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CHAPTER - 1
INTRODUCTION

1.1 PROJECT OVERVIEW

Recommendation system is a technique, which provides users with information, which he/she may be interested in or accessed in the past. Traditional recommender techniques such as content and collaborative filtering used in various applications such as education, social media, marketing, entertainment, e-governance and many more. Content-based and collaborative filtering has many advantages and disadvantages and they are useful in specific applications. Sparsity and cold start problems are major challenges in content and collaborative filtering. Challenges of content and collaborative filtering can be solved by using hybrid filtering. Hybrid filtering combines the features of two recommender systems like content and collaborative; content-based filtering improves the classification accuracy and collaborative model easily gives the best-predicted result of a latent factor model.

1.2 PURPOSE

At present, swimming pools are built in hotels, sport clubs, schools and private residences.Although there have been various regulations put into place to reduce drowning accidents in some countries, communities still experience many drowning incidents. Accordingly, a real-time system that will track swimmers in a pool using machine learning techniques and prevents drowning accidents is proposed.Automating such a process will provide the communities with an efficient way of detecting drowning incidents that may occur while swimming. Existing drowning detection technologies can be categorized into two types: vision based systems and wearable sensor based systems .Vision based systems are classified according to the positions of the cameras. They mainly depend on two types of cameras: underwater cameras and above water cameras .

CHAPTER - 2
LITERATURE SURVEY

2.1 EXISTING PROBLEM

There are currently many devices to detect drowning of a person but the visionable and wearable devices used may malfunction due to the continuous use of it in underwater and the software used also does not give a good accuracy rate for drowning. Many devices also use Bluetooth connection for alerting and alarming purpose which may or may not be audible in crowded place.

2.2 SURVEY WORKS

2.1 Detection of early dangerous state in deep water of indoor swimming pool based on surveillance video (Fan Wang ET AL,14 JUNE 2021)

This paper gives an outlook for early detection of dangerous condition in the deep-water zone of swimming pool based on video surveillance. This paper proposes feature extraction, feature expression and assessment criteria, which includes a method for evaluating normal swimming speed based on the time series of swimmers, a method for calculating an upright state that is not limited by the camera angle, and the rules for evaluating dangerous state. They collected real-life data from the swimming pool and conducted experiments related to it. This method can easily and efficiently detect the swimmer who is in danger at an early stage and provide necessary rescue reminders to lifeguards on time.

2.2 Automated and Intelligent System for Monitoring Swimming Pool Safety Based on the IoT and Transfer Learning (Aziz Alotaibi,6 DECEMBER 2020)

Recently, desegregation the net of Things and pc vision has been created use in pool automatic police investigation systems. many studies are place forth to beat off-time police investigation drowning prevalence supported employing an order of videos to trace human motion and position. This paper proposes associate economical and reliable detection system that produces use of one image to seek out and classify drowning objects, to stop drowning prevalence. The projected system utilizes the IoT associated transfer learning to supply an intelligent and automatic answer for off-time observation pool safety. additionally, a specialised transfer-learning-based model utilizing a model pretrained on “ImageNet”, which may bring out the foremost helpful and sophisticated options of the captured image to differentiate between humans, animals, and different objects, has been projected. The projected system aims to scale back human interference by process and causing the classification results to the owner’s mobile device.

2.3 The Visible Behaviour of Drowning Persons: A Pilot Observational Study Using Analytic Software and a Nominal Group Technique (Aida Carballo-Fazanes ET AL,22 SEPTEMBER 2020)

This was Associate in Nursing associate experimental study of drowning videos determined by twenty international specialists within the field of water safety. For measuring, every video was analysed with Lance observation software system by four participants. A Nominal cluster Technique generated input for the chemical analysis and also the 2 principal investigators conducted

a post-hoc analysis. study confirms previous assumptions of drowning behaviour and provides novel evidence-based info regarding the massive type of visible behaviours of drowning persons. New behaviours, that primarily embody high-frequency resurfacing throughout a struggle for fewer than two min and backward water edge, are recognised during this study.

2.4 Computer Vision Enabled Drowning Detection System (Upulie Handalage ET AL,2021)

The current systems expected to handle the matter of guaranteeing safety at swimming pools have vital issues thanks to their technical aspects, like underwater cameras and method aspects like the requirement for human intervention within the rescue mission. the employment of an automatic visual-based observation system will facilitate to scale back drownings and assure pool safety effectively. This study introduces a revolutionary technology that identifies drowning victims in a very minimum quantity of your time and dispatches an automatic drone to save lots of them. mistreatment convolutional neural network (CNN) models, it will notice a drowning person Whenever such a scenario like this is often detected, the expansive tube-mounted self-driven drone can endure a rescue mission, sounding Associate in Nursing alarm to tell the near lifeguards. The system additionally keeps a watch out for probably dangerous actions that would lead to drowning. This system's ability to save lots of a drowning victim in underneath a second has been incontestable in example experiments' performance evaluations.

2.5 The Swimmers Motion Detection Using Improved VIBE Algorithm (Atif Iqbal ET AL,17 NOVEMBER 2020)

This paper planned a unique methodology for drowning person detection within the swimming bath victimisation video pictures. For

background extraction and to update the precise motion space from the complete video victimisation frame by frame distinction ambiance algorithmic rule is employed. Static and dynamic options are detected to acknowledge the conventional swimmer and drowning person. the current invention discloses video-based swimming pools drowning event detection methodology. within the detection method Time of map (Tom), the strategy is employed to enhance the standard ambiance result. The sequence of video pictures of the swimming bath is collected in time period by employing a camera put in higher than the water surface, that principally includes 3 steps of swimmer's detection, swimmers trailing and drowning person behaviour analysis. within the side of swimmer detection, AN improved ambiance swimmer detection algorithmic rule is planned, and therefore the algorithmic rule is employed to work out the swimmer's position. The swimmer trailing and particle filter supported the colour distribution model that is combined with the closest neighbour information association algorithmic rule to realize trailing of multiple swimmers. within the analysis of drowning behaviour, 3 characteristics of drowning behaviour are planned to work out whether or not the swimmer is drowning. The invention will monitor the swimming bath in time period through the camera put in higher than the water surface in a very real public swimming place, and mechanically discover the drowning person, that has nice engineering application worth.

2.6 A novel drowning detection method for safety of swimmers (Ajil Roy ET AL,16 DECEMBER 2018)

Effective drowning detection ways area unit essential for the security of

swimmers. during this paper, a unique style of drowning detection technique addressing several limitations of prevailing drowning detectors is projected. The projected technique ensures detection of drowning and news at the sooner stages. The projected drowning detection technique is additionally a generic resolution that suites totally different water bodies from pools to oceans, and an economically viable technique helpful for each low- and middle-income countries. The paradigm of the drowning detection technique is developed and model of the system is simulated in Proteus style suite. The results of the simulation and hardware experimentation are according.

