VISHNU
UNIVERSAL LEARNING

B V RAJU INSTITUTE OF TECHNOLOGY

(UGC Autonomous)
Vishnupur, Narsapur, Medak District

Department of Computer Science and Engineering

Mini Project – First Review (2022 Batch)

Title : REAL TIME THINGS IDENTIFICATION USING YOLOv8 AND FLASK

By:

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Outline

- Overview of 0th Review
- Recommendations & Suggestions by panel member in 0th Review.
- Proposed System Architecture diagram
- Proposed Flow diagram (Flow Chart, which you kept in the proposal document)
- Proposed Data Flow diagram
- Proposed List of Modules
- Proposed Algorithm Working Steps.
- UML Diagrams (Use Case, Class Diagram, Sequence Diagram, Activity Diagram)
- Expected Results in the Proposed Model.

Overview of 0th Review

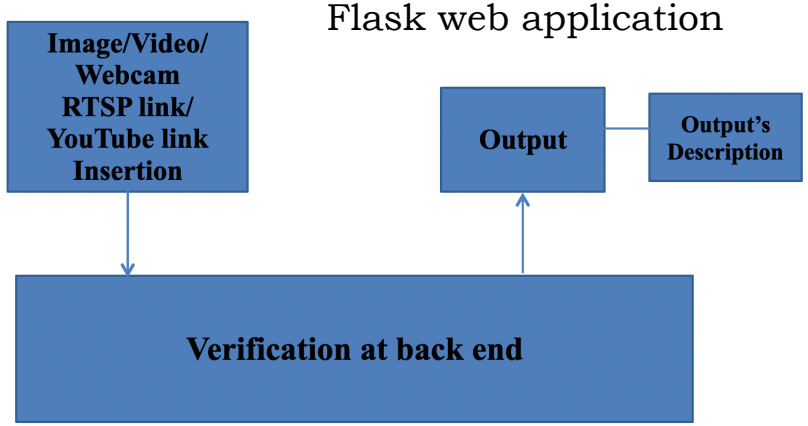
- **Short points about topics presented in 0th review.**

1. Project Overview – A web-based real-time object detection platform using YOLOv8 and Flask, supporting images, videos, and live streams with user-friendly customization options.
2. Problem Statement – Existing object detection systems are either too complex or expensive; this project aims to provide an accessible, real-time, and customizable solution.
3. Objectives – Develop an intuitive web app with real-time object detection and pose estimation, allowing users to adjust parameters and process multiple media formats.
4. Proposed Model – Features real-time processing, bounding box overlays, customization settings, and a simple UI for uploading media and tuning detection accuracy.
5. Applications – Can be used in security, robotics, surveillance, and augmented reality, providing an efficient and scalable solution for various real-world detection tasks.

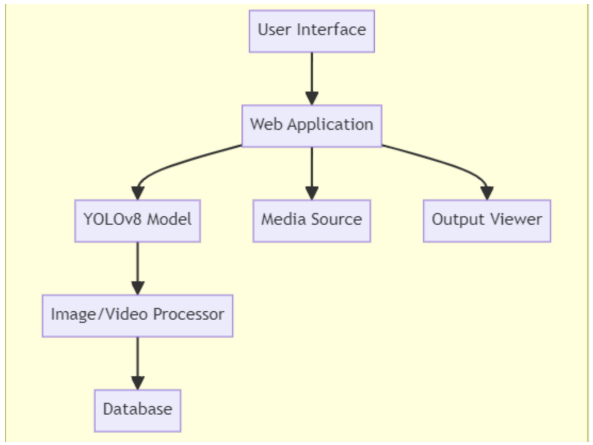
S.NO	Recommendations & Suggestions given by panel	Changes made by member as per suggestions
1	Study base paper thoroughly	selected and Studied the recent published base paper
2	Learn models related to your project	Researched about how yolov8 object detection is possible
3	Comparison about the present proposed model and existing models	YOLOv8 is better than YOLOv7 because it offers improved accuracy across various model sizes, faster detection speeds, a more flexible architecture

