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Drowning Detection System Using CNN

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ABSTRACT: Drowning Detection in dynamic swimming environment is a challenging problem in computer vision, for which no satisfiable solutions have been found. Currently known methods primarily rely on background subtraction-based techniques; however, random motion caused by water rippling, splashing, and moving object and reflections frequently result in interface and inaccuracies. In this work, an alternative for real time drowning detection solution for real time developed by using deep learning technology. 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. Human detect by various algorithm and detect behaviour of object that already set by us. If the swimmer or object get difficulty then the system detect it by motion and gets alert and save the swimmer's life.

KEYWORDS: Drowning Detection, Object, Alert

I. INTRODUCTION

The term drowning detection system is used to describe various electronic system. Safety in a water has a main concern in many centuries for survival of human life. The latest technology advancement have enables to come up with effective drowning detection methods. 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.

By using this logic we are getting up to 85% accuracy with 480p video quality and minimum spaces and with higher video quality and processing power we are getting up to >90% accuracy.

II. LITERATURE REVIEW

On existing system there are two similar system created but these systems useful when the swimmer goes die or goes down on the surface. The existing system is more costly as well as they need large appliances, but in our system we used small appliances as well as it is more friendly for environment. The system is useful before swimmer gets difficulty in water. Existing system is only used in reached country on only on swimming pool the space is allocated for these is too small area, but in these newer version we used any ware in open surface for example river, sea.