2.7 Automated Vision-based Surveillance System to Detect Drowning Incidents in Swimming Pools (Abdel Ilah N. Alshbatat ET AL,26 JULY 2020)

This paper projected an amount system that will track swimmers throughout a pool victimization machine learning techniques and prevents drowning accidents is projected. The system consists of a Raspberry Pi with the Raspbian package, a Pixy camera, Associate in Nursing Arduino Nano board, stepper motors, Associate in Nursing device, and motor drivers. The projected system depends on the colour-based formula to position and rescue swimmers World Health Organization unit of measurement drowning. The device then sends Associate in Nursing alarm to the lifeguards. The results from experiments indicate that the system contains a particular capability to look at and track swimmers, thereby enabling it to mitigate and curb the number of deaths by drowning.

2.3 PROBLEM STATEMENT DEFINITION

Problem Statement (PS)	I am a	I'm trying to	But	Because	Which makes me feel
PS-1	Beginner	Learn Swimming	I am scared of drowning	There is no one to monitor	Insecure
PS-2	Lifeguard	Save people	It's a difficult job	Monitoring all people at same time is not possible	Incautious
PS-3	Parent	Teach my children to swim	I can't pay attention to all	I can't watch them all simultaneously	Anxious

CHAPTER -3

IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

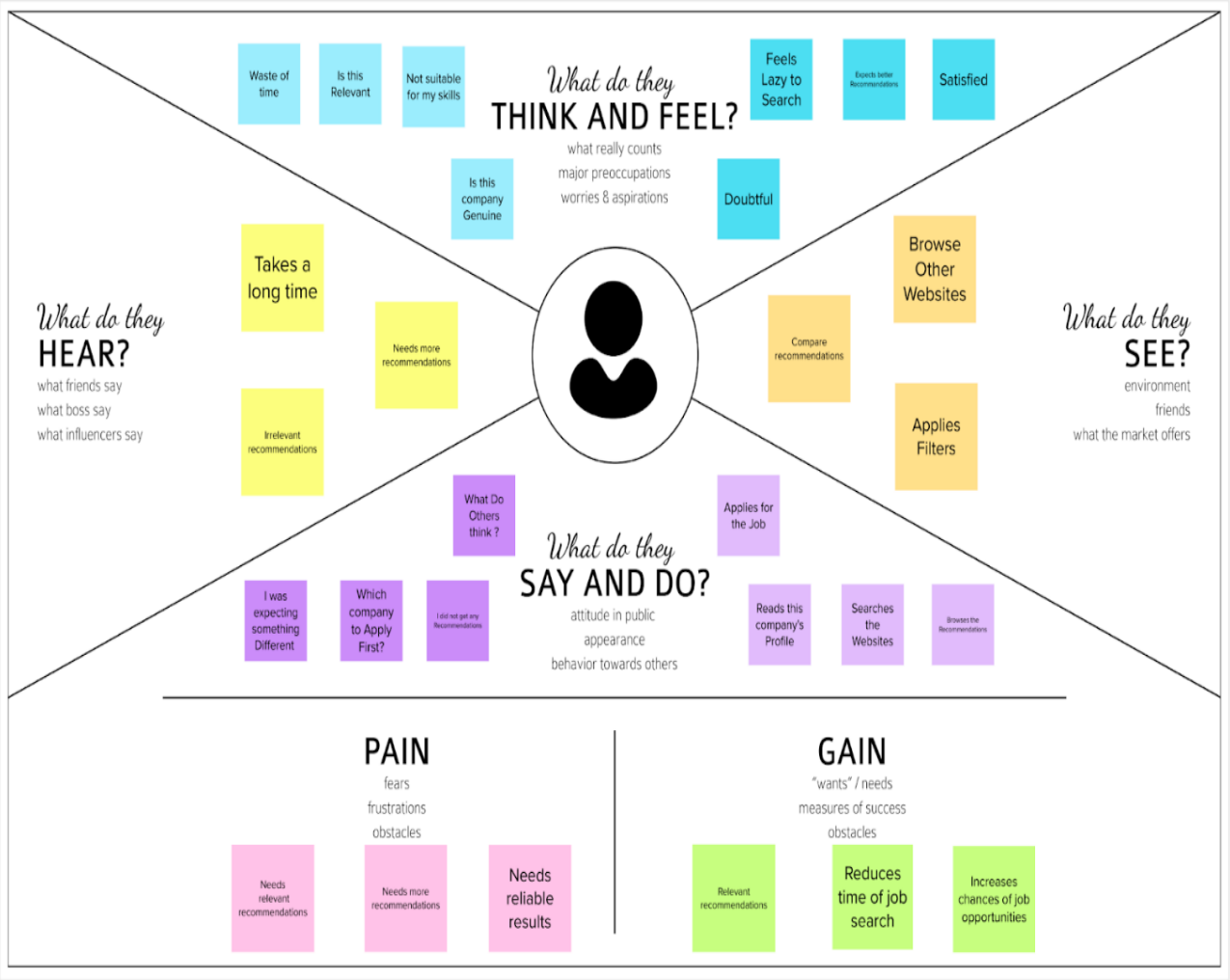


Fig 3.1 Empathy Map canvas

3.2 BRAINSTORMING AND IDEA PRIORITIZATION

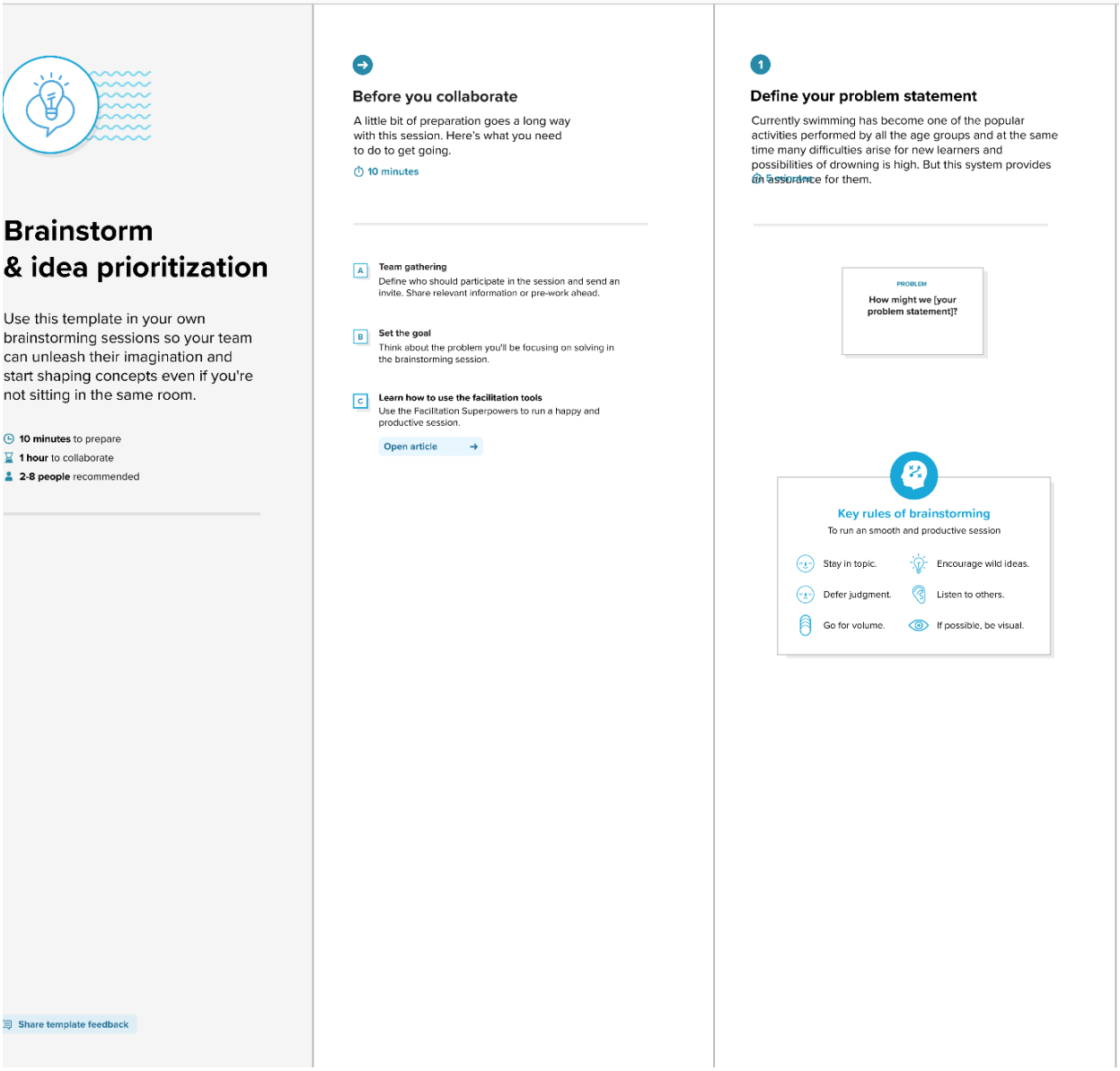


Fig 3.2 (A) Brainstorming And Idea Prioritization

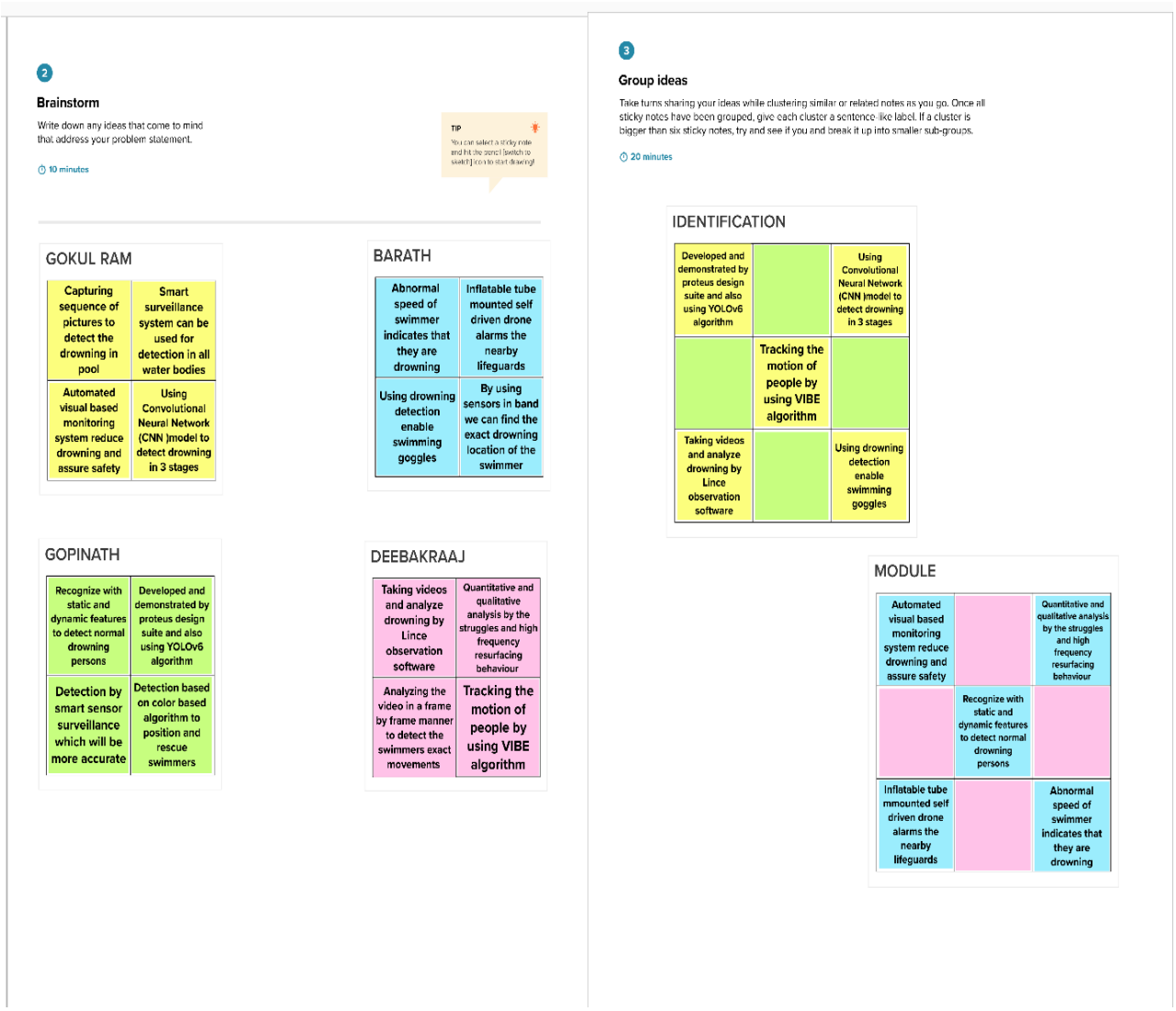


Fig 3.2 (B) Brainstorming And Idea Prioritization

Fig 3.2 (C) Brainstorming And Idea Prioritization

3.3 PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Abnormal behaviour real-time object detection and prevent from drowning.
2.	Idea / Solution description	We use Vibe algorithm (vibration) for drowning detection. Also, we use YOLO version 6 object detection algorithm.
3.	Novelty / Uniqueness	We predict the exact position of the swimmer using skeleton where he drowns. Also give alert at the same time.
4.	Social Impact/ Customer Satisfaction	Yearly 1.2 million unplanned deaths occur globally due to drowning. It is the helpful solution for the one who doesn't know much swimming.
5.	Business Model (Revenue Model)	Since there is a system to detect drowning and ensure safety of the simmers, most of them will be interested to learn swimming. It can increase the number of people who comes to swimming pool.
6.	Scalability of the Solution	It can monitor a wide area which increases the possibility of locating the swimmer in danger in different locations simultaneously and alerts the lifeguard accordingly. It gives high accuracy and easy to detect.

