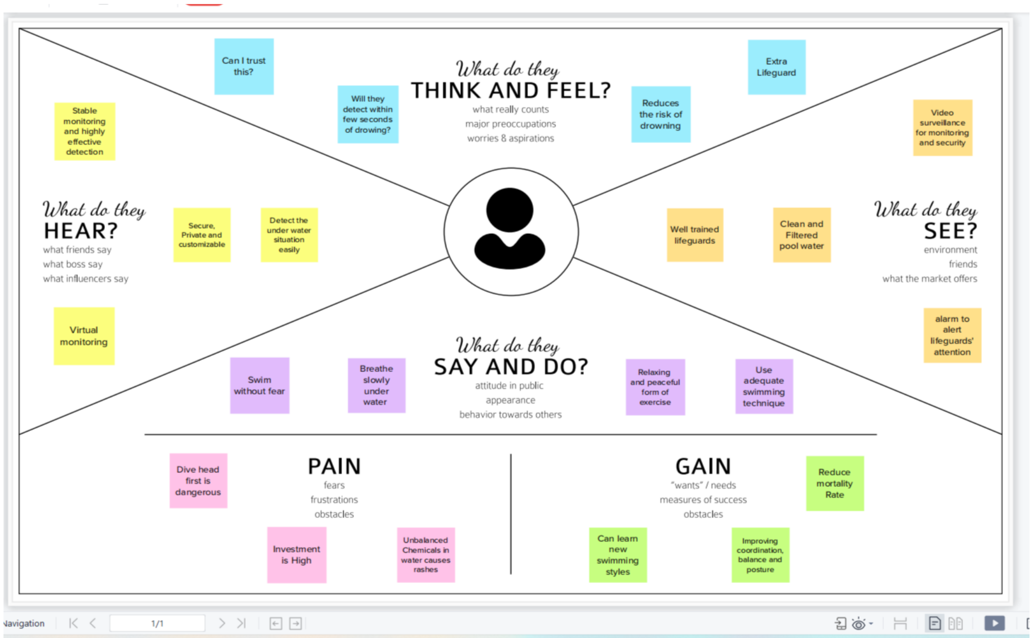
To save lives, a meticulous system must be implemented along swimming pools.
By studying body movement patterns and connecting cameras to AI System ,We can create a safer underwater pool.

Installing 16 underwater and ceiling cameras and analysing video feeds can create such systems.

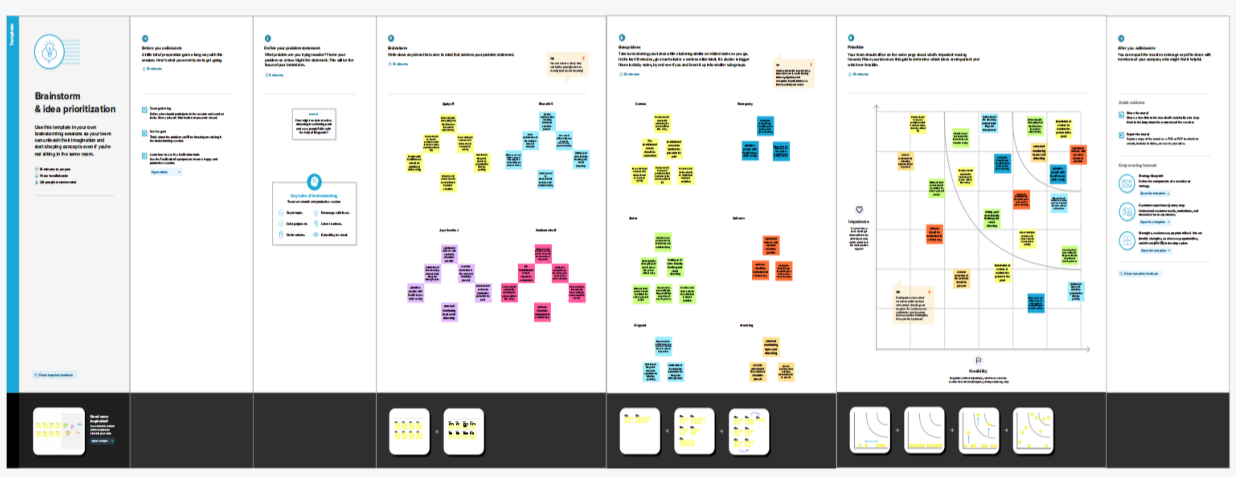
As a POC,we use one camera that streams underwater video and analyses swimmers' positions to assess drowning risk; if it's high, an alert is generated to alert lifeguards.

3.IDEATION & PROPOSED SOLUTION

3.1 Empathy Map canvas


Can I trust this?
Will they detect within few seconds of drowing?
What do they
THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations
Reduces the risk of drowning
Extra Lifeguard
Stable monitoring and highly effective detection
Video surveillance for monitoring and security
What do they
HEAR?
what friends say
what boss say
what influencers say
Secure, Private and customizable
Detect the under water situation easily
Well trained lifeguards
Clean and Filtered pool water
What do they
SEE?
environment
friends
what the market offers
Virtual monitoring
alarm to alert lifeguards' attention
Swim without fear
Breathe slowly under water
What do they
SAY AND DO?
attitude in public
appearance
behavior towards others
Relaxing and peaceful form of exercise
Use adequate swimming technique
Dive head first is dangerous
PAIN
fears
frustrations
obstacles
Investment is High
Unbalanced Chemicals in water causes rashes
GAIN
"wants" / needs
measures of success
obstacles
Reduce mortality Rate
Can learn new swimming styles
Improving coordination, balance and posture
Navigation
1/1

