



Cheating Detection in Online Exam

BADS7203 Image and Video Analytics

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|----|--------------------------|------------|
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Problem

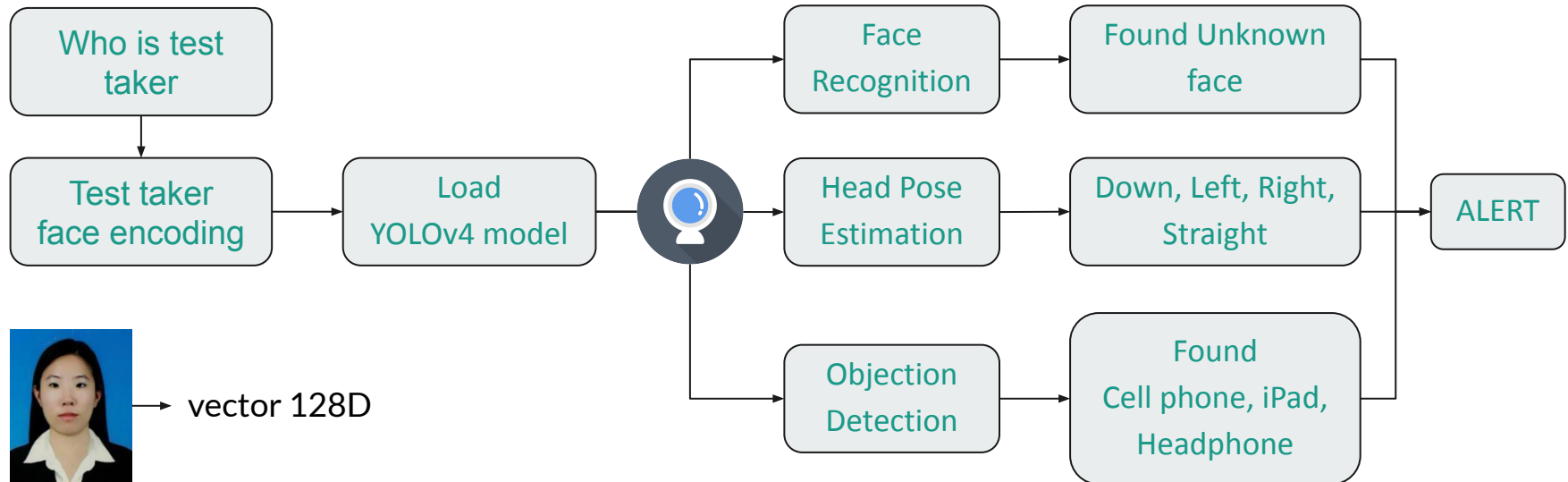


- In covid-19 situation, teaching, learning and online exam need to be completely online.
- Taking the online exam in a close book format can be difficult.
- The number of staff is not sufficient to control the behavior of students.
- So, Fraud in online close book exams is so easy to do.