3.4 PROBLEM STATEMENTS

Problem Statement (PS)	I am a	I'm trying to	But	Because	Which makes me feel
PS-1	Beginner	Learn Swimming	I am scared of drowning	There is no one to monitor	Insecure
PS-2	Lifeguard	Save people	It's a difficult job	Monitoring all people at same time is not possible	Incautious
PS-3	Parent	Teach my children to swim	I can't pay attention to all	I can't watch them all simultaneously	Anxious

3.5 PROBLEM SOLUTION FIT

<table>
<tr><td>CUSTOMER SEGMENTS(S)
Developers and Ordinary people, Organization and Trainers</td><td>CUSTOMER LIMITATIONS
It will be in affordable price and User-friendly device</td><td>AVAILABLE SOLUTIONS
(PROS AND CONS)
A device exists which gets the data and after training the model, predicts the results. Various software and device have been developed but not gives accuracy rate</td></tr>
<tr><td>PROBLEMS/ PAINS
(ITS FREQUENCY)
Trainer can’t monitor all the swimmers at a time
No proper system to detect drowning
Chances of drowning is high</td><td>PROBLEM ROOT/ CAUSE
Since there is no proper system for drowning detection, the possibilities of unplanned dead are high so there is a need for developing a proper system that gives accuracy on drowning detection</td><td>BEHAVIOR ITS INTENSITY
Research about drowning people
Search for solution in online
Seek suggestion from other</td></tr>
<tr><td>TRIGGERS TO ACT
When he finds so many un expected drowning</td><td rowspan="2">YOUR SOLUTION
A device is developed using VIBE algorithm and YOLOv4 and detects the drowning people
It provides various functionalities such as alerting by alarm and shows the exact position of a drowning of object</td><td>CHANNELS OF BEHAVIOR (ONLINE)
Social media, blogs</td></tr>
<tr><td>EMOTIONS
(BEFORE/ AFTER)
Before: Tensed
After: Relaxed</td><td>OFFLINE
Software developers and Friends</td></tr>
</table>

Fig 3.5 Problem Solution

CHAPTER -4

REQUIREMENTS ANALYSIS

4.1 Functional Requirements:

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration/Login	Via Email Via Phone number
FR-2	User confirmation	Confirmation Via OTP Confirmation Via Email
FR-3	User location	User location will be detected.

4.2 Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Eco-friendly and user-friendly
NFR-2	**Security**	Acts as a life guard for swimmers
NFR-3	**Reliability**	Suitable for all swimming pool and can be used by all swimmers
NFR-4	**Performance**	It can detect the body movements of a drowning person which has a high accuracy rate.
NFR-5	**Availability**	It is accessible at any time.
NFR-6	**Scalability**	It works more efficiently the life span is high which is comfortable for all users.