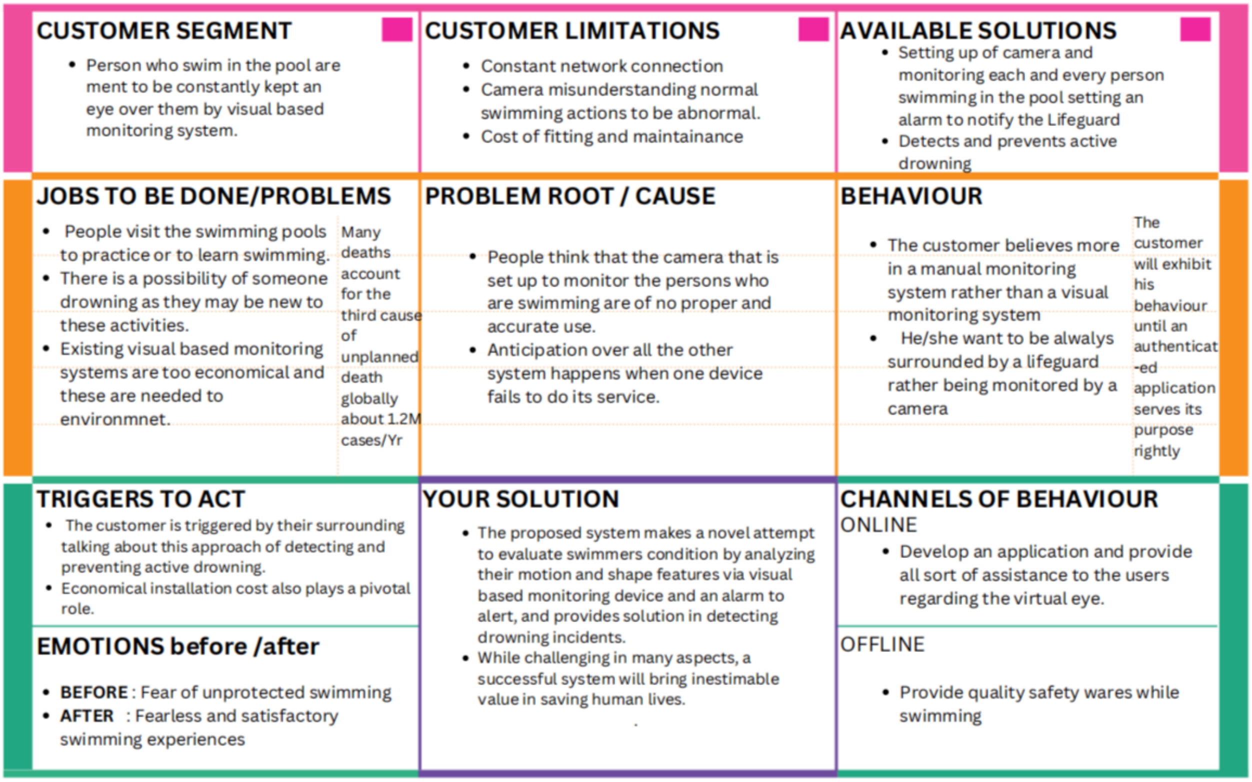
3.2 Ideation& Brianstorming



3.3 Proposed Solution

SNO	Parameter	Description
1	Idea / Solutiondescription	This system by analyzing the movement and shape, evaluates swimmers' condition based on visual based monitoring device and analarm to alert the lifeguards and provides solution in detecting drowning incidents.
2	Novelty / Uniqueness	Virtual eye has developed a novel idea of alerting the ambulance and another life guard if there is any delay in saving the person to death
3	Social Impact / Customer Satisfaction	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. Suchkinds of deaths account for the third cause of unplanned death globally, with about 1.2 million cases yearly. To overcome this conflict,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.
4	Business Model (Revenue Model)	There are many products currently available this regard. Our solution, once developed well, has enough possibility to become a good product to save drowning victims.
5	Scalability of the Solution	Our proposed solution is very scalable i.e.,in future,there are a lot of rooms forevolving our present model by Adding new features to enhance our system in the future.

3.4 Problem Solution Fit



CUSTOMER SEGMENT

- Person who swim in the pool are ment to be constantly kept an eye over them by visual based monitoring system.

CUSTOMER LIMITATIONS

- Constant network connection
- Camera misunderstanding normal swimming actions to be abnormal.
- Cost of fitting and maintainance

AVAILABLE SOLUTIONS

- Setting up of camera and monitoring each and every person swimming in the pool setting an alarm to notify the Lifeguard
- Detects and prevents active drowning

JOBS TO BE DONE/PROBLEMS

- People visit the swimming pools to practice or to learn swimming.
- There is a possibility of someone drowning as they may be new to these activities.
- Existing visual based monitoring systems are too economical and these are needed to environmnet.

Many deaths account for the third cause of unplanned death globally about 1.2M cases/Yr

PROBLEM ROOT / CAUSE

- People think that the camera that is set up to monitor the persons who are swimming are of no proper and accurate use.
- Anticipation over all the other system happens when one device fails to do its service.

BEHAVIOUR

- The customer believes more in a manual monitoring system rather than a visual monitoring system
- He/she want to be alwalys surrounded by a lifeguard rather being monitored by a camera

The customer will exhibit his behaviour until an authenticat-ed application serves its purpose rightly

TRIGGERS TO ACT

- The customer is triggered by their surrounding talking about this approach of detecting and preventing active drowning.
- Economical installation cost also plays a pivotal role.

EMOTIONS before /after

- **BEFORE** : Fear of unprotected swimming
- **AFTER** : Fearless and satisfactory swimming experiences

YOUR SOLUTION

- The proposed system makes a novel attempt to evaluate swimmers condition by analyzing their motion and shape features via visual based monitoring device and an alarm to alert, and provides solution in detecting drowning incidents.
- While challenging in many aspects, a successful system will bring inestimable value in saving human lives.

CHANNELS OF BEHAVIOUR

ONLINE

- Develop an application and provide all sort of assistance to the users regarding the virtual eye.

OFFLINE

- Provide quality safety wares while swimming

4.REQUIREMENT ANALYSIS

4.1 Functional requirements

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Installation	Needed to be fixed under the water without Creating any disturbance to the people in the swimming pool.
FR-2	User registration	Register via Email/Phone number and get verified for further use

FR-3	Deduction	Either not moving or in unconscious state
FR-4	Support	Take swim tubes or take the help of rescuer
FR-5	Alert	Set alarm and send message through the application to life guard.
FR-6	Output	Vision based monitor Image, position and movement detection Drowning is detected Resue drowning people by Life Guard

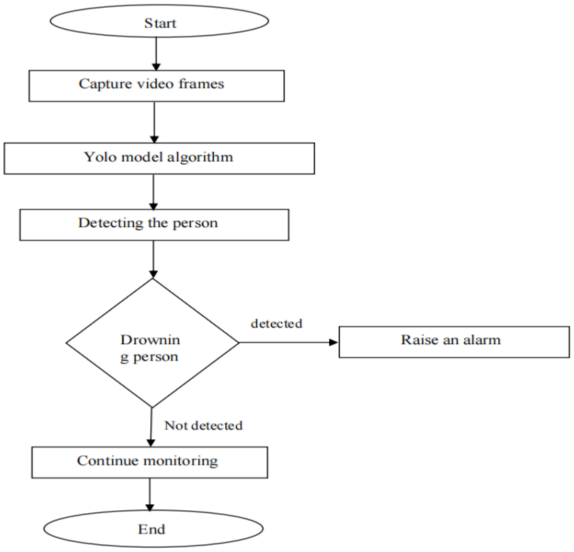
4.2 Non-Functional Requirement

S No.	**Non-Functional Requirement**	**Description**
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.
2	**Security**	Lifeguards should be aware of the alertmessage to save the life of the swimmer
3	**Reliability**	Virtual eye lifeguard triggers an immediate prior alarm if a swimmer is in peril, helping to avoid panic even in critical situations.
4	**Performance**	The alarm is triggered when the swimmer is detected as drowning
5	**Availability**	Equipment and accessories include

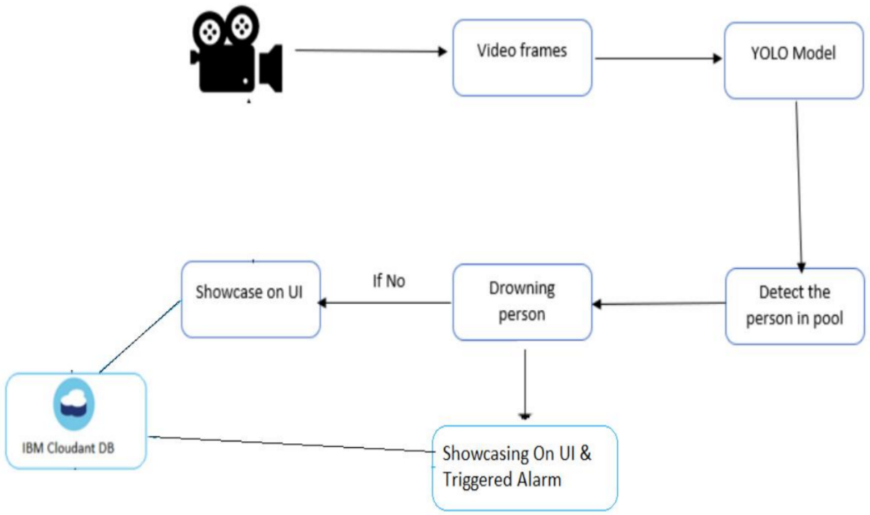
		lifesaverrings, inflatable vests, aShepherd's Crook, life hooks, spine boards, rescue tubes, and a first aid kit. Remember to keep them accessible to quickly pull someone from the water water safely
6	**Scalability**	Virtual eye lifeguard detects potentialdrownings and promptly notifies you. It features the latest artificial intelligence technology and adapts to the needs of the user.