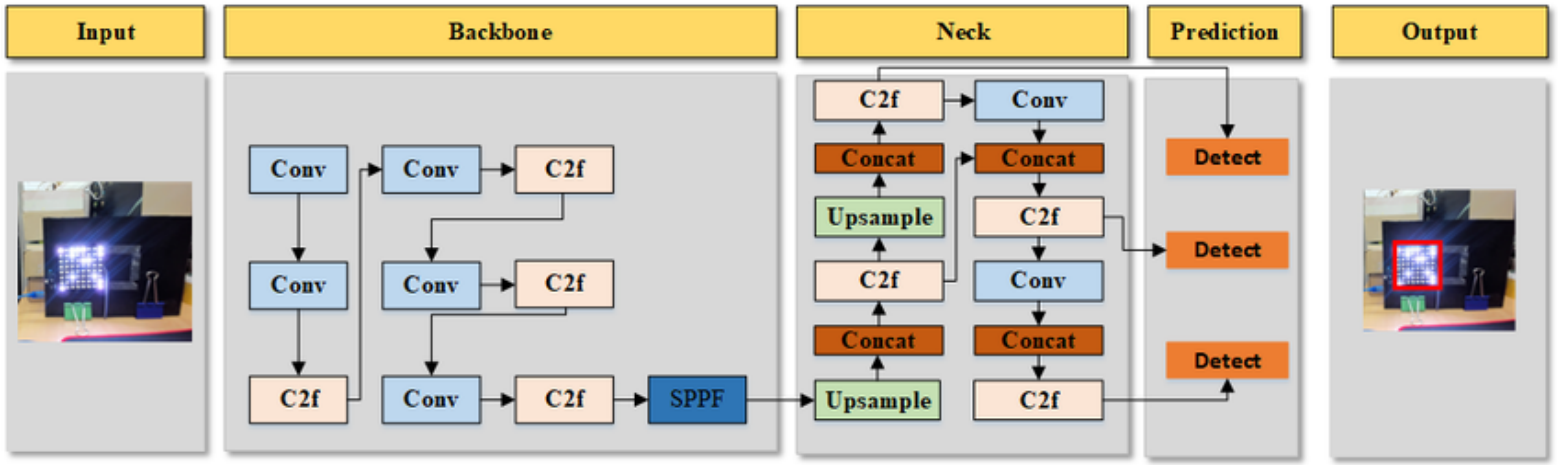
Proposed Architecture diagram

Flask web application



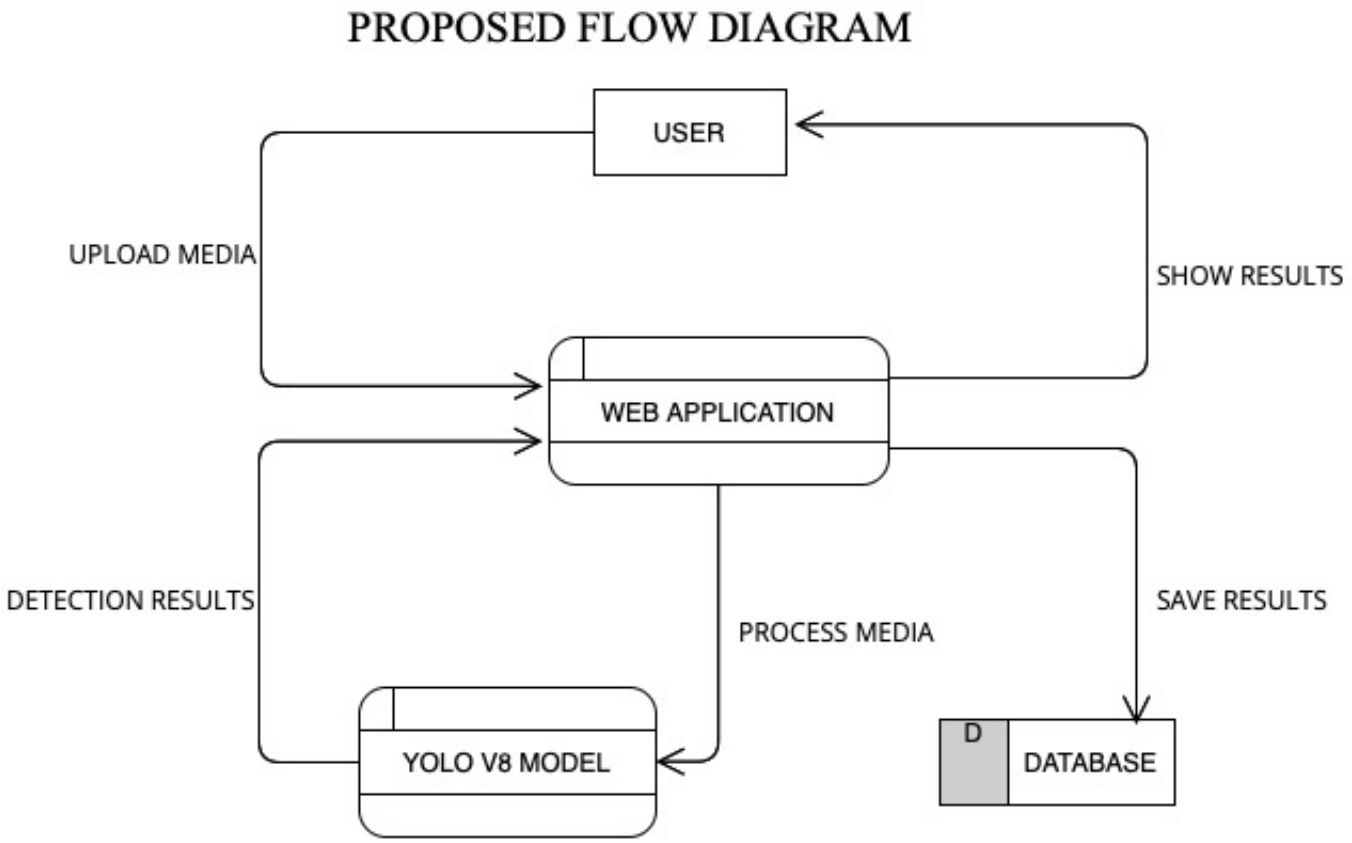
Proposed system architecture



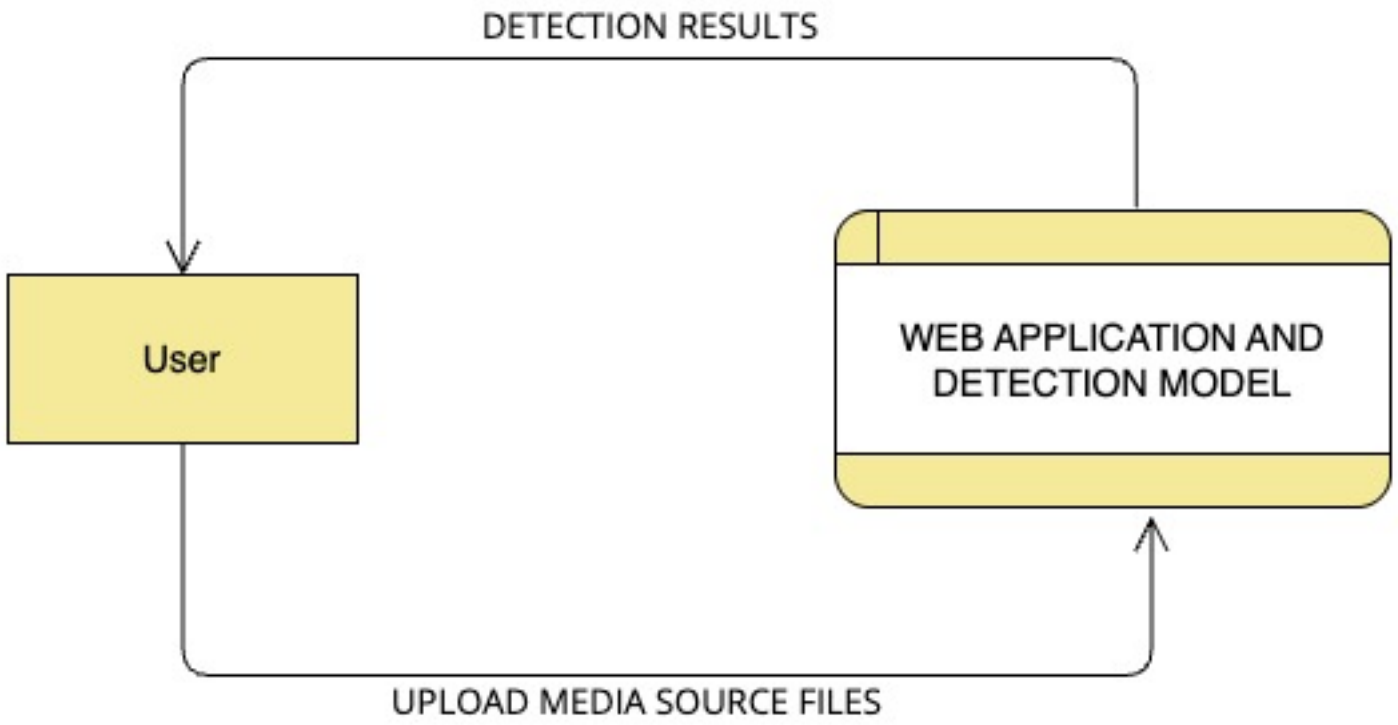


YOLO v8 architecture

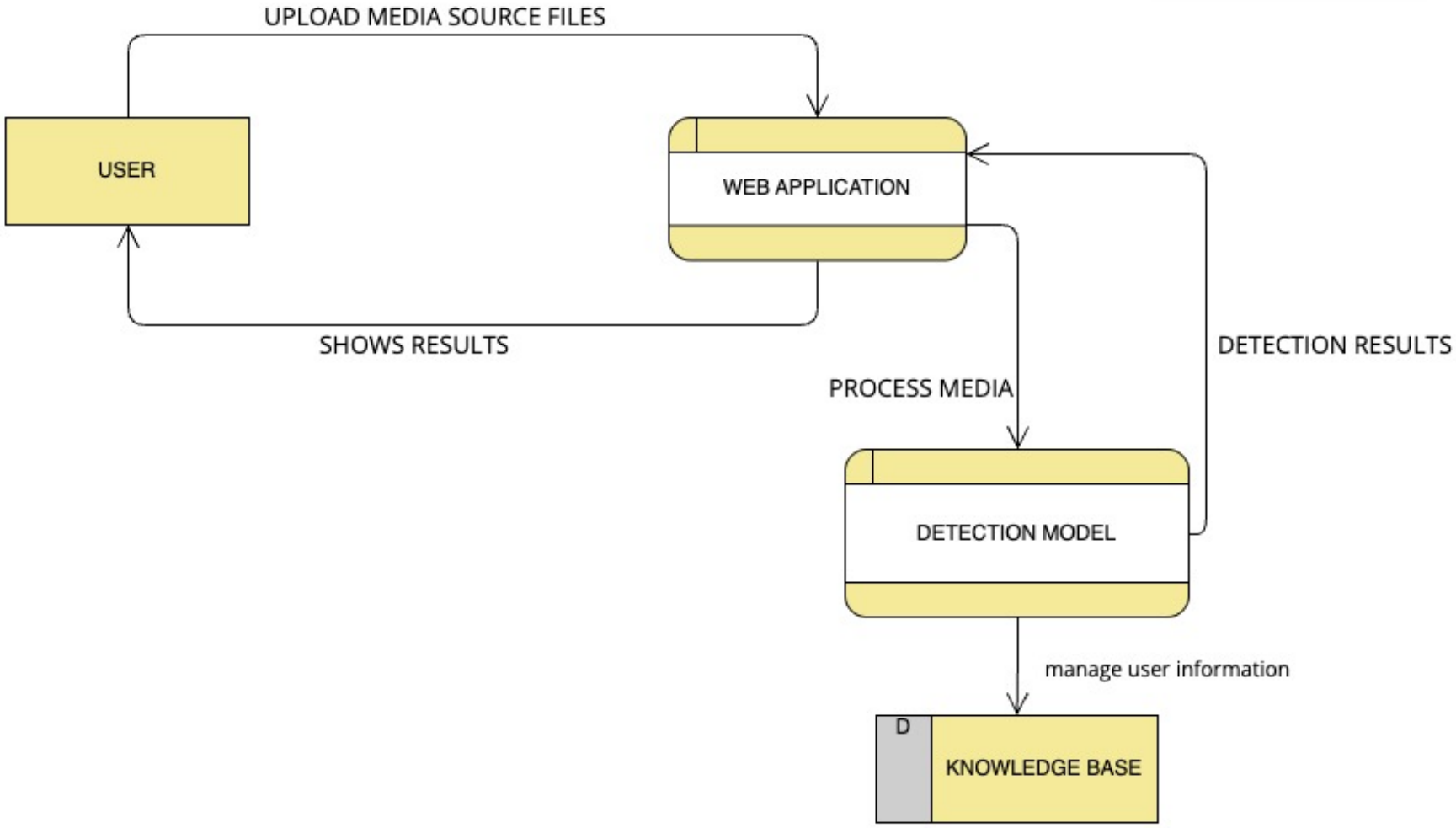
Proposed Flow diagram



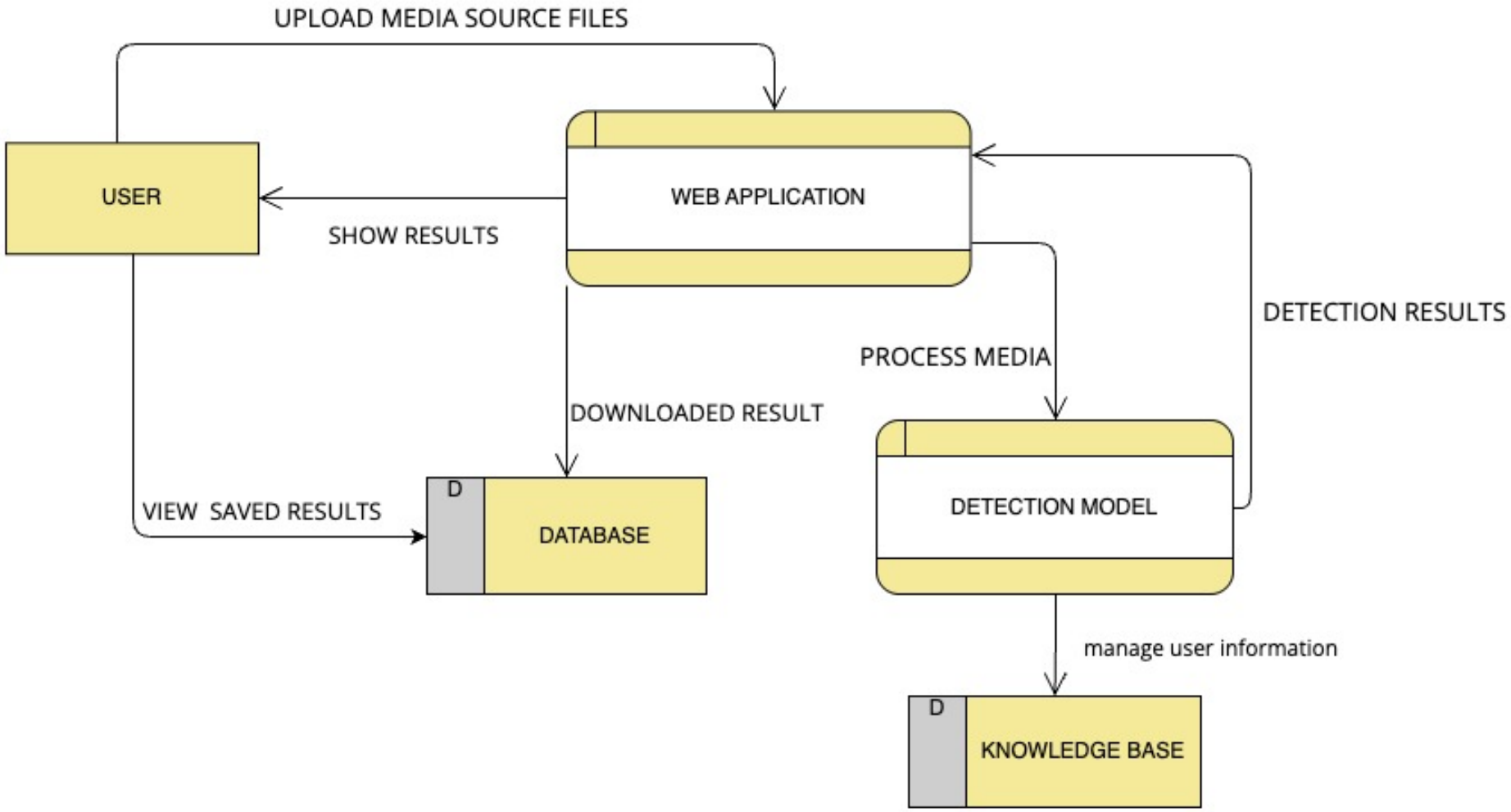
Data Flow Diagram(Level 0)



Data Flow Diagram(Level-1)



Data Flow Diagram(Level-2)



Proposed List of Modules

1. **User Interface Module:** This module handles the interaction between the user and the system. It provides a user-friendly interface for uploading images, videos, or specifying video sources (e.g., YouTube, RTSP, webcam)

2. **Media Processing Module:** This module is responsible for preprocessing the uploaded media (images, videos, or live streams) before passing it to the YOLOv8 model.

3. **YOLOv8 Model Integration Module:** This module integrates the YOLOv8 model into the system for object detection, image classification, and human pose estimation.

4. **Detection and Pose Estimation Module:** This module processes the output from the YOLOv8 model and overlays the detection results (bounding boxes, skeletons) on the input media.

5. **Database Module:** This module stores processed data, results, and user information for future retrieval and analysis.

6. **Web Application Framework Module:** This module manages the overall web application using flask, including routing, media processing, and interfacing with the YOLOv8 model.

7. **Security and Privacy Module:**This module ensures the security and privacy of user-uploaded media and detection results.