CHAPTER-5

PROJECT DESIGN

5.1 DATA FLOW DIAGRAM

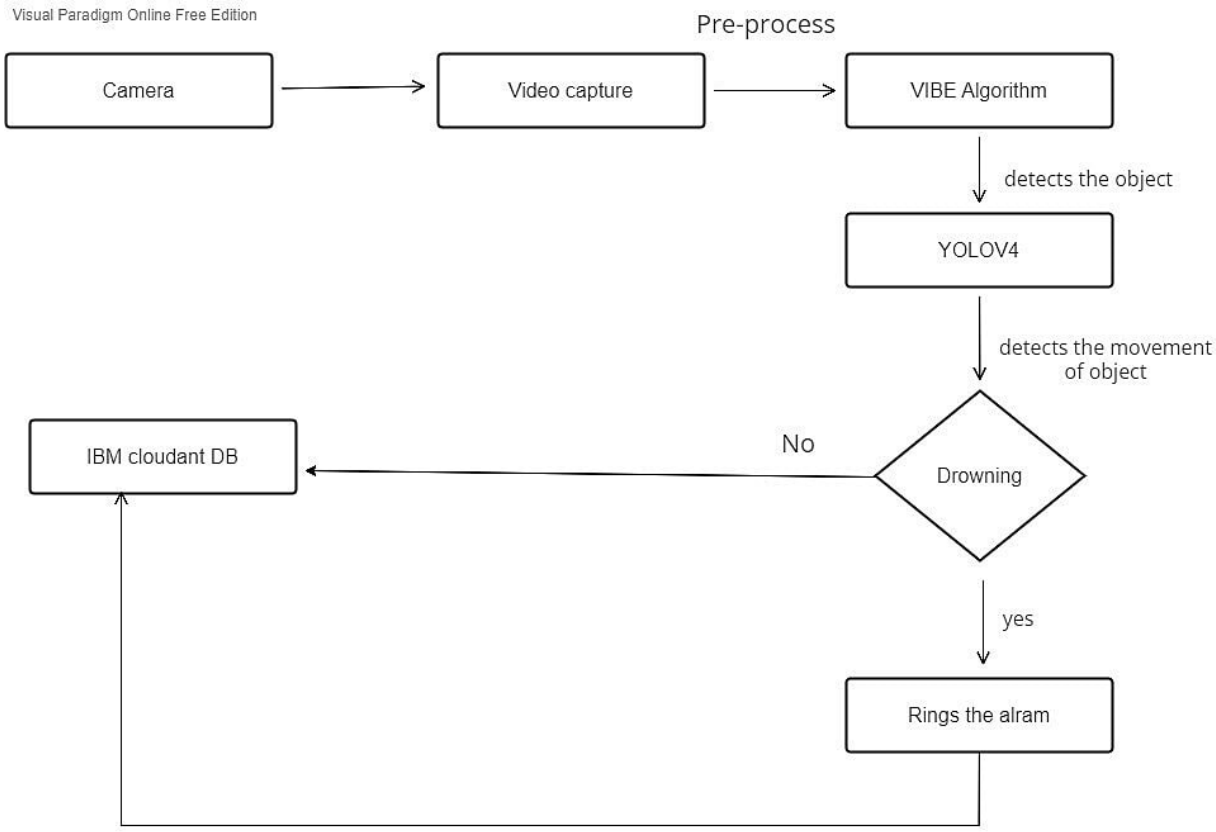


Fig 5.1 DATA FLOW DIAGRAM

5.2 SOLUTION ARCHITECTURE

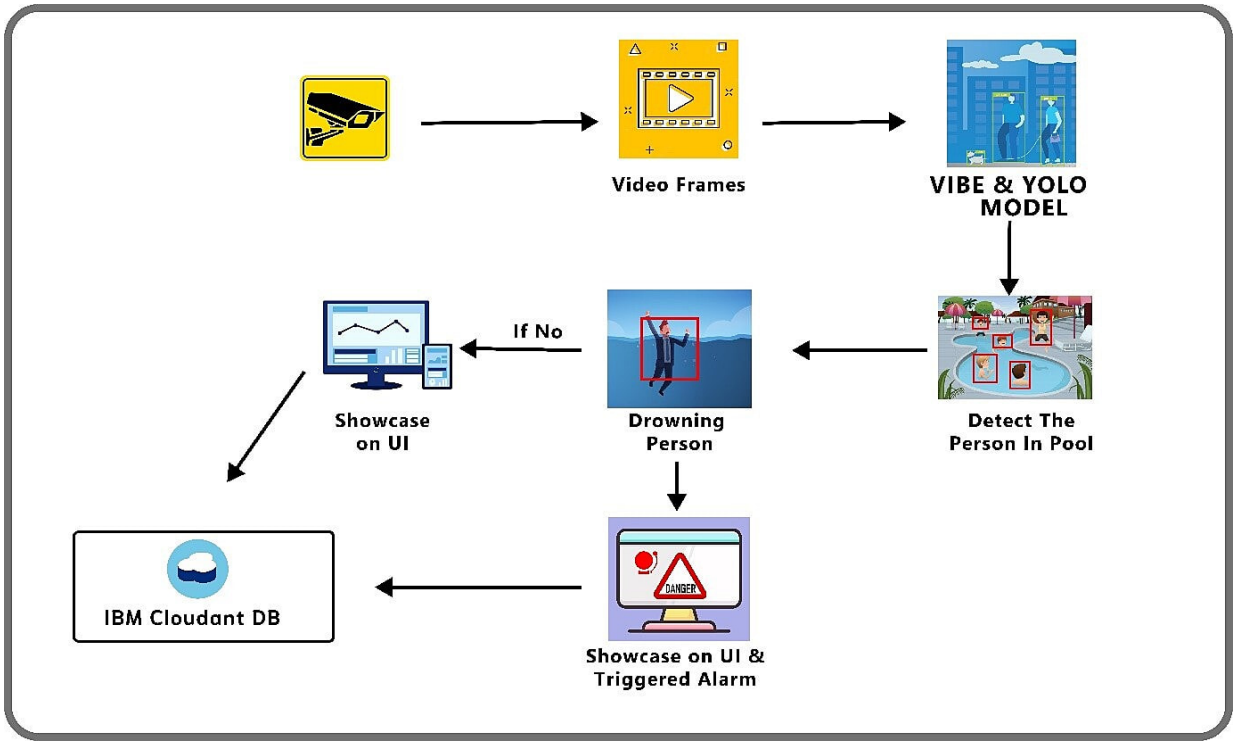


Fig 5.2 SOLUTION ARCHITECTURE

5.2 TECHNOLOGY ARCHITECTURE

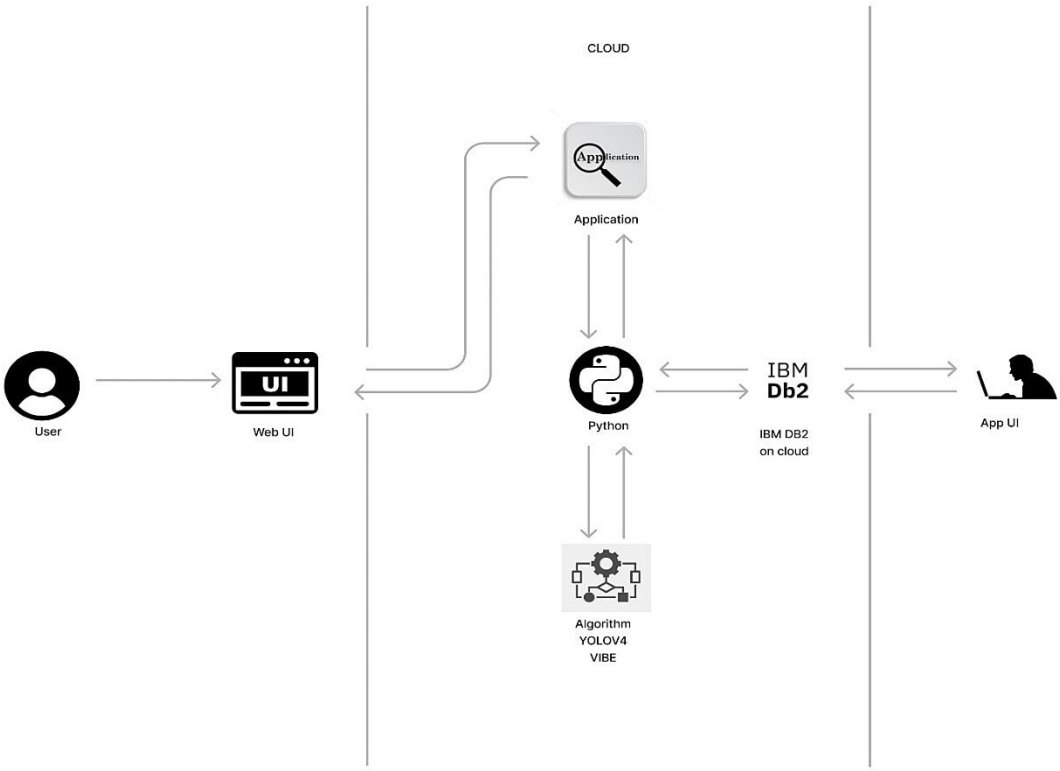


Fig 5.2 TECHNOLOGY ARCHITECTURE

5.4 USER STORIES

User Type	Functional Requirement(Epic)	User Story Number	User Story/ Task	Acceptance criteria	Priority	Release
Customer (Supervisor)	Installation	USN-1	They set the camera and install and configure thesystem in swimming pools	The software is installed in the device	High	Sprint-1
	Pre-processing	USN-2	Train and test the device	Train the model by using datasets	High	Sprint-1
	Detection ofdrowning	USN-3	The swimmers are monitored by the device whichis connected to band	Camera surveillance	High	Sprint -2
		USN-4	Swimmers are detected by their actionsand device connected	Detection of drowning	High	Sprint-1
	Alarm rings	USN -5	Alarm rings Whenthe system detectsabnormal behavior of a person	Alert thelifeguard	High	Sprint-3
Trainer	Saves the person	USN-6	The trainer savesthe swimmer who alarm rings	Saves the life of people	High	Sprint-3
Administrator	Register	USN-7	Register into the application and confirm the registration by OTP send	Admin can access the account	Medium	Sprint-2
	Login	USN-8	Login and manage the application andallow sensor to track the location	Manage system	Medium	Sprint-2
		USN-9	Tracks the location	Storage the database	Medium	Sprint-2