5.PROJECT DEESIGN

5.1 Data Flow Diagram



5.2 Solution & Techincal Architecture



5.3 User Stories

User Type	Functional Requirement	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Supervisor)	Installation	USN-1	Theyset camera and install and configure the system in swimming pools	The software is installed and cameras are setup	High	Sprint-1
	Pre-processing	USN-2	Train and test the model	Trainthe model byusing datasets	High	Sprint-1

		USN-4	Swimmers can be detected through the actions Detection of drowning	Detection of drowning	High	Sprint-2
	Alarm rings	USN -5	Alarm rings When the system detects drowning person	Alert the lifeguard	High	Sprint-3
User Type	**Functional Requirements**	**User Story Number**	**User story/Task**	**Acceptance criteria**	**Priority**	**Release**
Lifeguard	Saves the person	USN-6	The Lifeguard saves the swimmer who is drowning once the alarm rings	Saves the life of people	High	Sprint-3
Administrator	Register	USN-7	Register into the application	Admin can access the account	Medium	Sprint-2
	Login	USN-8	Login and manage the application	Manage system	Medium	Sprint-2
		USN-9	Stores the database	Storage the database	Medium	Sprint-2

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	Registration	USN-1	As a user, I can register for the application by entering my email,password, and confirming my password.	2	High	Agalya R
Sprint-1	Registration	USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Bharathi S
Sprint-1	Registration	USN-3	As a user, can register forthe application through throughFacebook	2	Low	Jaya Swetha J
Sprint-1	Registration	USN-4	As a user, can register forthe applicationthrough Gmail	2	Medium	Madhumetha R
Sprint-1	Login	USN-5	As a user, can log into the application by entering email & password	1	High	Agalya R

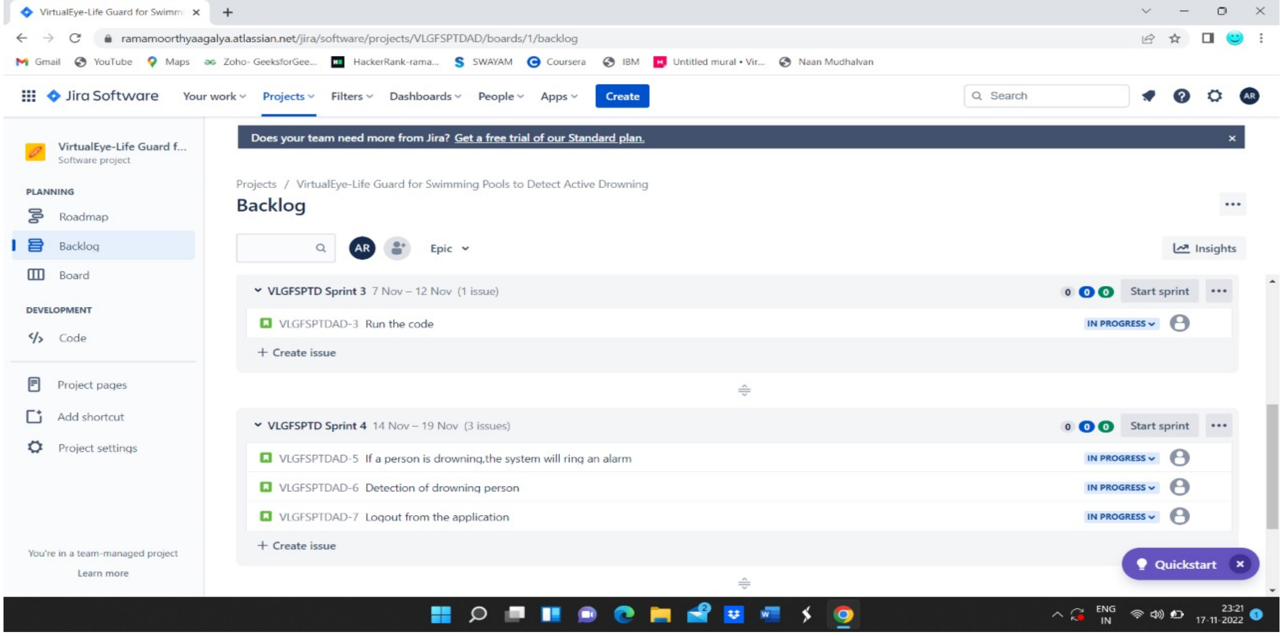
Sprint-2	Dataset Collect	USN-6	Collect number of datasets and get accuracy	2	Medium	Bharathi S
Sprint-2	Pre-processing	USN-7	The dataset is extracted	2	High	Jaya Swetha J
Sprint-2	Train the model	USN-8	Train the model.	4	High	Madhumetha R
Sprint-2	Test the model	USN-9	Test the model	6	High	Agalya R
Sprint-3	Detection	USN-10	Load the trained model.	3	High	Bharathi S
Sprint-3	Detection	USN-11	Identify the person by collecting real-time data through a webcam.	5	Medium	Jaya Swetha J
Sprint-3	Detection	USN-12	classify it by using a trained model to predict the output	8	High	Madhumetha R
Sprint-4	Detection	USN-13	If person isdrown the system will ring alarm to give signal	7	High	Agalya R
Sprint-4	Detection	USN-14	As a User,I can detect the drowning person.	3	Medium	Bharathi S
Sprint-4	Logout	USN-15	As a User,I can logout application	2	Low	Jaya Swetha J

6.2 Sprint Delivery Schedule

Sprint	Total StoryPoint	Duration	Sprint Start Date	Sprint End Date(Planned)	Story point Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	8	6 Days	24 Oct 2022	29 Oct 2022	6	29 Oct 2022
Sprint-2	14	6 Days	31 Oct 2022	05 Nov 2022	12	05 Nov 2022
Sprint-3	16	6 Days	07 Nov 2022	12 Nov 2022	11	12 Nov 2022
Sprint-4	12	6 Days	14 Nov 2022	19 Nov 2022	12	19 Nov 2022

6.3 Reports from JIRA

Screen Shot 1:



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Projects / VirtualEye-Life Guard for Swimming Pools to Detect Active Drowning