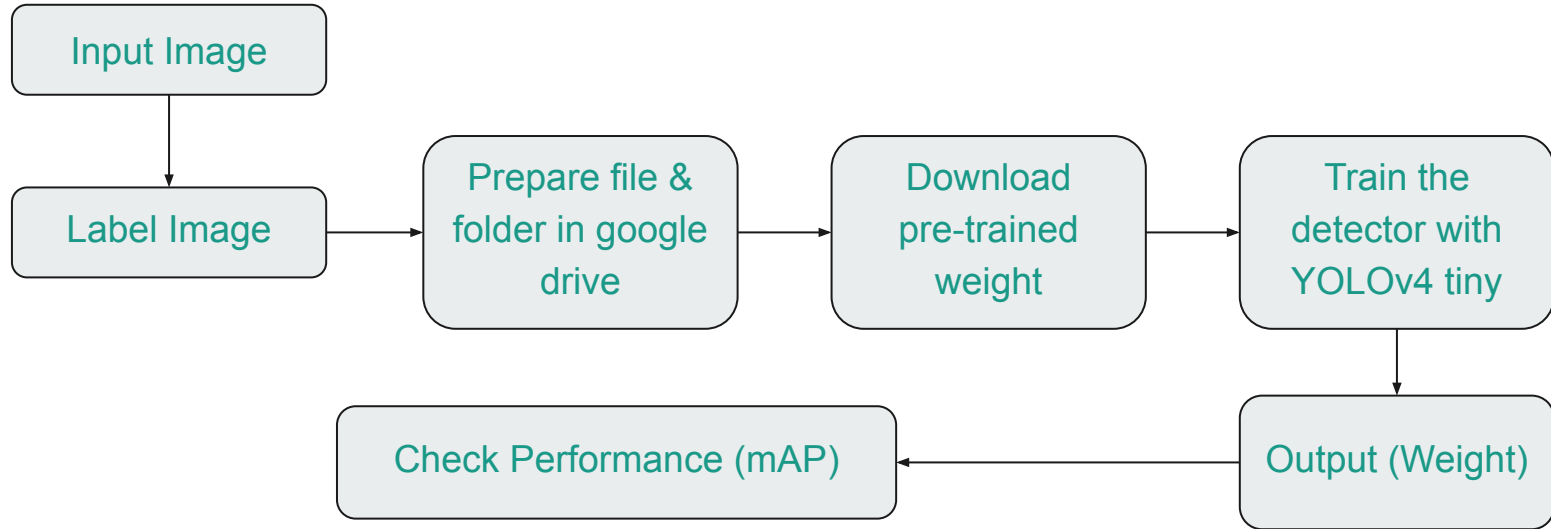
Benefit

- The system allows staff to monitor test takers during the exam for suspicious behavior during the exam.

Application Flow



Train Object Detection



Model Performance

calculation mAP (mean average precision)...

Detection layer: 30 - type = 28

Detection layer: 37 - type = 28

244

detections_count = 931, unique_truth_count = 289

class_id = 0, name = cell_phone, ap = 95.04% (TP = 63, FP = 27)

class_id = 1, name = ipad, ap = 92.73% (TP = 81, FP = 22)

class_id = 2, name = head_phone, ap = 95.52% (TP = 57, FP = 16)

class_id = 3, name = ear_phone, ap = 47.28% (TP = 29, FP = 19)

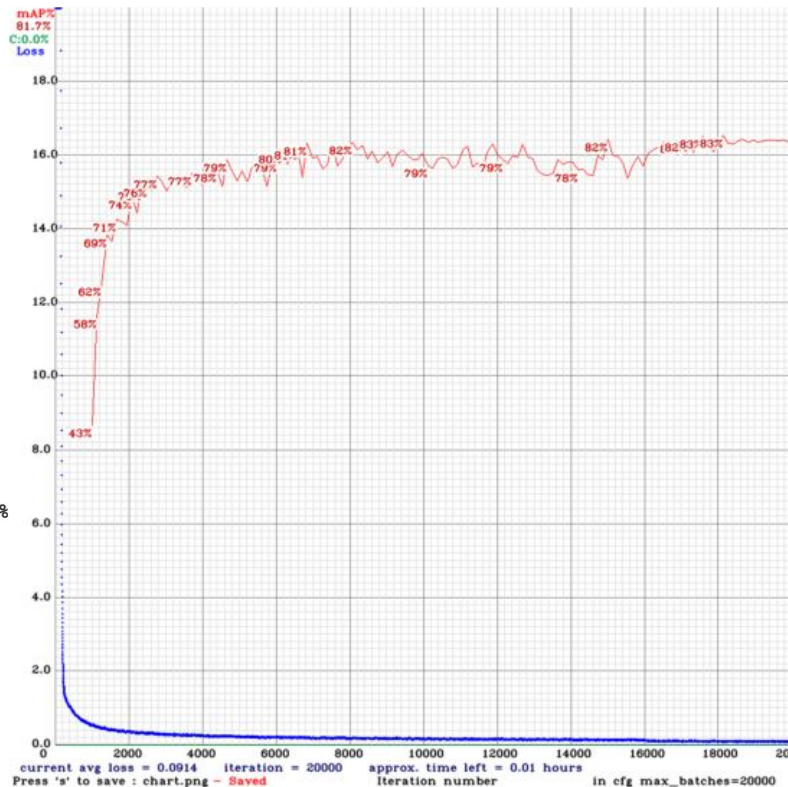
for conf_thresh = 0.25, precision = 0.73, recall = 0.80, F1-score = 0.76

