Project Design Phase-I
Ideation

Date	3 OCTOBER 2022
Team ID	PNT2022TMID18501
Project Name	Virtual eye – lifeguard for swimming pools for active drowning
Maximum Marks	**2 Marks**

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

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

VIRTUAL EYE

Brainstorm & idea prioritization

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

Ground Rules

- Be Creative
- Rule out every possible ideas and improvements
- Make your points clear and purposeful
- Don't hesitate. (Every point is noteworthy)
- Arguments are good ALA it lands beneficial
- Have various perspectives towards the problem

Team

- Sai priyan J K
- Pavinesh
- Raja Vigneshpherumal
- Shai Dharshan

1 Choose your best "How Might We" Questions

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

10 minutes

QUESTION 1
How might we detect and differentiate active drowning with the least possible error rate?

QUESTION 2
How might we automate the alert systems so as to provide crutial stats and info to the rescue team ?

QUESTION 3
How might we optimize the detection algorithm to yield results in the least time?

QUESTION 4
How might we bring more privacy, yet use camera for detection?

QUESTION 5
How might we optimally use minimal hardware to get the most accurate information in an around the environment?

2 Brainstorm solo

Have each participant begin in the "solo brainstorm space" by silently brainstorming ideas and placing them into the template. This "silent-storming" avoids group-think and creates an inclusive environment for introverts and extroverts alike. Set a time limit. Encourage people to go for quantity.

10 minutes

Sai Priyan J K

- High level testing must be carried out before real world deployment.
- Proper hyperparameters must be found for the model
- Systematic and Efficient algorithms to be followed
- Requires HD cameras for good quality frames to be processed
- Underwater cameras a possible solution to detect humans under deep water
- 24/7 Power supply is must for the system to run & report
- Provide critical and proper message to the rescue team
- Make sure the stakeholders know, how the system works.
- Make sure the stakeholders understand that there is a possiblity for a false alarm as well

Pavinesh

- optimized feed transfer to achieve live realay will less BW to get the classifiable video of underwater footage
- able to process absolute drowning and also alrerting the rescue team of passive possibilities as a probable instance
- setup an ACS and suggestive ways to ensure the information reaches in one or more ways as this deals with critical life saving situation
- ensuring ways where there is a 100% gaurentee of spotting a drowning situations and placing multiple cameras strategically to achive results in unpredictable situations
- 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
- having an integration with fitness band companies to get vital stats of a swimmer to have better information and predict possabilities of a drowning incident
- having retro reflective indicators given to childeren and newbies and teaching them signals to make the drowning detection easy
- having considered the metrics and variance of different age groups and also different swimming environments both controlled and liesure

Raja Vignesh Pherumal

- 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?
- Will the system detect properly if the pool is clumsy?
- System should detect multiple drowning and should report the same
- For privacy purpose the video stream should not be stored.
- The system shouldnt annoy others
- cameras can be mounted on the bottom of floating boards for large swimming pools.

Shai dhashan

- power backup should be there in case of powercut.
- The network connectivity should be good for faster alert trasmission.
- cameras should be maintained properly for good results
- What happens if animals were encountered in the pool?
- When more people are drowning there will be a problem to detect all so multiple cameras are needed to eliminate such problems.
- Use powerful algorithm to get trained from various datasets.
- AI should be trained in such a way that it should detect multiple drowning

3 Brainstorm as a group

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

TIP
You can use the **Voting session** tool above to focus on the strongest ideas.

15 minutes

Privacy

- ensuring the video feed is not being recorded or saved instead being used only for detection which is later discarded
- For privacy purpose the video stream should not be stored.

Features

- having retro reflective indicators given to children and newbies and teaching them signals to make the drowning detection easy
- having an integration with fitness band companies to get vital stats of a swimmer to have better information and predict possabilities of a drowning incident
- When more people are drowning there will be a problem to detect all so multiple cameras are needed to eliminate such problems.
- Will the system detect properly if the pool is clumsy?

User Perspective

- Make sure the stakeholders know, how the system works and understand the possibility for system work.
- The system should not annoy the swimmers
- Make sure the stakeholders understand that there is a possiblity for a false alarm as well

Cameras & Hardwares

- cameras should be maintained properly for good results
- Cameras should be mounted on Underwater and bottom of floating boards for detecting drowning effectively especially on large swimming pools.
- System should detect multiple drowning and should report the same

Network and Connectivity

- The network connectivity should be good for faster alert trasmission.
- optimized feed transfer to achieve live realay will less BW to get the classifiable video of underwater footage

Power

- 24/7 Power supply and power backup must for the system to run & report proper alerts to rescue team.
- using alternative source of energy such as solar to make a green system but making sure to always have backup supply
- power backup should be there in case of powercut.

AI and ML

- Proper hyperparameters must be found for the model
- able to process absolute drowning and also alrerting the rescue team of passive possibilities as a probable instance
- The AI should be trained with more samples for better results
- AI should be trained in such a way that it should detect multiple drowning
- High level testing must be carried out before real world deployment.

4 Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

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

Feasibility — Regardless of their importance, which tasks are more feasible than others? (Cost, time, effort, complexity, etc.)

- 1. Input devices 2. Alerting systems 3. Backup and ACS
- 1. Achieving all features
- 1. Model and Dataset 2. Privacy 3. Renewable Backup 4. Connectivity
- 1. Cameras in floating boats
- 1. User perspective 2. Guidelines

5 Decide your focus

Give each person two icons to vote which idea should your team focus on & assign the duties & responsibilities

5 minutes

Kishore Kumar Backend and Intergration	**Barani** Backend and MLA
Karthika Frontend and Design	**Babhu Ganesh** and Utils

Whats 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.