Backlog

VLGFSPTD Sprint 3 7 Nov – 12 Nov (1 issue) 0 0 0

VLGFSPTDAD-3	Run the code	IN PROGRESS

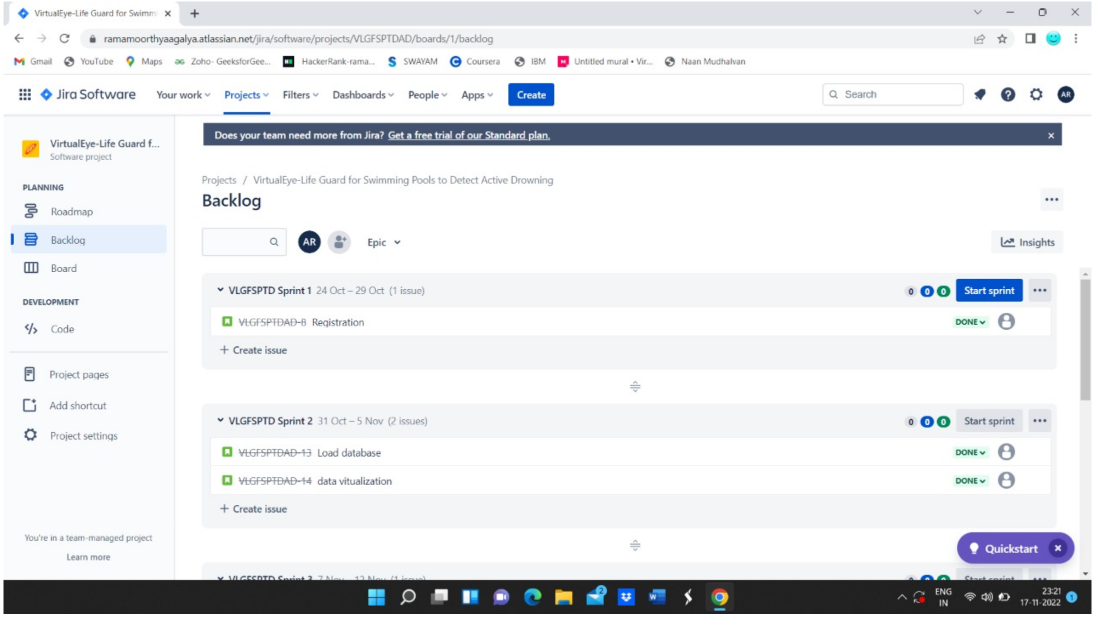
+ Create issue

VLGFSPTD Sprint 4 14 Nov – 19 Nov (3 issues) 0 0 0

VLGFSPTDAD-5	If a person is drowning,the system will ring an alarm	IN PROGRESS
VLGFSPTDAD-6	Detection of drowning person	IN PROGRESS
VLGFSPTDAD-7	Logout from the application	IN PROGRESS

+ Create issue

Screen Shot 2:


VirtualEye-Life Guard for Swimm
ramamoorthyaagalya.atlassian.net/jira/software/projects/VLGFSPTDAD/boards/1/backlog
Gmail YouTube Maps Zoho- GeeksforGee... HackerRank-rama... SWAYAM Coursera IBM Untitled mural • Vir... Naan Mudhalvan
Jira Software
Your work
Projects
Filters
Dashboards
People
Apps
Create
Search
VirtualEye-Life Guard f...
Software project
PLANNING
Roadmap
Backlog
Board
DEVELOPMENT
Code
Project pages
Add shortcut
Project settings
You're in a team-managed project
Learn more
Epic
Insights
Start sprint
Quickstart
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23:21
17-11-2022

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Projects / VirtualEye-Life Guard for Swimming Pools to Detect Active Drowning

Backlog

VLGFSPTD Sprint 1 24 Oct – 29 Oct (1 issue) 0 0 0

~~VLGFSPTDAD-8~~ Registration DONE

+ Create issue

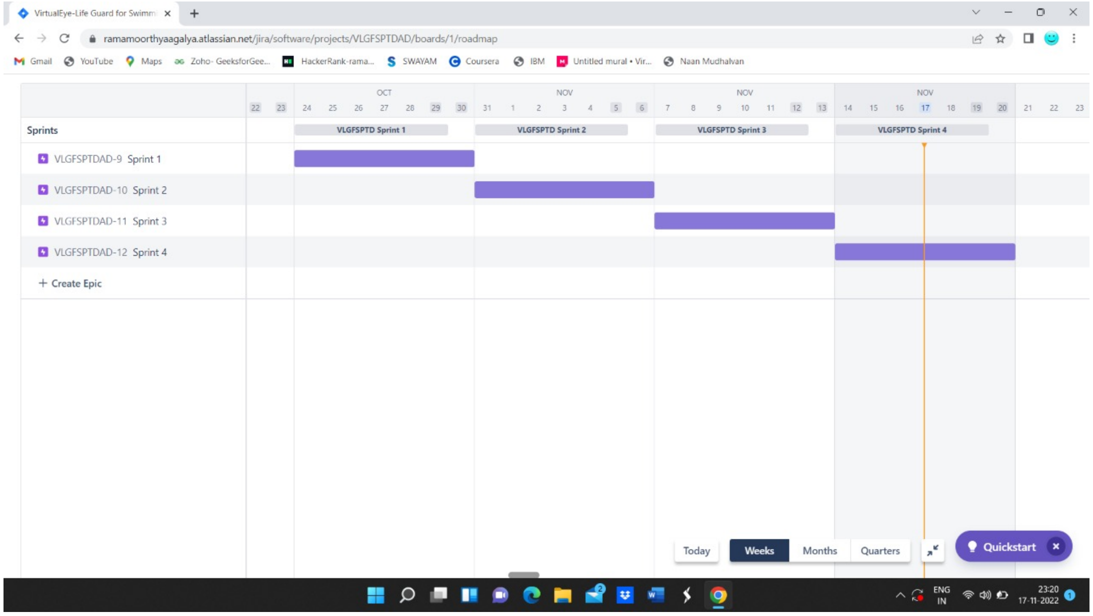
VLGFSPTD Sprint 2 31 Oct – 5 Nov (2 issues) 0 0 0

~~VLGFSPTDAD-13~~ Load database DONE

~~VLGFSPTDAD-14~~ data vitualization DONE

+ Create issue

Screen Shot:3


VirtualEye-Life Guard for Swimm
ramamoorthyaagalya.atlassian.net/jira/software/projects/VLGFSPTDAD/boards/1/roadmap
Gmail YouTube Maps Zoho- GeeksforGee... HackerRank-rama... SWAYAM Coursera IBM Untitled mural • Vir... Naan Mudhalvan
OCT
NOV
NOV
NOV
22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
VLGFSPTD Sprint 1
VLGFSPTD Sprint 2
VLGFSPTD Sprint 3
VLGFSPTD Sprint 4
Today
Weeks
Months
Quarters
Quickstart
ENG IN
23:20
17-11-2022

Sprints

VLGFSPTDAD-9 Sprint 1

VLGFSPTDAD-10 Sprint 2

VLGFSPTDAD-11 Sprint 3

VLGFSPTDAD-12 Sprint 4

+ Create Epic

7. CODING & SOLUTIONING

7.1 Feature 1

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. 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. 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.

Softwarw Requirements:

tensorflow

keras

IBM Cloudant

Flask

opencv-python

imutils

flask

barplaysound

Hardware Requirement:

Processor	- Intel core i5
Hard Disk Space	- Minimum 100GB
RAM	- 4GB
Display	-14.1"colour monitor (LCD,CRT or LED)
Clock Speed	- 1.67 GHz

7.2 Freature 2

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

The system can be deployed in house,hotels,resorts,and swimmingpoolcenters.The result is predicated in real-time,thus it can be used in emergency situations.

