ML Intern Evaluation Report

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# Task Summary

Real-time detection of:  
  
- Missing objects  
- New object placements

# Approach Used

Model: YOLOv5s (pretrained from PyTorch Hub)

Framework: PyTorch + OpenCV

Detection Pipeline:  
- Run YOLO on each frame  
- Store detected object names  
- Compare with previous frame  
- Label new/missing objects on the frame

# Performance

FPS Achieved: ~15 FPS on CPU (depends on hardware)

Hardware Used:  
- CPU: Intel i5 (8th Gen)  
- RAM: 8GB  
- GPU: None (CPU-only)  
- Resolution: 640x480 input frames

# Sample Outputs

(object labels like "Missing: Chair" or "New: Bag")

# Optimizations Used

- Used yolov5s (light model) for real-time inference.  
- Avoided writing video to disk during testing (displayed instead).  
- Calculated FPS manually using time module.

# Challenges Faced

- Jupyter Notebook could not import torch (fixed using proper environment setup).  
- FPS dropped while writing video (solution: disable write during testing).

# Next Improvements

- Add object tracking (e.g., using BYTETrack).  
- Extend to object count-based alerts.  
- Deploy with GPU for faster inference.