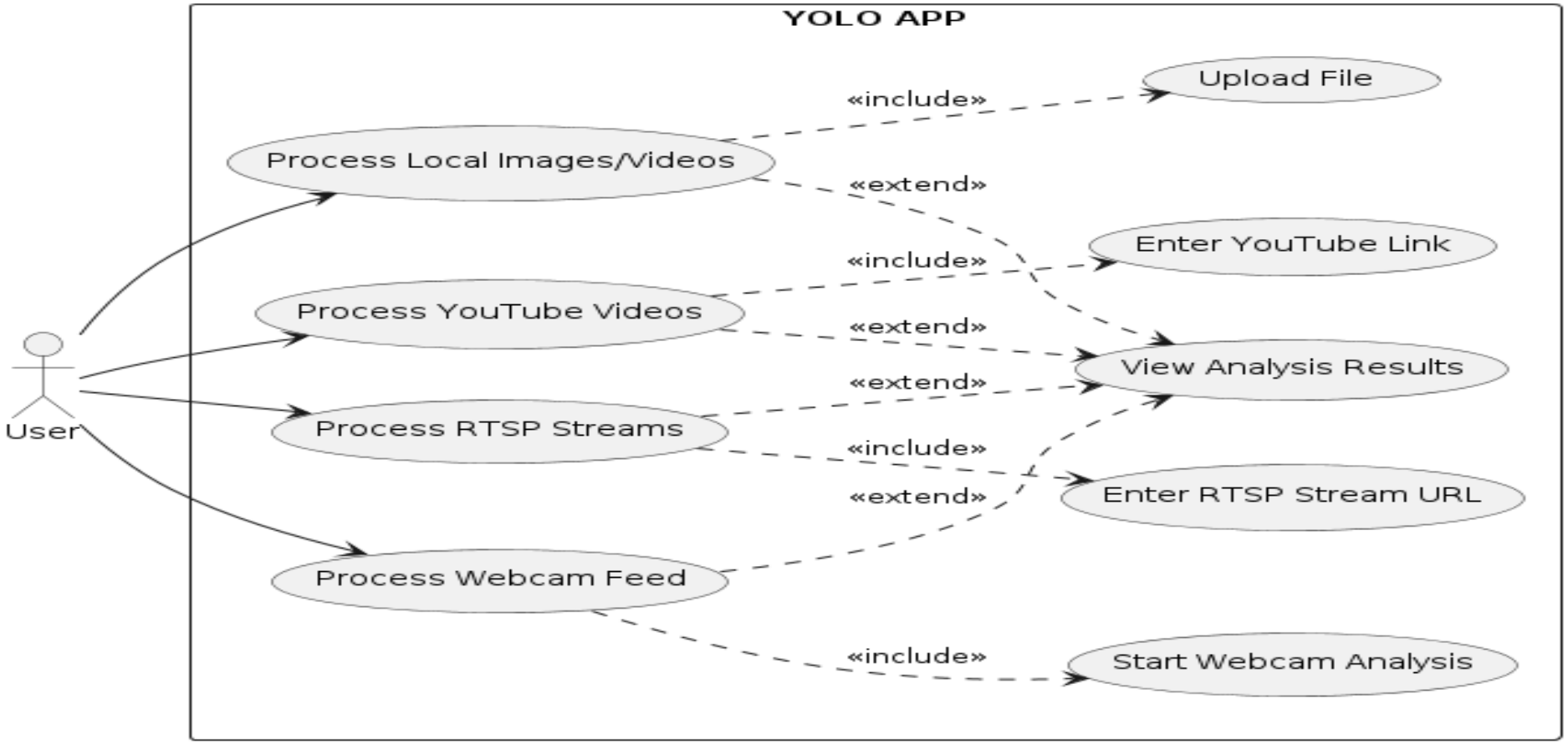
8. **Performance Optimization Module:** This module ensures the system performs efficiently, providing real-time or near-real-time processing capabilities.