CHAPTER-6
PROJECT PLANNING & 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	I can register for the application by entering my phone number.	1	High	GokulramS B
		USN-2	I will receive confirmation box once I have registered forthe application.	2	Low	DeebakRaaj V P S
		USN-3	I can also regis thr	2	Medium	GopinathS B
	Login	USN-4	I can login into the application by enteringemail or phone number &password.	1	High	Barath R
		USN-5	In prediction page, the data uploaded will help the user to mo	2	Medium	GopinathS B
	Dataset collection	USN-6	The datasetcollected will give highaccuracy	2	High	Barath R

			on the drowning details of the person.			
Sprint-2	Data Pre-processing	USN-7	The dataset is extracted and is used totrain the model.	4	High	GokulramS B
	Train the model	USN-8	We will train the model.	8	High	DeebakRaajV P S
		USN-9	We will test the model.	6	High	GopinathS B
Sprint-3	Detection	USN-10	The testedmodel will be loaded.	3	High	Barath R
		USN-11	To identify the person by collecti ng real-time data.	5	Medi um	Gokulram S B
		USN-12	The data collected at present is checked with the pre-feeded data.	8	High	DeebakRaajV P S
Sprint-4	Alert	USN-13	When the abnormal movement is detected, the system will ring an alarm to notify the lifeguard to rescue the person.	7	High	GopinathS B

		USN-14	We will be able drowning	3	Medi	Barath R
	Logout	USN-15	User can logout of the application.	2	Low	DeebakRaajV P S

6.2 SPRINT DELIVERY SCHEDULE

Sprint	Total Story Points	Duration	SprintStart Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	10	6 Days	24 Oct 2022	29 Oct 2022	12	01 Nov 2022
Sprint-2	18	6 Days	31 Oct 2022	05 Nov 2022	16	06 Nov 2022
Sprint-3	16	6 Days	07 Nov 2022	12 Nov 2022	13	13 Nov 2022
Sprint-4	12	6 Days	14 Nov 2022	19 Nov 2022	11	19 Nov 2022