III. SYSTEM DESIGN

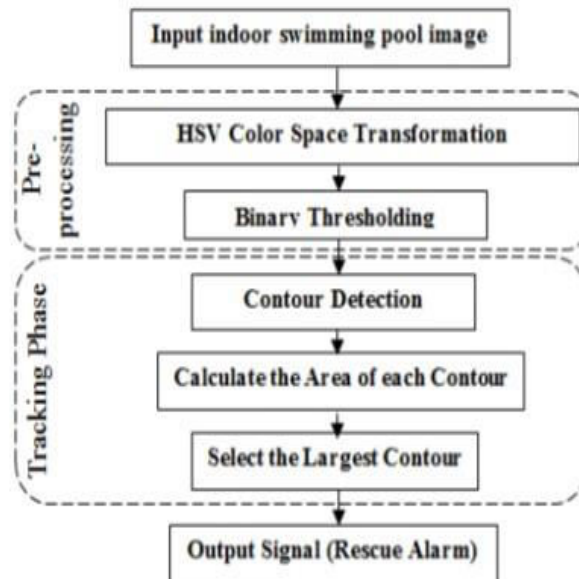


Figure.1. Block diagram for Drowning Detection System

IV. FLOWCHART

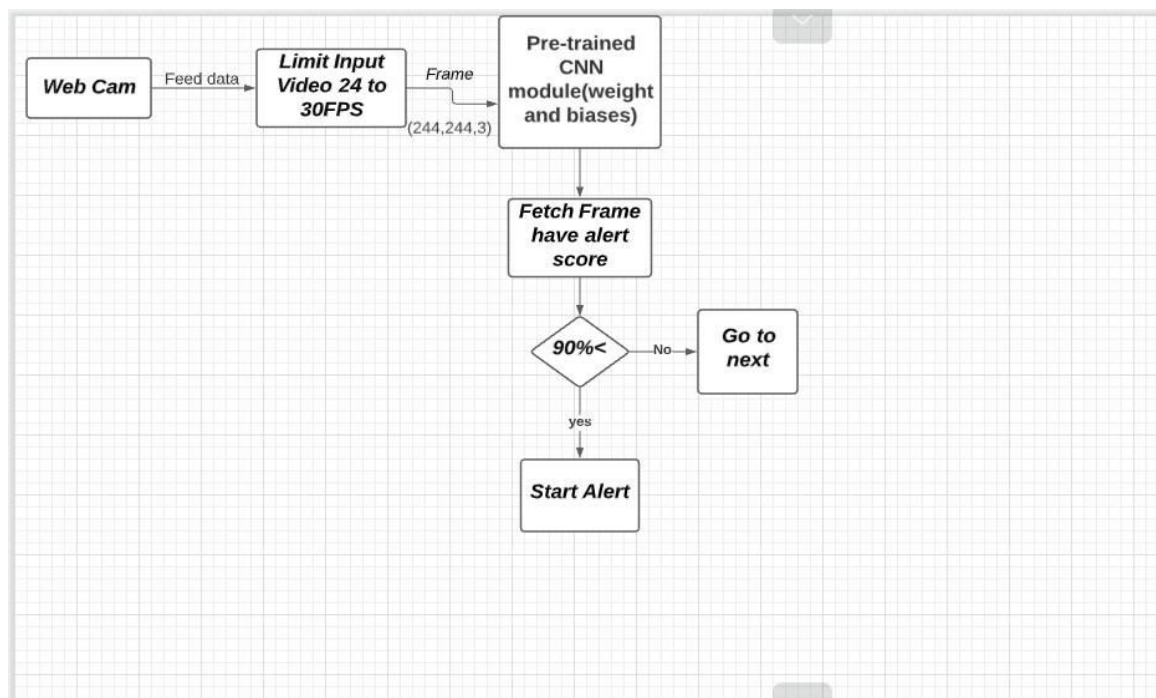
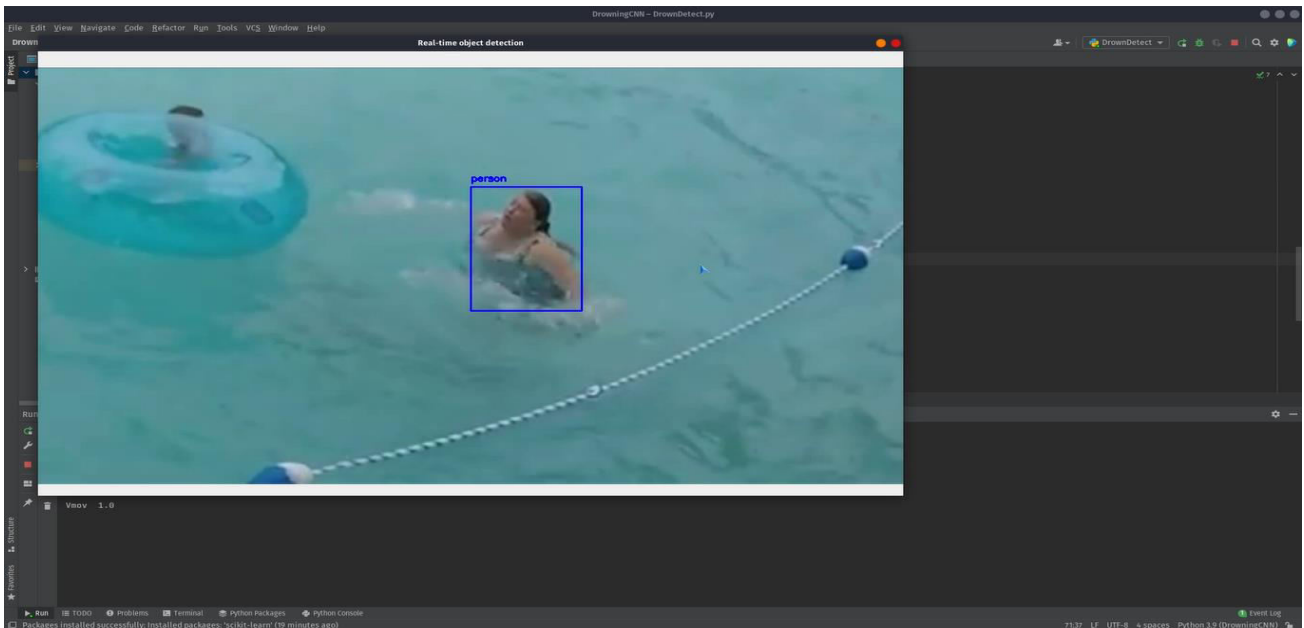