Proposed Algorithm Explanation

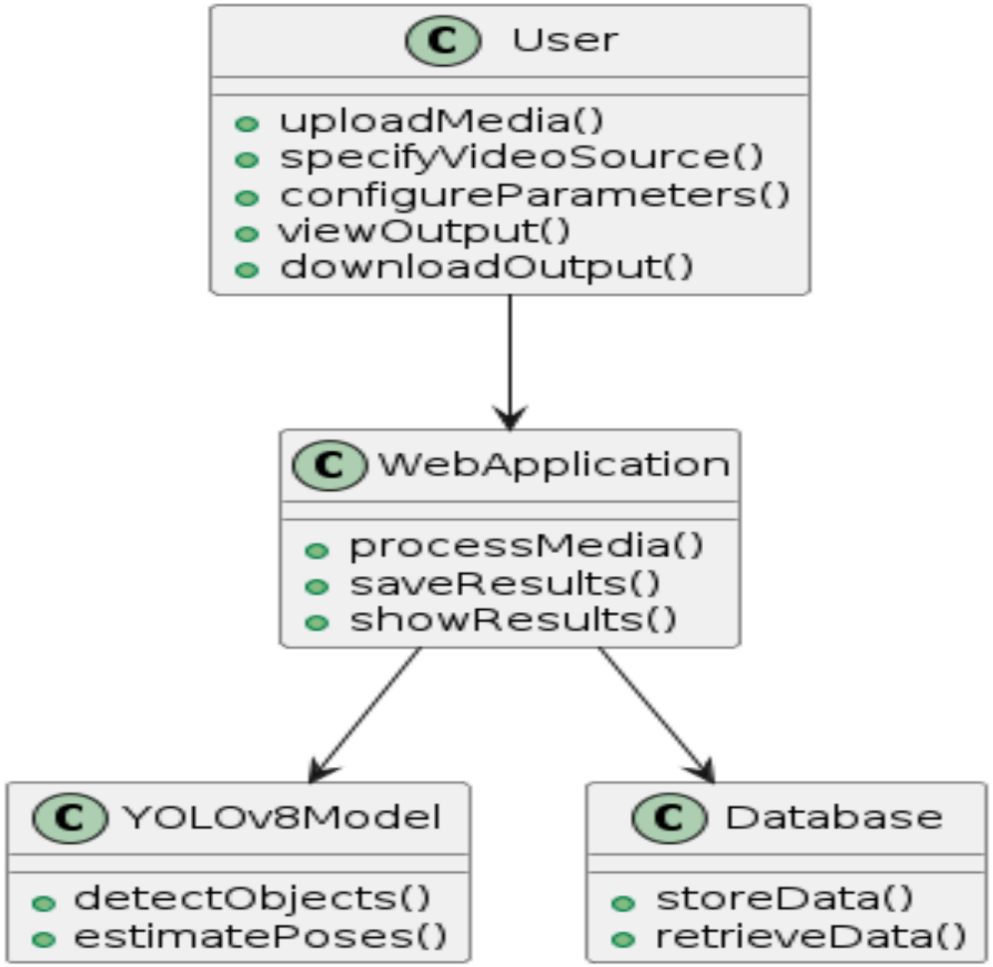
Flow of the Algorithm

1. **User Interaction**:The user uploads media(images or videos) or specifies a video source (e.g., YouTube link, RTSP stream, or webcam feed) through the web interface.
2. **Preprocessing**:Prepare the input data for the YOLOv8 model by performing necessary preprocessing steps (resizing, normalization, etc.).
3. **Model Inference**:The preprocessed media is passed through the YOLOv8 model for detection, classification, or pose estimation.
4. **Post-Processing**:Refine the model's output to improve accuracy and usability.The model's output is refined using NMS and threshold filtering**.**
5. **Visualization**:The results are overlaid on the input media and displayed to the user web interface.
6. **Output**:The user can download or share the processed results.Enables users to retain and share detection results.Supports multiple output formats for flexibility**.**