6.3 REPORT FROM JIRA

SPRINT 1

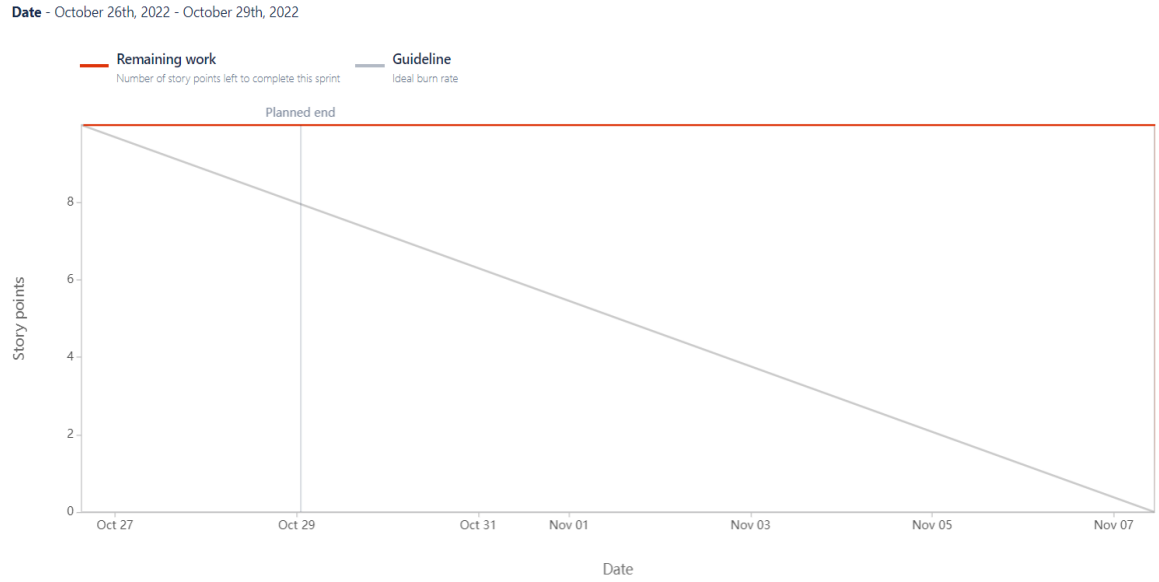


Fig 6.3 (A) Report From Jira

SPRINT 2

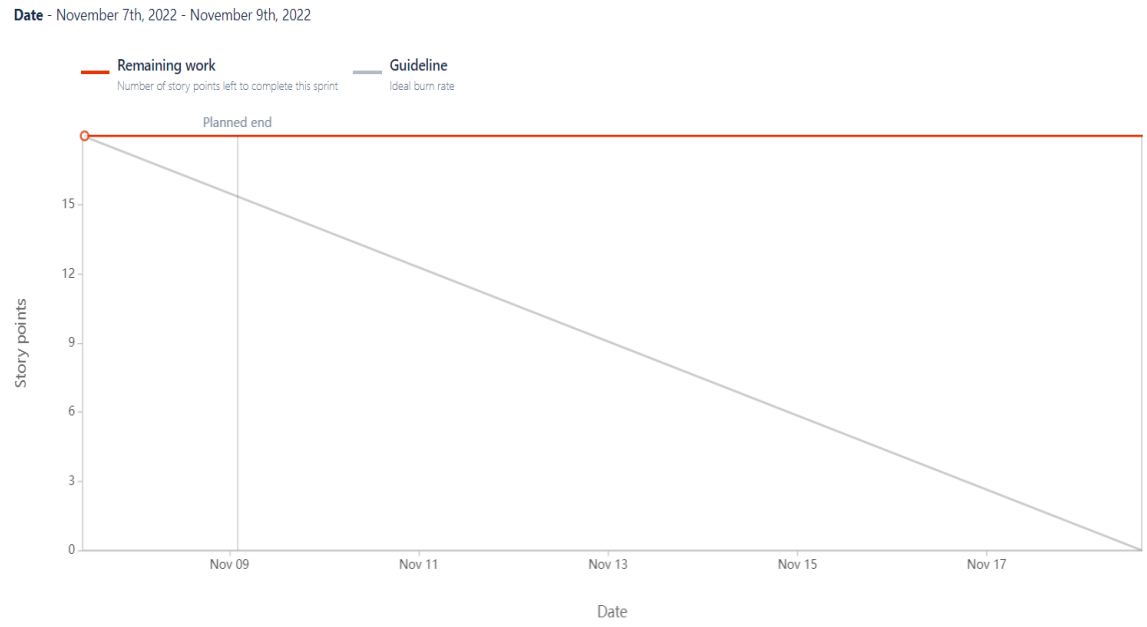


Fig 6.3 (B) Report From Jira

SPRINT 3

Fig 6.3 (C) Report From Jira

SPRINT 4

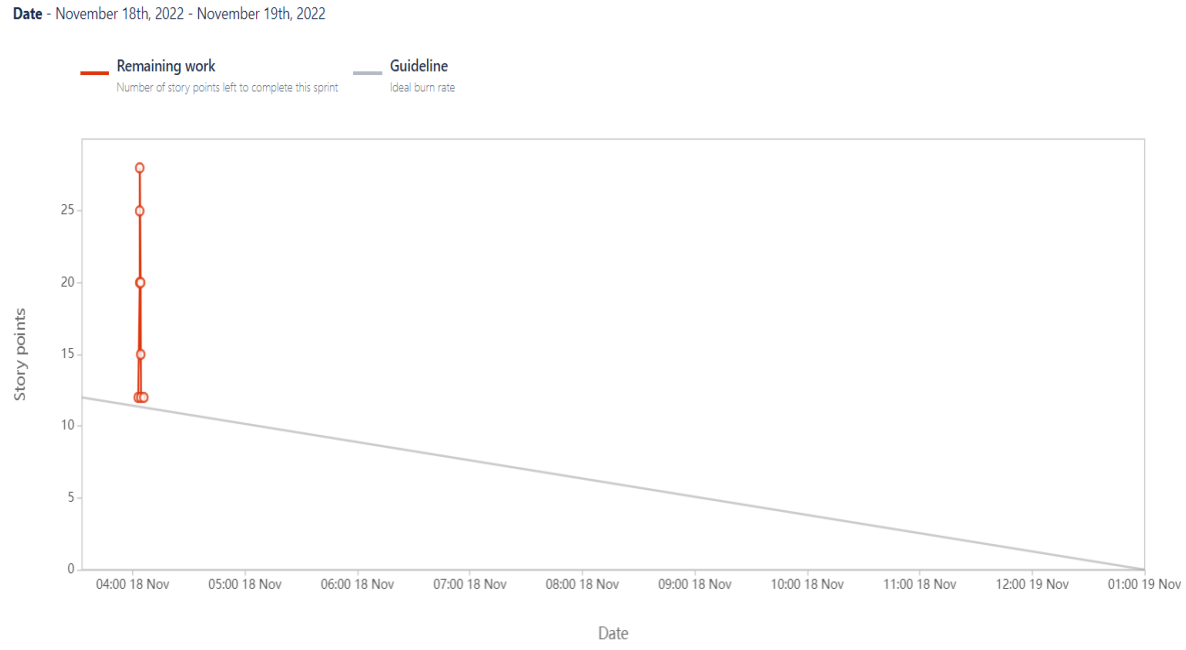


Fig 6.3 (D) Report From Jira

CHAPTER-7
CODING & SOLUTIONING

7.1 FEATURE 1

AI transfroms CCTV cameras into smart cameras. It helps to analyzes the images captured by the CCTV cameras, effectively by seeing through the water and allowing the system to track swimmers to find whether they are drowning.

```
webcam = cv2.VideoCapture(image.filename)
    t0 = time.time()
    centre0 = np.zeros(2)
    isDrowning = False
    while True:
      status, frame = webcam.read()
      if not status:
        print("Could not read frame")
        exit()
      bbox, label, conf = cv.detect_common_objects(frame)
      if(len(bbox)>0):
            bbox0 = bbox[0]
            centre = [0,0]


            centre =[(bbox0[0]+bbox0[2])/2,(bbox0[1]+bbox0[3])/2 ]
            hmov = abs(centre[0]-centre0[0])
            vmov = abs(centre[1]-centre0[1])
            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('bbox: ', bbox, 'centre:', centre, 'centre0:', centre0)
            print('Is he drowning: ', isDrowning)
            centre0 = centre

        out = draw_bbox(frame, bbox, label, conf,isDrowning)
        cv2.imwrite('image.jpg',out)
        if isDrowning:
            playsound('alarm.mp3')
        cv2.imshow("Real-time object detection", out)
        if cv2.waitKey(1) & 0xFF == ord('q'):
            break
    webcam.release()
    cv2.destroyAllWindows()
```

7.1 FEATURE 2

Here the swimmer is detected and the features of images are extracted and image are processed which helps to find the drowning person.

```
if isDrowning:
        playsound('alarm.mp3')
    cv2.imshow("Real-time object detection", out)
```

CHAPTER-8
CODING & SOLUTIONING

8.1 TEST CASES

Test case ID	Component	Test Scenario	Steps To Execute	Expected Result	Test Data	Actual result	Status
PredictionPage_TC_OO1	Prediction Page	Verify user is able to see the Prediction page	1.Click URL and go 2.Click on Register option on the navigation bar 3. After Login into application 4. Verify Prediction page is displayed or not	Prediction Page displayed		Working as expected	Pass
PredictionPage_TC_OO2	Prediction Page	Verify File upload for detection	1.Click URL and go 2.Click on Register option on the navigation bar 3. After Login into application 4.choose a file for detection in prediction page	File upload for detection		Working as expected	Pass

Test case ID	Component	Test Scenario	Steps To Execute	Expected Result	Test Data	Actual result	Status
LoginPage_TC_OO1	Index Page	Verify user is able to see the Login page	1.Click URL and go 2.Click on Login option on the navigation bar 3. Verify login page displayed or not	Login page should display		Working as expected	Pass
LoginPage_TC_OO2	Login page	Verify the UI elements in Login	UI elements: a. email text box b. password text box c. Login button d. new customer? Create account link e. Last password? Forgot password	Application should show below UI elements: a. email text box password text box c. Login button with orange colour d. new customer? Create account link e. Last password? Forgot password		Working as expected	Pass
LoginPage_TC_OO3	Login page	Verify user is able to log into application with Valid credentials	1.Enter URL and click go 2.Click on Login option on the navigation bar 3. Enter Valid email in Email text box 4.Enter valid password in password text box	Login into the prediction page	Email: 2k19cse005@kiot.ac.in password: Ajitha@52	Working as expected	Pass

			5.Click on login button				
LoginPage_TC_004	Login page	Verify user is able to log into application with Invalid credentials	1.Enter URL and click go 2. Click on Login option on the navigation bar 3.Enter Invalid password or email 5.Click on login button	Application should show 'Invalid email or password ' validation message.	Email: 2k19cse005@kiot.ac.in password: Ajitha#12	Working as expected	Pass

Test case ID	Component	Test Scenario	Steps To Execute	Expected Result	Test Data	Actual result	Status
RegisterPage_TC_OO1	Index Page	Verify user is able to see the Register page	1.Click URL and go 2.Click on Register option on the navigation bar 3. Verify Register page displayed or not	Register page displayed		Working as expected	Pass
RegisterPage_TC_OO2	Register page	Verify the UI elements in Regsiter	UI elements: a. email text box b. password text box c. Username d. Register button e. already have an account? Login	Application should show below UI elements: a. email text box b. password text box c. Username d. Register button e. already have an account? Login		Working as expected	Pass

RegisterPage_TC_OO3	Register page	If user don't have an account? Register User has able to register	1.Enter URL and click go 2.Click on Register option on the navigation bar 3. Enter Username 4. Enter Valid email in email text box 5.Enter valid password in password text box 6. Re-enter the password for confirmation 7.Click on Register button	Application should show 'Registration Successfully please login using your details' validation message.	Email: 2k19cse005@kiot.ac.in password: Ajitha@52	Working as expected	Pass
LoginPage_TC_004	Register page	If user have an account?	1.Enter URL and click go 2.Click on Register option on the navigation bar 3. Enter Username 4. Enter Valid email in email text box 5.Enter valid password in password text box 6. Re-enter the password for confirmation 7.Click on Register button	Application should show ' Already a member please login using your details' validation message.	Email: 2k19cse005@kiot.ac.in password: Ajitha#12	Working as expected	Pass

Test case ID	Component	Test Scenario	Steps To Execute	Expected Result	Test Data	Actual result	Status
LogoutPage_TC_OO1	Prediction Page	Verify user is able to see the Prediction page	1.Click URL and go 2.Click on Register option on the navigation bar 3. After Login into application 4. prediction page displayed 5. In prediction page, click the logout option in navigation bar 6. Verify logout page displayed or not	Logout page displayed		Working as expected	

8.2 User Acceptance Testing

1 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).