8.TESTING

8.1 Testcase

Test case	**Feature type**	**Page**	**Test scenario**	**Step To Execute**	**Test**	**Expected Result**	**Actual Result**
Login page_TC _001	Functional	Home page	Verify user is see the login/signup popup when user clicked on my accountbutton	1.Enter URL and click go 2.click on my account dropdown 3.verify login/signup	Login.html	login/sign popup should display	Result Working

				popup display or not			
Login page_TC _002	Functional	Home page	Verify the UI element in login/sign up popup	1.Enter URL and click go 2.Click on My account dropdown 3.Verify login/signup below UI a.Mail text box. b.password text box c.L% in button d.New customer?Create an account e.Lost password? Recovery password	Login.html	Application should show below element: a.email text box b.password text box c.login button with orange colour d.New Customer? Create account e.Last password ?Recovery password	Working
Login page_TC _003	Functional	Home page	Verify user is able to log into	1.Enter URL and click go	User name:swetha@g	User Should navigate	Working

			application with valid credentials	2.Click my account dropdown 3.Enter valid user name	mail.com Password:swtha21	to prediction homepage	
Login page_TC_004	Functional	Login page	Verify user is able to log into application with Invalid credentials	1.-Enter URL and click go 2.Click on my account dropdown 3.Enter Valid username/email in Email text box	Username:swetha@gmail.com password:swetha21	Application should show'Incorrect email or password' validation message	Working
Login page_TC_005	Functional	Login page	Verify user is able to into application with Invalid credentials	1.Enter URL and click go 2.Click on My Account Dropdown 3.Enter	Username:swetha@gmail.com password:swetha21	Application should show'Incorrect email or password' validation message.	Working

				Invalid username /email in Email Text box			
Login page_TC_006	Functional	Prediction page	Page should display wheather the person is drowning or not	1.Cameras should take pictures of drowning in pools 2.It should predict the probability of drowning	Image of people drowning	Generate a alert to lifegaurd if people are drowning	Working

8.2 User Acceptance testing

1.Defect Analysis

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

Section	**Test Case**	**Not Testd**	**Fail**	**Pass**
Print Engine	2	0	0	2
Client Application	2	0	0	2
Security	1	0	0	1
Outsource Shipping	1	0	0	1
Exception Reporting	2	0	0	2
Final Report Output	1	0	0	1

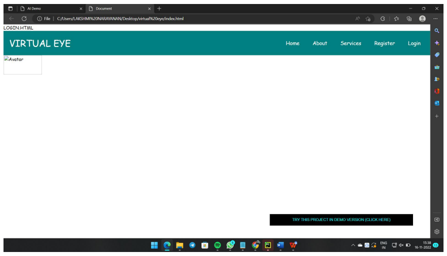
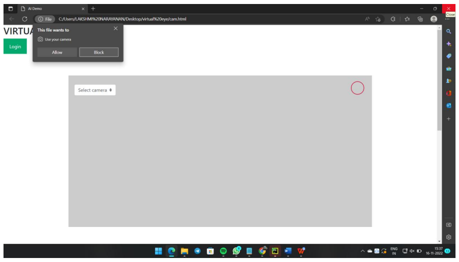
2.Test case Analysis

This report shows the nmber of test case that have been passed,failed,untested

Resolution	Severty 1	Severty 2	Severty 3	Severty 4	Severty 5
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	5	2	1	8
Totals	24	14	13	26	77

9.RESULT

9.1 Performance Metrics

S. NO	Parameter	Values	Screenshot
1.	Model summey	-	 AI Demo Document File C:/Users/LAKSHMI%20NARAYANAN/Desktop/virtual%20eye/index.html LOGIN.HTML VIRTUAL EYE Home About Services Register Login Avatar TRY THIS PROJECT IN DEMO VERSION (CLICK HERE) ENG IN 15:38 16-11-2022
2.	Accuracy	Trainng Accuacy-28 Validation Accuracy-44	 AI Demo File C:/Users/LAKSHMI%20NARAYANAN/Desktop/virtual%20eye/cam.html Close VIRTUA Login This file wants to Use your camera Allow Block Select camera ENG IN 15:37 16-11-2022

10. ADVANTAGES & DISADVANTAGES

Advantages

The use of deep learning gives accurate results after training the model.

YOLOv3 model is fast and can process upto 45 frames per second.

Disadvantages

YOLO has low recall value and struggles to detect very close objects.

11. CONCLUSION

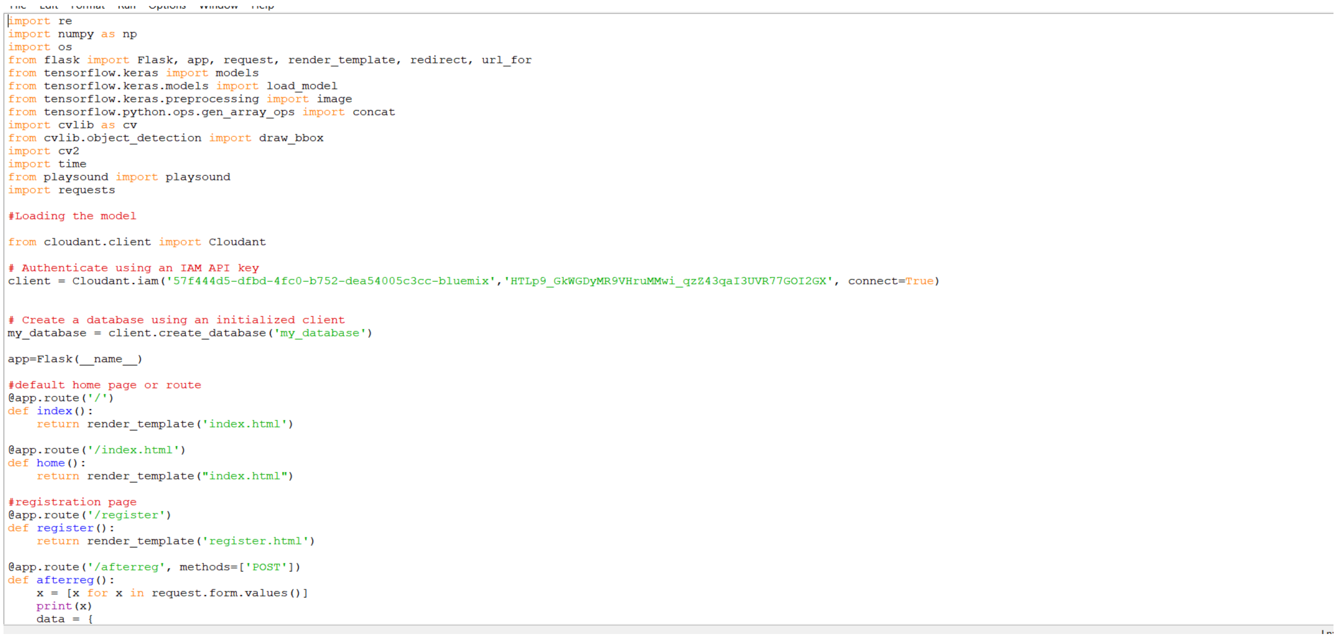
In this project, we have developed a deep learning system using YOLOv3 model topredict if a person is drowning or not. The system is connected to IBM cloud services the user can access through a web application along with the alarm feature system to notigy the lifegaurd.