Figure.2. Flow Diagram for Drowning Detection System

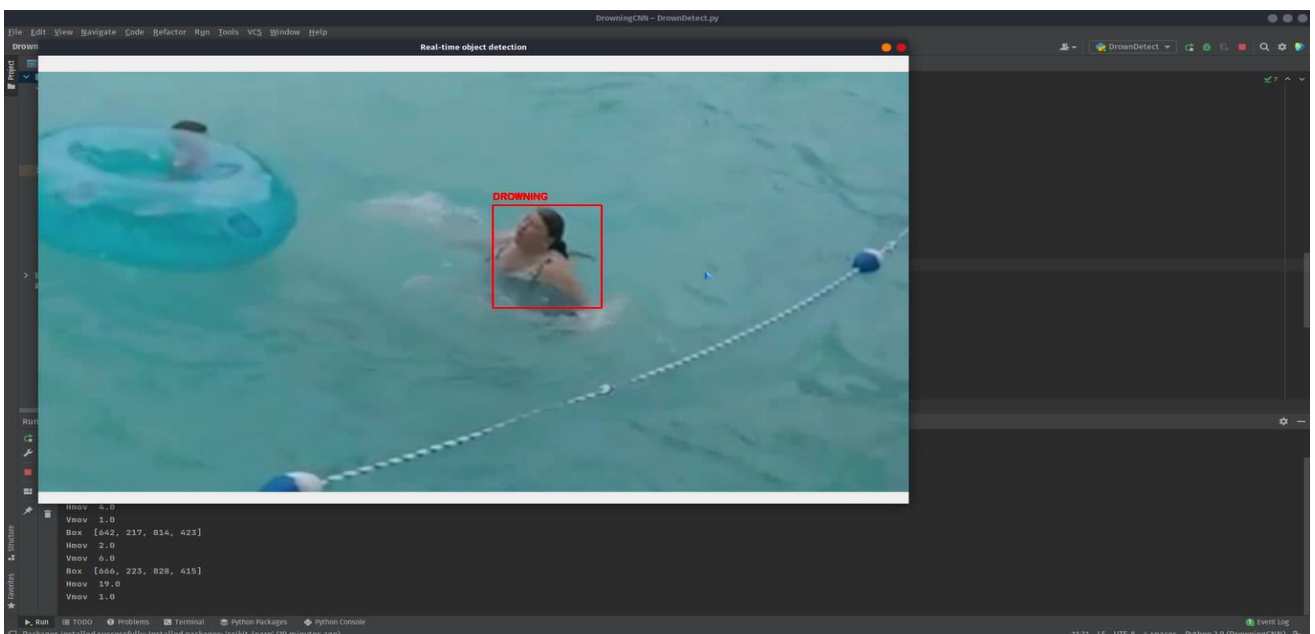
CONCEPT OF THE SYSTEM

First we get input that is our photos for example swimmer swim in swimming pool then camera take the picture on process of video processing. This video processing will capture the image. This images send to the Convolution Neural Network (CNN), then Convolution Neural Network (CNN) check if fattle is occurred then alarm, if fattle is not occurred then continue for the input process.

