CSYE 7374 : SPECIAL TOPICS IN COMPUTER SYSTEMS ENGINEERING

PROJECT PROPOSAL

OBJECT DETECTION IN VIDEO AND VIDEO COMPRESSION

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OVERVIEW :

The demand for video streaming has been growing over the past few years. This has made video storage and video transfer a bottleneck for service providers, increasing the need for more robust video compression algorithms. Deep learning has a potential to address this concern.

Not just that, it is equally important to notify the supervisors immediately when there is a danger in the area.

GOALS :

1. Detect and segmentation of video frames.
2. Analyse if there is any danger.
3. Trigger alert if any.
4. Compress the video to decrease the storage space.

DATA :

As this is an application based on video, any video datasets can be used.

TECHNOLOGY:

- **Deep Learning Frameworks** : Keras, MXNET
- **Library/Packages** : OpenCV, YOLO v3
- Flask
- AWS Cloud
- Live and Static video analysis

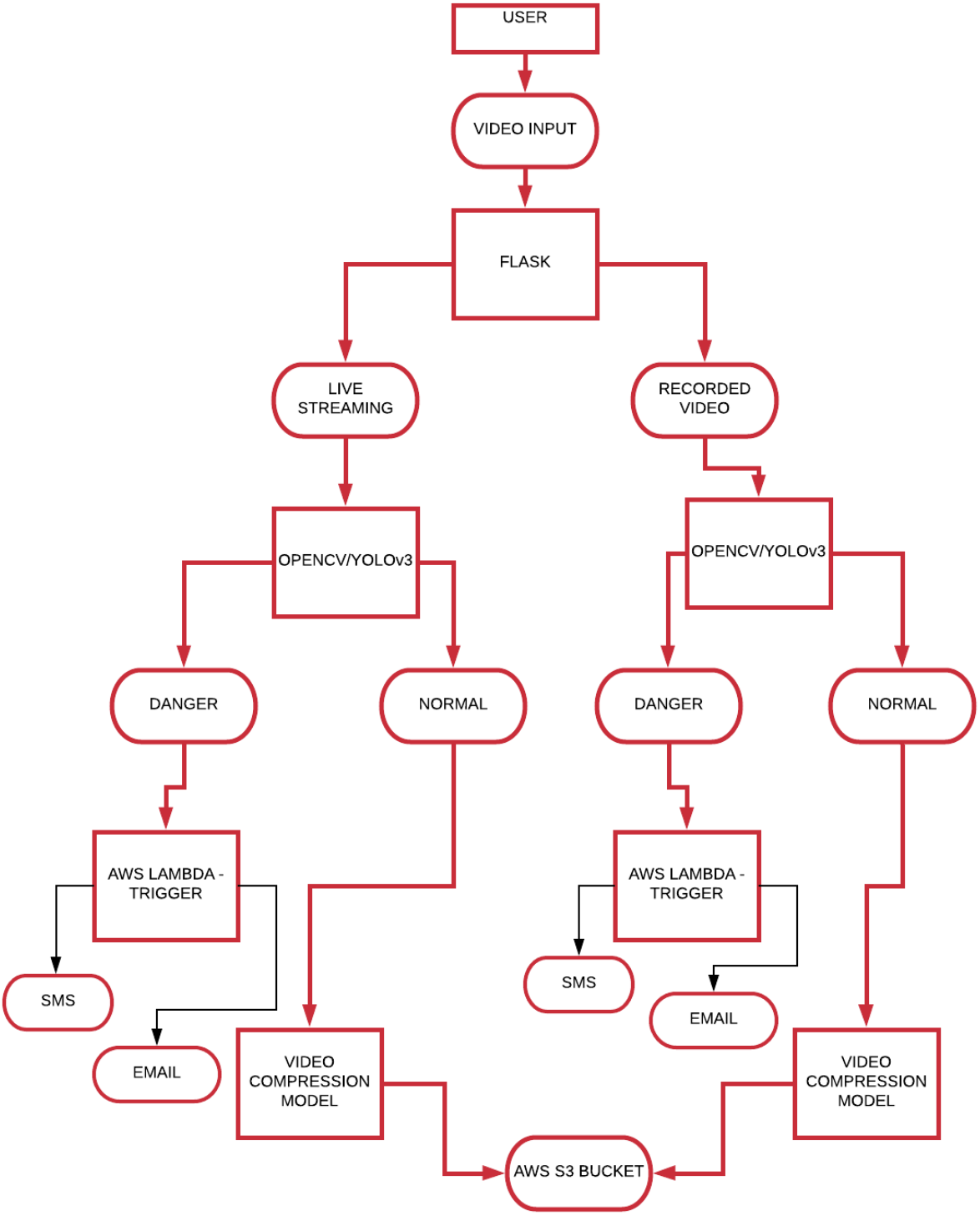
EVALUATION METRICS :

Object Detection : IoU (Intersection over union) ,MAP (Mean Average Precision)

Video Compression : Peak Signal to Noise Ratio (PSNR) and Structural Similarity Index Measurement (SSIM) – calculates the similarity of the edges.

Greater the PSNR value, the better(implies the output video has more noise removed).

PIPELINE :


USER
VIDEO INPUT
FLASK
LIVE STREAMING
RECORDED VIDEO
OPENCV/YOLOv3
OPENCV/YOLOv3
DANGER
NORMAL
DANGER
NORMAL
AWS LAMBDA - TRIGGER
AWS LAMBDA - TRIGGER
SMS
EMAIL
SMS
EMAIL
VIDEO COMPRESSION MODEL
VIDEO COMPRESSION MODEL
AWS S3 BUCKET

PROCESS OUTLINE :

1. User inputs the video input.
2. Flask will have 2 options : Live streaming and Recorded video.
3. Video is given as input to OPENCV model.
4. The model now segments and labels the objects in the video.
5. It analyses the video labels to check for danger.
6. If danger, AWS Lambda will send a trigger to SMS and Email.
7. The video is then compressed and stored in S3 bucket.

TIMELINE :

TIMEFRAME	PROCESS
Day 1 - 5	**Object Detection and partial video compression**
Day 6 – 10	**Complete model**
Day 10 – 14	**Flask app and Report**