12.FUTURE SCOPE

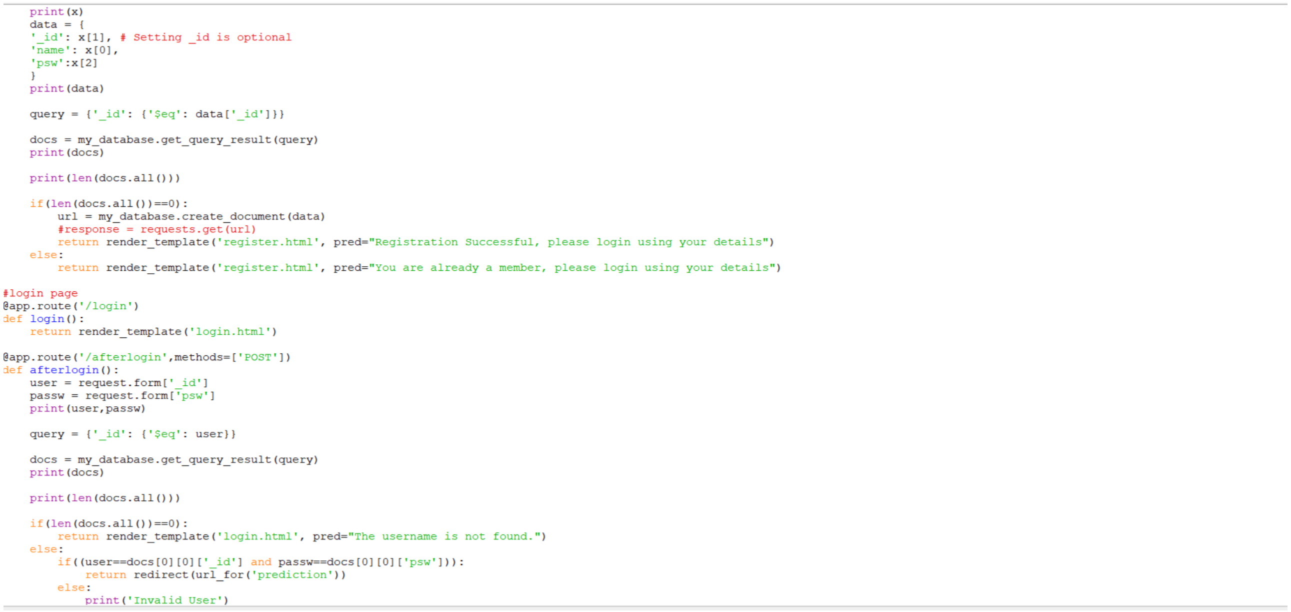
The project can be further extended by deploying multiple cameras underwater to improve accuracy of prediction.The processing speed of the model can be improved to produce the result faster.

13. APPENDIX

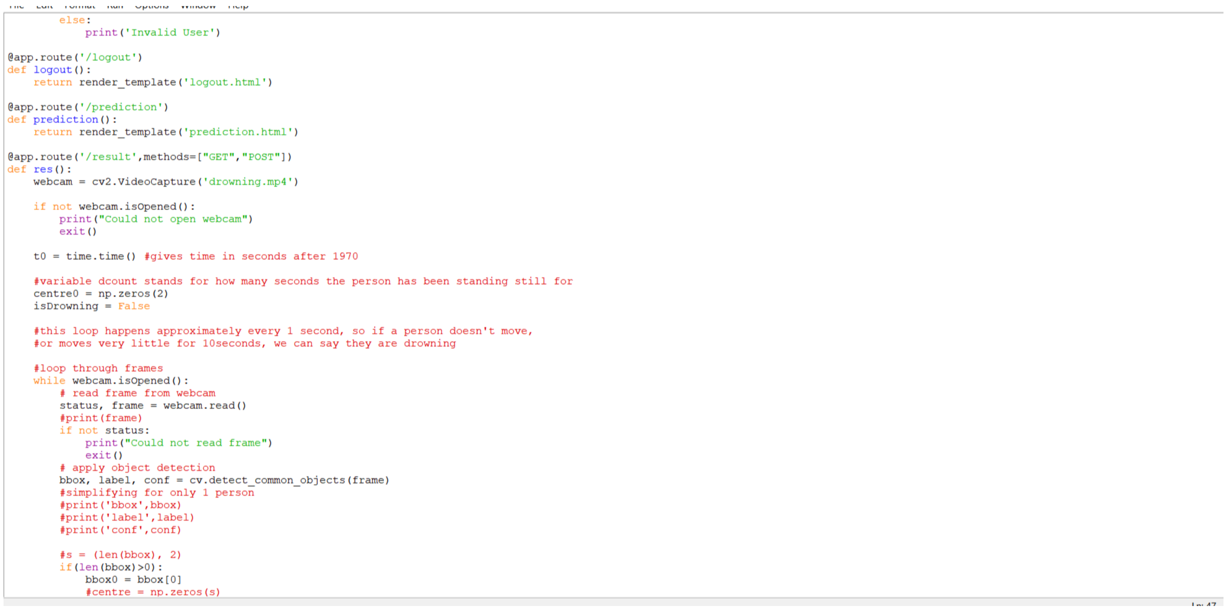
SourceCode



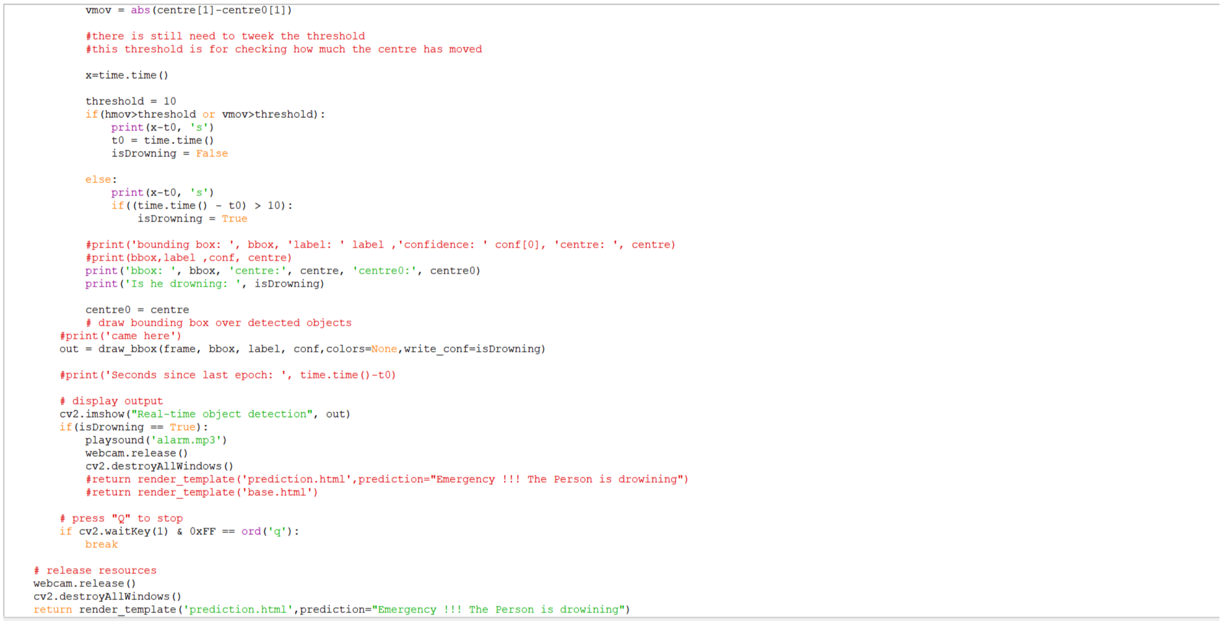
```python
import re
import numpy as np
import os
from flask import Flask, app, request, render_template, redirect, url_for
from tensorflow.keras import models
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
from tensorflow.python.ops.gen_array_ops import concat
import cvlib as cv
from cvlib.object_detection import draw_bbox
import cv2
import time
from playsound import playsound
import requests

#Loading the model

from cloudant.client import Cloudant

# Authenticate using an IAM API key
client = Cloudant.iam('57f444d5-dfbd-4fc0-b752-dea54005c3cc-bluemix','HTLp9_GkWGDyMR9VHruMMwi_qzZ43qaI3UVR77GOI2GX', connect=True)


# Create a database using an initialized client
my_database = client.create_database('my_database')

app=Flask(__name__)

#default home page or route
@app.route('/')
def index():
    return render_template('index.html')

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

#registration page
@app.route('/register')
def register():
    return render_template('register.html')

@app.route('/afterreg', methods=['POST'])
def afterreg():
    x = [x for x in request.form.values()]
    print(x)
    data = {
```



```python
    print(x)
    data = {
    '_id': x[1], # Setting _id is optional
    'name': x[0],
    'psw':x[2]
    }
    print(data)

    query = {'_id': {'$eq': data['_id']}}

    docs = my_database.get_query_result(query)
    print(docs)

    print(len(docs.all()))

    if(len(docs.all())==0):
        url = my_database.create_document(data)
        #response = requests.get(url)
        return render_template('register.html', pred="Registration Successful, please login using your details")
    else:
        return render_template('register.html', pred="You are already a member, please login using your details")

#login page
@app.route('/login')
def login():
    return render_template('login.html')

@app.route('/afterlogin',methods=['POST'])
def afterlogin():
    user = request.form['_id']
    passw = request.form['psw']
    print(user,passw)

    query = {'_id': {'$eq': user}}

    docs = my_database.get_query_result(query)
    print(docs)

    print(len(docs.all()))

    if(len(docs.all())==0):
        return render_template('login.html', pred="The username is not found.")
    else:
        if((user==docs[0][0]['_id'] and passw==docs[0][0]['psw'])):
            return redirect(url_for('prediction'))
        else:
            print('Invalid User')
```

