High Level Architecture for Social Distancing Detection

Document Version Control

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Abstract

Social distancing detection using deep learning to evaluate the distance between people to mitigate the impact of this coronavirus pandemic. The detection tool was developed to alert people to maintain a safe distance with each other by evaluating a video feed. The a video frame from the camera was used as input, and yolov5 is used to detect the person available in the frame. If more than one person is identified in a frame, their centroid will be calculated. If they are close , frames will be marked as red , otherwise it will be green

1. Introduction

1.1 Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

The HLD
will:
- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project
- List and describe the non-functional attributes like:
  - Security
  - Reliability
  - Maintainability
  - Portability

- Reusability
- Application
- compatibility
- Resource
- utilization
- Serviceability

1.2 Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

1.3 Definitions

Term	Description
Database	Collection of all the information monitored by this system
IDE	Integrated Development Environment
AWS	Amazon web service
YoloV5	Pretrained model to detect the object

2. General Description

2.1 Problem Statements

Social distancing detection using deep learning to evaluate the distance between people to mitigate the impact of this coronavirus pandemic. The detection tool was developed to alert people to maintain a safe distance with each other by evaluating a video feed.

2.2 Proposed Solutions

In the proposed solution, We shall be using a camera to feed the frames. These frame shall be extracted using OpenCV. Once we receive the frame, We shall be using YoloV5 to check if the object is available or not. If more than two persons are available in a single frame, We should detect them and we will calculate the centroid of these two persons.

Once we have the centroid, we shall calculate the distance between them. If the distance between them is more than a configured value we shall be drawing a green bounding box. Otherwise we shall be showing the red bounding box.

2.3 Further Improvements

Application can be further improved to show the distance between the persons in UI .
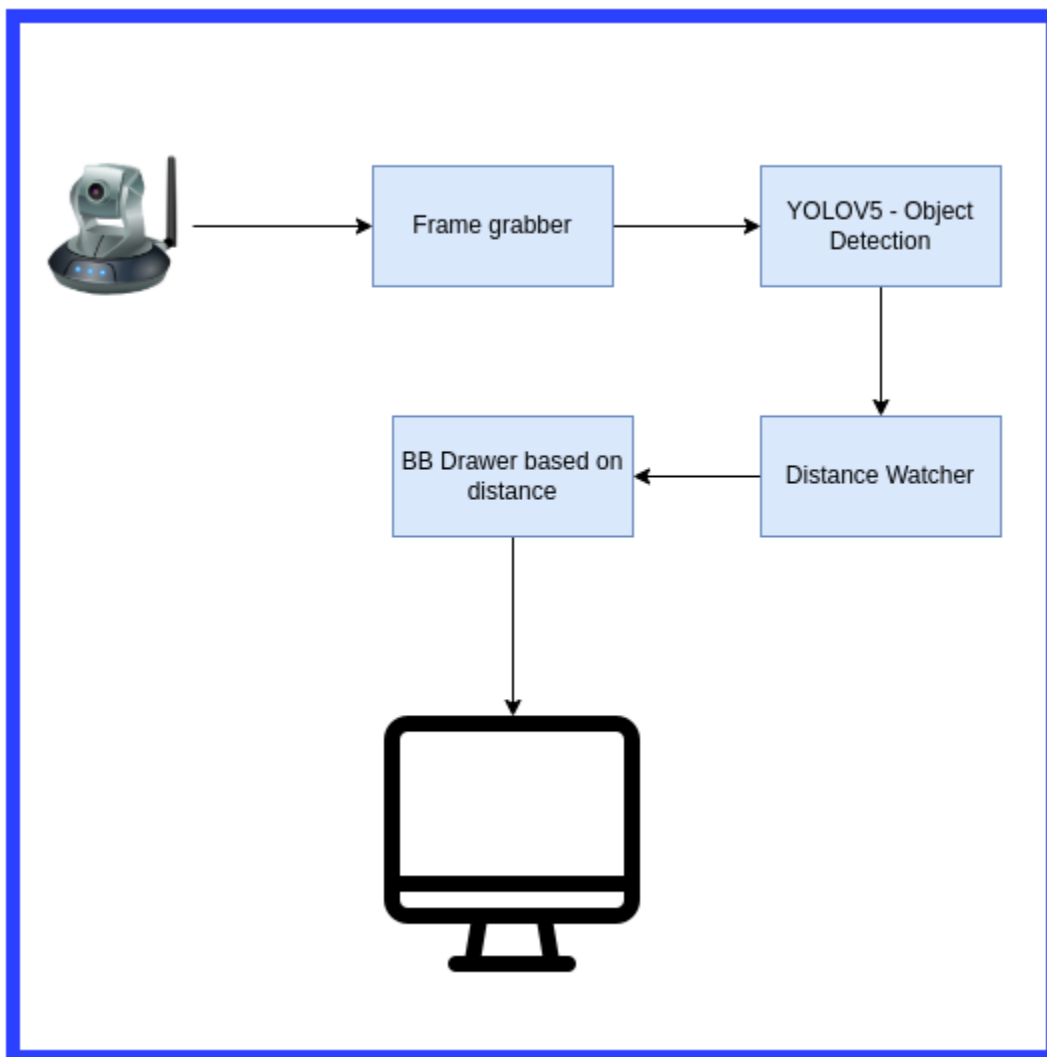
2.3 Technical Requirements

2.4 Tools Used
- Python
- Django

- Django Rest framework
- Opencv
- Numpy
- Pandas
- Yolov5
- Pytorch
- HTML

3.Design Details

3.1 Process Flow

3.2 Event log

We are using Django default log to log the details

Conclusion

Designed application will able to use to detect social distance