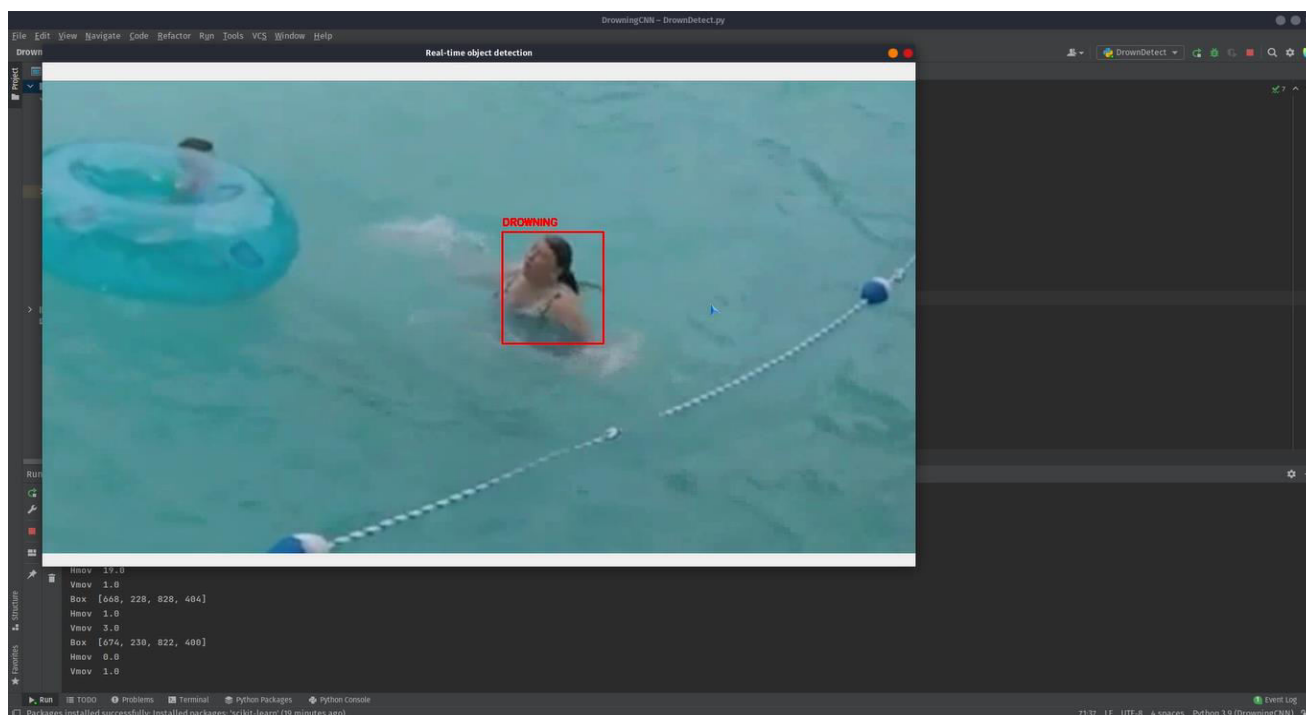
V. IMPLEMENTATION



Result 1:



Result 2:



Result 3:

This project uses CNN Architecture to classify different objects with their dimensions (In general Height and width of the object), so we detect human from the video frame, then we calculate height and width of that object/human. To check if human in that box is drowning or not, we check the center of the box and the position of the box (vertical and horizontal.) By this calculation we get idea about the state of the human that is let's consider following scenario:

1st. Human is swimming then box will be horizontal (Width will be more than height) and center will be below water level. Here AI will determine that human is swimming and not drowning (In this case Not).

2nd. Human is trying to swim then box will be most likely vertical as panic, human tries to keep head up from the water level. Also center will be too below water level thus AI will indicate that human is drowning.

RESULTS :

We are getting upto 85% accuracy with 480p video quality and minimum specs and with a higher video quality and processing power we are getting upto >90 accuracy.

VI. CONCLUSION

The system has been tested on several instances of simulated water conditions such as water reflection, lightning condition and false alarms. Our algorithm was able to detect all the drowning condition along with the exact position of the drowning person to the swimming pool. Our results show that the proposed method can be used as a reliable multimedia video-based surveillance system.

VII. ACKNOWLEDGMENT

Report is on the topic: **“Drowning detection System”** All the Relevant and essential details are included in the paper. At the beginning we have given the summarized details of the project which we are building and we have also provided details about how the project is going to be implemented and which technologies we are going to use to develop this project.

We are thankful to **Prof. Mr. Amar Palvankar** who guides us and helps in preparing the paper. We thank him for providing us the confidence and most importantly giving us the track regarding the project topic whenever we needed it.



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