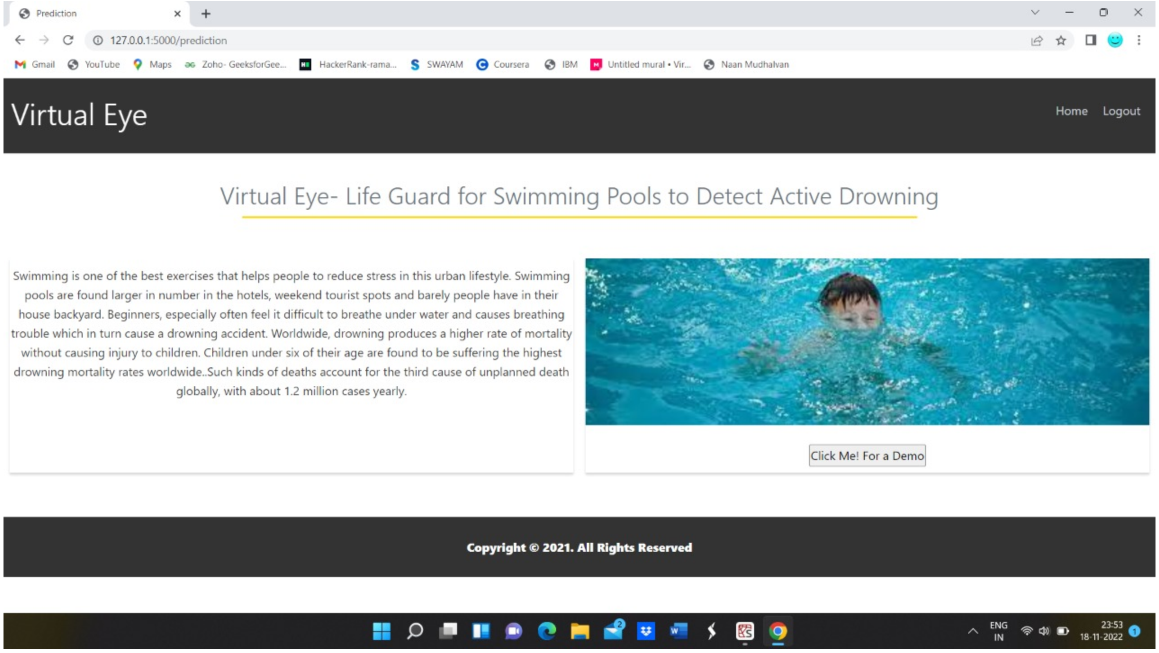


```
        else:
            print('Invalid User')

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

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

@app.route('/result',methods=["GET","POST"])
def res():
    webcam = cv2.VideoCapture('drowning.mp4')

    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()
        #print(frame)
        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
        #print('bbox',bbox)
        #print('label',label)
        #print('conf',conf)

        #s = (len(bbox), 2)
        if(len(bbox)>0):
            bbox0 = bbox[0]
            #centre = np.zeros(s)
```



```
            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
        #print('came here')
        out = draw_bbox(frame, bbox, label, conf,colors=None,write_conf=isDrowning)

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

        # display output
        cv2.imshow("Real-time object detection", out)
        if(isDrowning == True):
            playsound('alarm.mp3')
            webcam.release()
            cv2.destroyAllWindows()
            #return render_template('prediction.html',prediction="Emergency !!! The Person is drowining")
            #return render_template('base.html')

        # press "Q" to stop
        if cv2.waitKey(1) & 0xFF == ord('q'):
            break

    # release resources
    webcam.release()
    cv2.destroyAllWindows()
    return render_template('prediction.html',prediction="Emergency !!! The Person is drowining")
```

Output:


Prediction
127.0.0.1:5000/prediction
Gmail YouTube Maps Zoho- GeeksforGee... HackerRank-rama... SWAYAM Coursera IBM Untitled mural • Vir... Naan Mudhalvan
Home Logout
ENG IN
23:53
18-11-2022

