High-Level Design (HLD)

1. Objective:

To develop a system that captures video frames, detects people using YOLOv3, and checks the distance between detected people. It visually marks bounding boxes in red if the distance is below a threshold and green if above.

2. System Architecture:

- **Input:**
  - Video stream from a camera or video file.
- **Processing:**
  - YOLOv3 for object detection.
  - Calculation of distances between detected people.
- **Output:**
  - Annotated video frames showing bounding boxes in red or green based on distance.

3. Components:

- **Video Capture:**
  - Captures frames from a camera or video file.
- **YOLOv3 Object Detection:**
  - Detects objects in each frame.
- **Distance Calculation:**
  - Calculates distances between detected people.
- **Annotation:**
  - Draws bounding boxes on the frame based on distance.
- **Display:**
  - Shows the annotated frames in real-time.

4. Flow Diagram:

- **Step 1:** Initialize video capture.
- **Step 2:** Load YOLOv3 model.
- **Step 3:** For each frame:
  - Capture frame.
  - Perform object detection.
  - Calculate distances between detected people.
  - Annotate frame.
  - Display annotated frame.
- **Step 4:** On termination, release resources.