1 Defect Analysis

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

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
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

2 Test Case Analysis

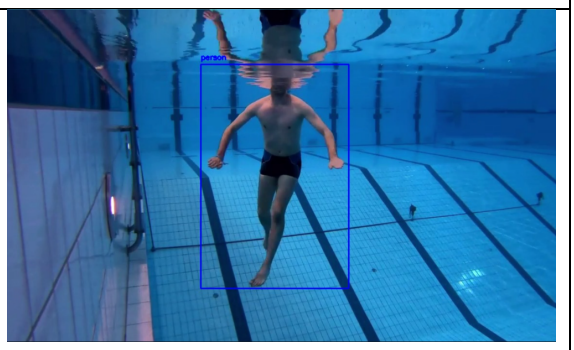
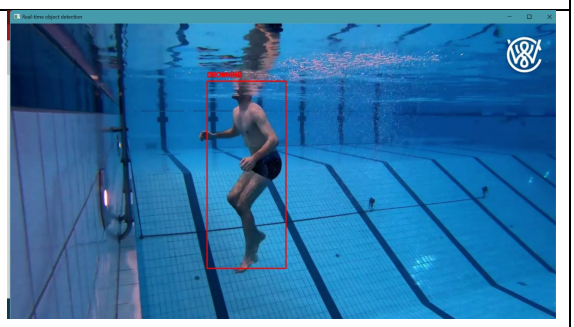
This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Security	2	0	0	2
Outsource Shipping	3	0	0	3

Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

CHAPTER-9
RESULTS

9.1 Performance Metrics

S.No.	Parameter	Values	Screenshot
1	Accuracy Score	Drowning Detected- NO Accuracy Score - 73	
2	Accuracy Score	Drowning Detected- YES Accuracy Score - 73	

CHAPTER-10
ADVANTAGES AND DISADVANTAGES

ADVANTAGES

The system consists of a Raspberry Pi with the Raspbian operating system, a Pixy camera, an Arduino Nano board, stepper motors, an alarm system, and motor drivers. The proposed system is based on the color-based algorithm to position and rescue swimmers who are drowning. The device then sends an alarm to the lifeguards. To verify the performance of the proposed system, a prototype has been developed, implemented, and tested. The results from experiments indicate that the system has a unique capability to monitor and track swimmers, thereby enabling it to mitigate and curb the number of deaths by drowning

DISADVANTAGES

Our model will give lesser results while the video is less in quality. Also we cannot detect drowning in a crowded area. This model is less efficient in low light. This model is only applicable for swimming pools not for rivers and lakes.

CHAPTER-11
CONCLUSION

This promotes the people to learn swimming without any fear. It also prevents many accidental deaths. By using this algorithm, we can predict the drowning person accurately.The system will be implemented in Python and use the opencv for object detection , playsound for alarm. We used Flask framework in our backend for better results. The accuracy score of our model is 73%.

CHAPTER-12
FUTURE SCOPE

The speed of the AI can be increased by increasing the speed of the detection. YOLO v3 can detect upto 80 objects, we can increase the number of objects by training the algorithm for detecting more objects. The accuracy of the model can be increased by improving the YOLO v3 algorithm.We can train the algorithm for detecting multiple swimmers at a time.

CHAPTER-13
APPENDIX

13.1 SOURCE CODE

```
import cvlib as cv
from cvlib.object_detection import draw_bbox
import cv2 , time
import numpy as np
from playsound import playsound
from flask import Flask , render_template , request , redirect,url_for
from cloudant.client import Cloudant

app=Flask(__name__)
client = Cloudant.iam("1fab0e8d-d938-42eb-b57d-421eccb4ed8e-bluemix" ,
"xSZm4--d0FbxVsGtFtbnAoC1nrl3SnnZ_tjD0voMQ21C" , connect = True)
my_database = client.create_database('my_database')

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

@app.route("/register" , methods = ['GET' , 'POST'])
def register():
    if request.method == "POST":
        x = [x for x in request.form.values()]
        data = {
```

```
            'email':x[0] ,
            'password':x[1]
        }
        query = {'data' : {'$eq' : data}}
        docs = my_database.get_query_result(query)
        print(len(docs.all()))
        if(len(docs.all()) == 0):
            url = my_database.create_document(data)
            return render_template('login.html')
    return render_template('register.html')

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

@app.route('/afterlogin', methods=['POST'])
def afterlogin():
    user = request.form['username']
    passw = request.form['pass']
    print(user, passw)
    query = {'email': {'$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]['email'] and passw == docs[0][0]['password'])):
            return redirect("/prediction")
        else:
            return render_template('login.html', pred="Invalid email or password")


@app.route("/prediction" , methods = ['GET' , 'POST'])
def predict():
    if request.method == 'POST':
        image = request.files['file']
        webcam = cv2.VideoCapture(image.filename)
        t0 = time.time()
        centre0 = np.zeros(2)
        isDrowning = False
        while True:
            status, frame = webcam.read()
            if not status:
                print("Could not read frame")
                exit()
            bbox, label, conf = cv.detect_common_objects(frame)
            if(len(bbox)>0):
                    bbox0 = bbox[0]
                    centre = [0,0]
                    centre =[(bbox0[0]+bbox0[2])/2,(bbox0[1]+bbox0[3])/2 ]
```

```
        hmov = abs(centre[0]-centre0[0])
        vmov = abs(centre[1]-centre0[1])
        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('bbox: ', bbox, 'centre:', centre, 'centre0:', centre0)
        print('Is he drowning: ', isDrowning)
        centre0 = centre
out = draw_bbox(frame, bbox, label, conf,isDrowning)
cv2.imwrite('image.jpg',out)

if isDrowning:
    playsound('alarm.mp3')

cv2.imshow("Real-time object detection", out)
if cv2.waitKey(1) & 0xFF == ord('q'):
    break
```

```
        webcam.release()
        cv2.destroyAllWindows()
    return render_template('prediction.html')


if __name__=="__main__":
   app.run(debug=True)
```

13.2 GITHUB & PROJECT DEMO LINK

Github link : https://github.com/IBM-EPBL/IBM-Project-18743-1659689161

Demo Link : https://www.youtube.com/embed/Z4SANL4fk50

CHAPTER-14
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