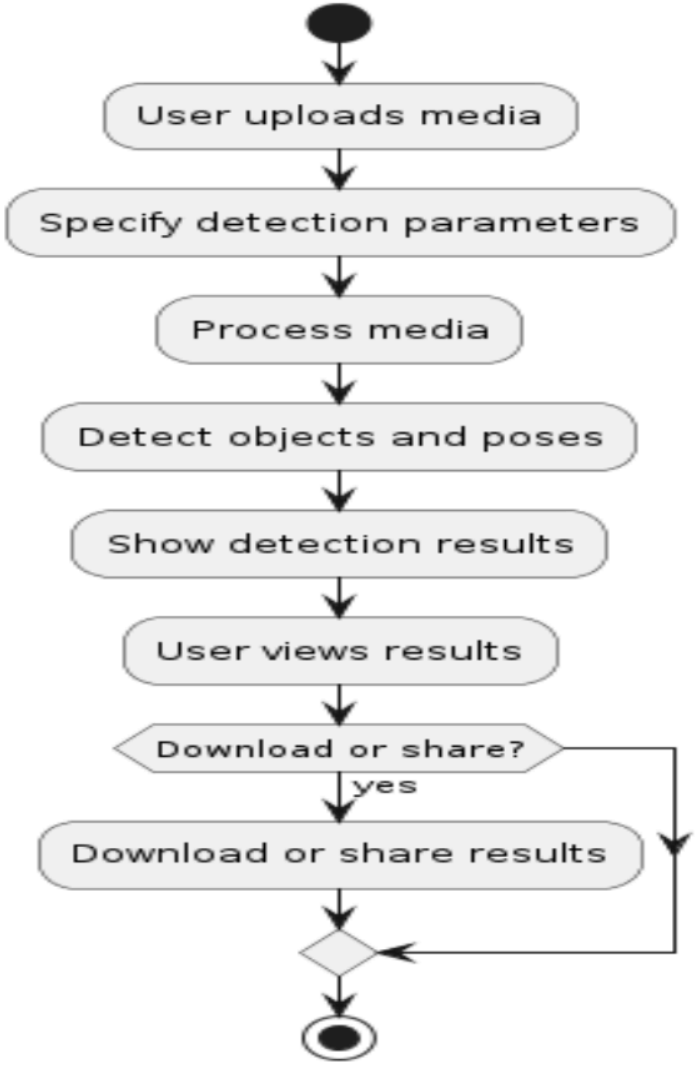
UML Diagram:-Use Case Diagram



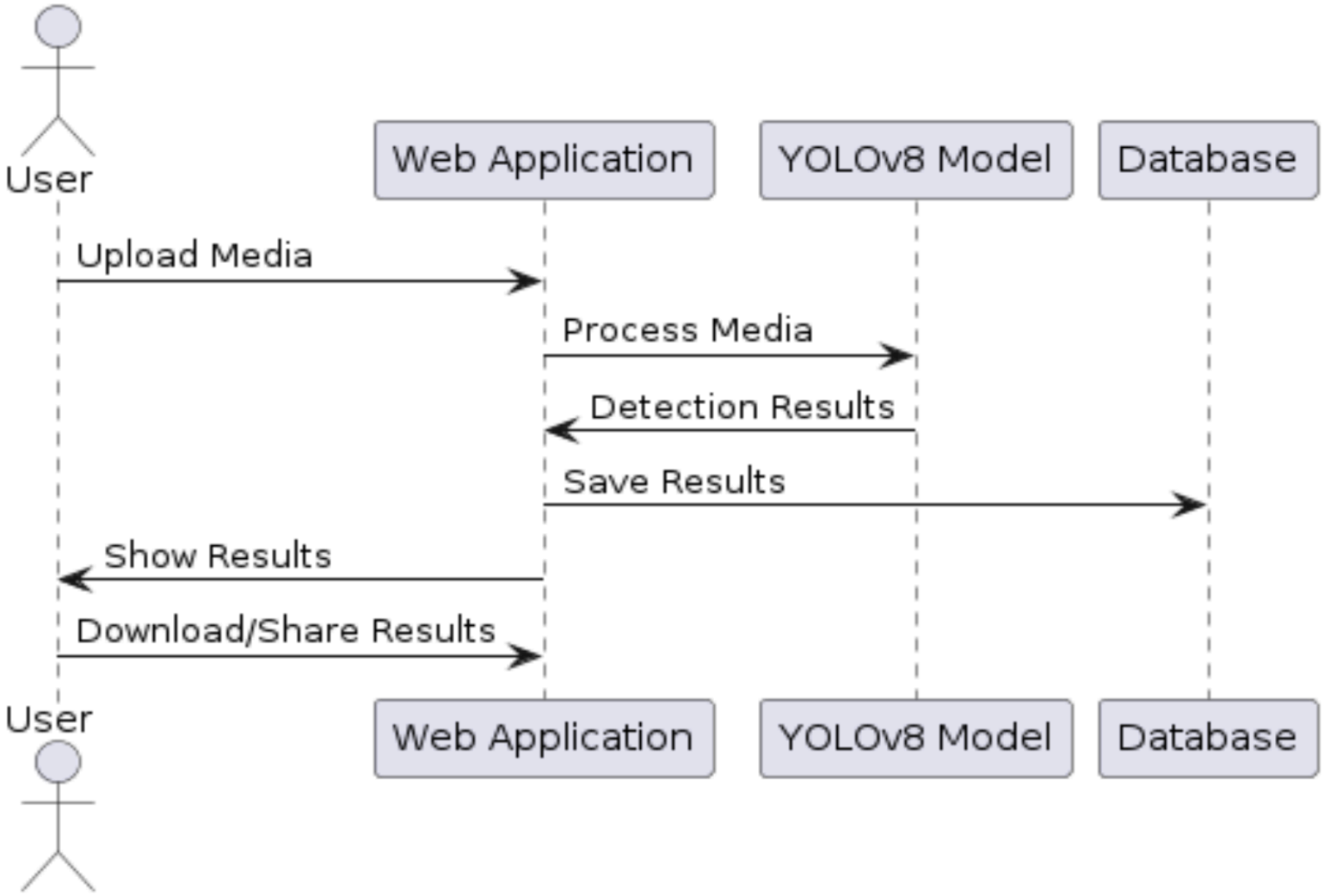
UML Diagram:-Class Diagram



UML Diagram:-Activity Diagram



UML Diagram:-Sequence Diagram



Expected Results in Proposed model

Metric	Proposed System (YOLOv8)	YOLOv7	Faster R-CNN	OpenPose
Accuracy (mAP)	56.8% (COCO dataset)	55.2%	53.5%	N/A
Speed (FPS)	83 FPS	67 FPS	7 FPS	22 FPS
Resource Usage	4.5 GB GPU memory	5.2 GB	8.1 GB	6.8 GB
Scalability	50+ concurrent users	30+ users	10+ users	15+ users
Pose Estimation (AP)	72.5% AP	N/A	N/A	74.3% AP
Training Time	12 hours	14 hours	20 hours	18 hours
Input Source Support	5 input sources	3 sources	2 sources	2 sources
Output Options	4 output formats	2 formats	2 formats	2 formats

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Thank You .....