Virtual Eye

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

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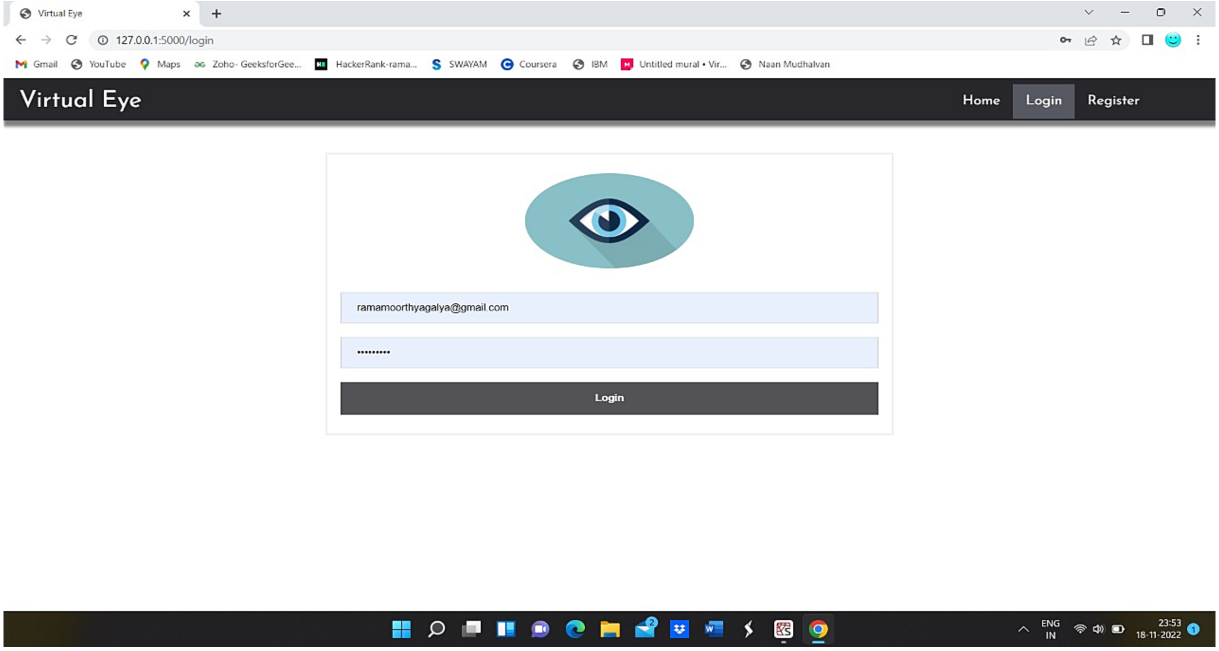
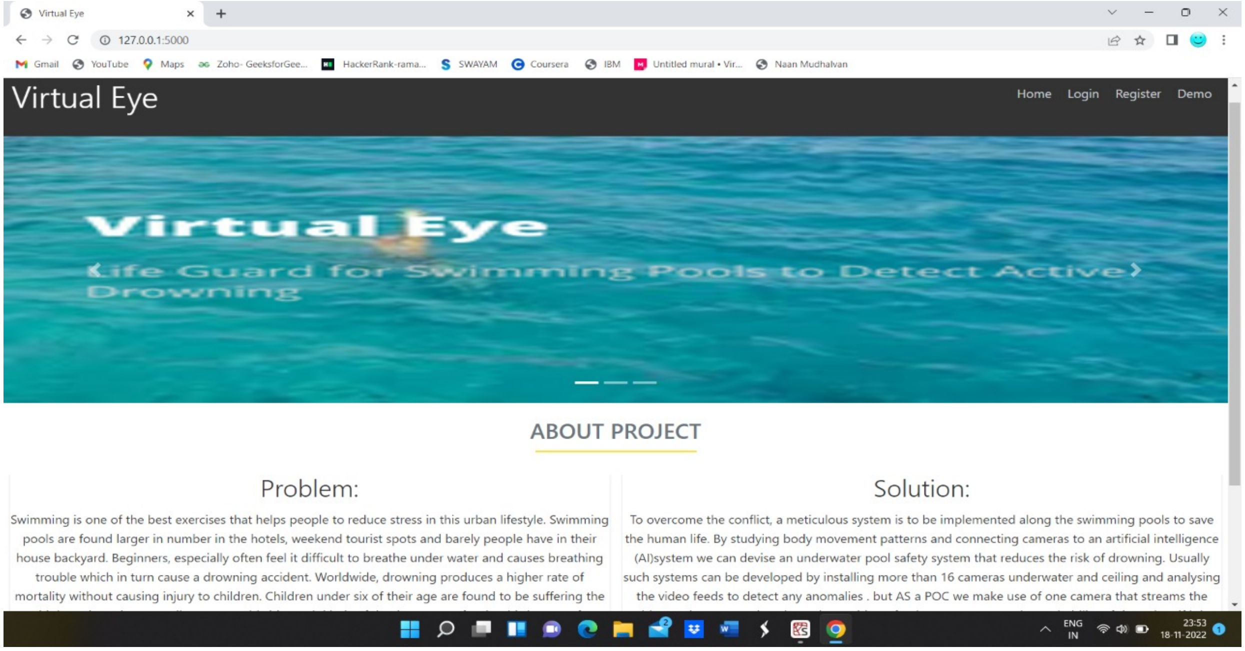

Virtual Eye
127.0.0.1:5000/login
Gmail YouTube Maps Zoho- GeeksforGee... HackerRank-rama... SWAYAM Coursera IBM Untitled mural • Vir... Naan Mudhalvan
Home Login Register
ENG IN
23:53
18-11-2022

Virtual Eye

ramamoorthyagalya@gmail.com

•••••••••

Login



Virtual Eye

Virtual Eye

Life Guard for Swimming Pools to Detect Active Drowning

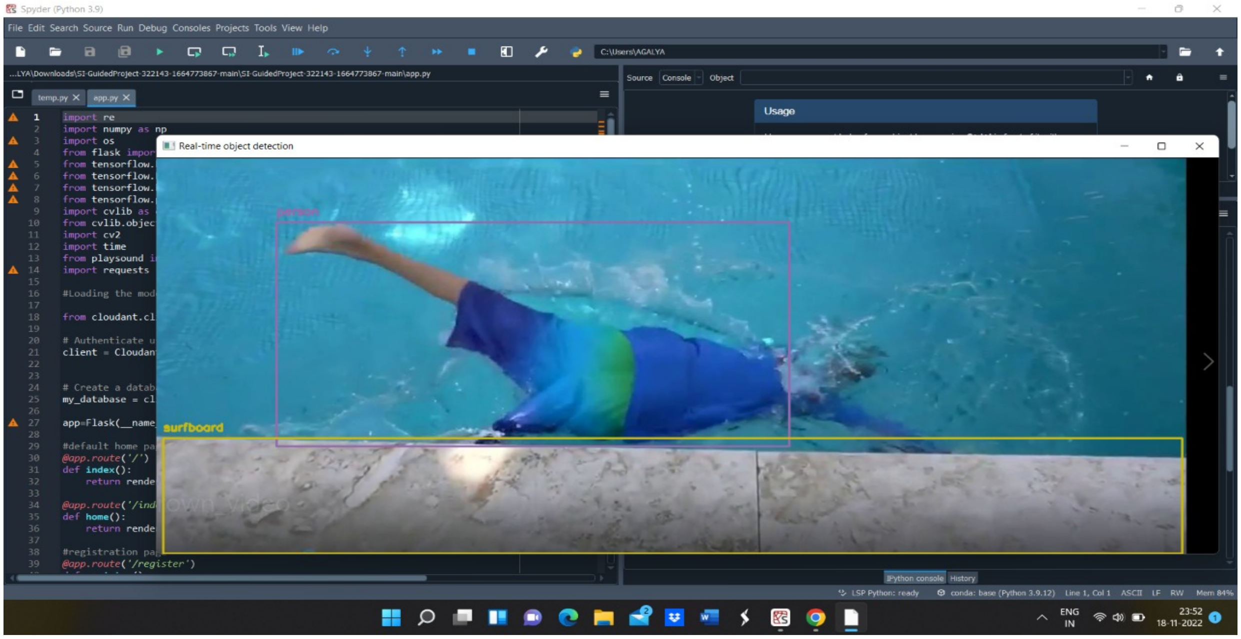
ABOUT PROJECT

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 mortality without causing injury to children. Children under six of their age are found to be suffering the

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 the video feeds to detect any anomalies . but AS a POC we make use of one camera that streams the



Spyder (Python 3.9)
File Edit Search Source Run Debug Consoles Projects Tools View Help
C:\Users\AGALYA
...LYA\Downloads\SI-GuidedProject-322143-1664773867-main\SI-GuidedProject-322143-1664773867-main\app.py
temp.py
app.py
Source
Console
Object
Usage
Real-time object detection
surfboard
IPython console
History
LSP Python: ready
conda: base (Python 3.9.12)
Line 1, Col 1
ASCII
LF
RW
Mem 84%
ENG
IN
23:52
18-11-2022

```
import re
import numpy as np
import os
from flask impor
from tensorflow.
from tensorflow.
from tensorflow.
from tensorflow.
import cvlib as
from cvlib.objec
import cv2
import time
from playsound i
import requests

#Loading the mod

from cloudant.cl

# Authenticate u
client = Cloudan


# Create a datab
my_database = cl

app=Flask(__name

#default home pa
@app.route('/')
def index():
    return rende

@app.route('/ind
def home():
    return rende

#registration pa
@app.route('/register')
```

GitHub Link
https://github.com/IBM-EPBL/IBM-Project-742-1658319090

Project Demo Link
https://youtu.be/5YwodU1Ii1l