for conf_thresh = 0.25, TP = 230, FP = 84, FN = 59, average IoU = 60.90 %

IoU threshold = 50 %, used Area-Under-Curve for each unique Recall

mean average precision (mAP@0.50) = 0.826429, or 82.64 %

Total Detection Time: 1 Seconds

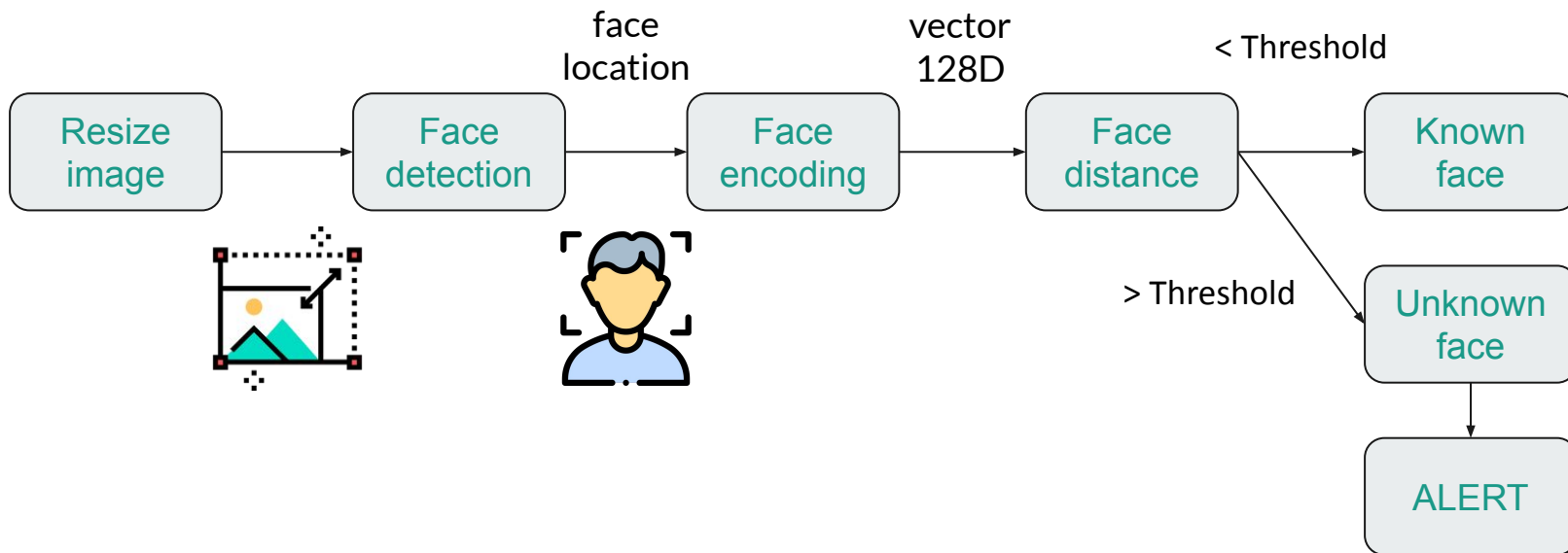


Object Detection



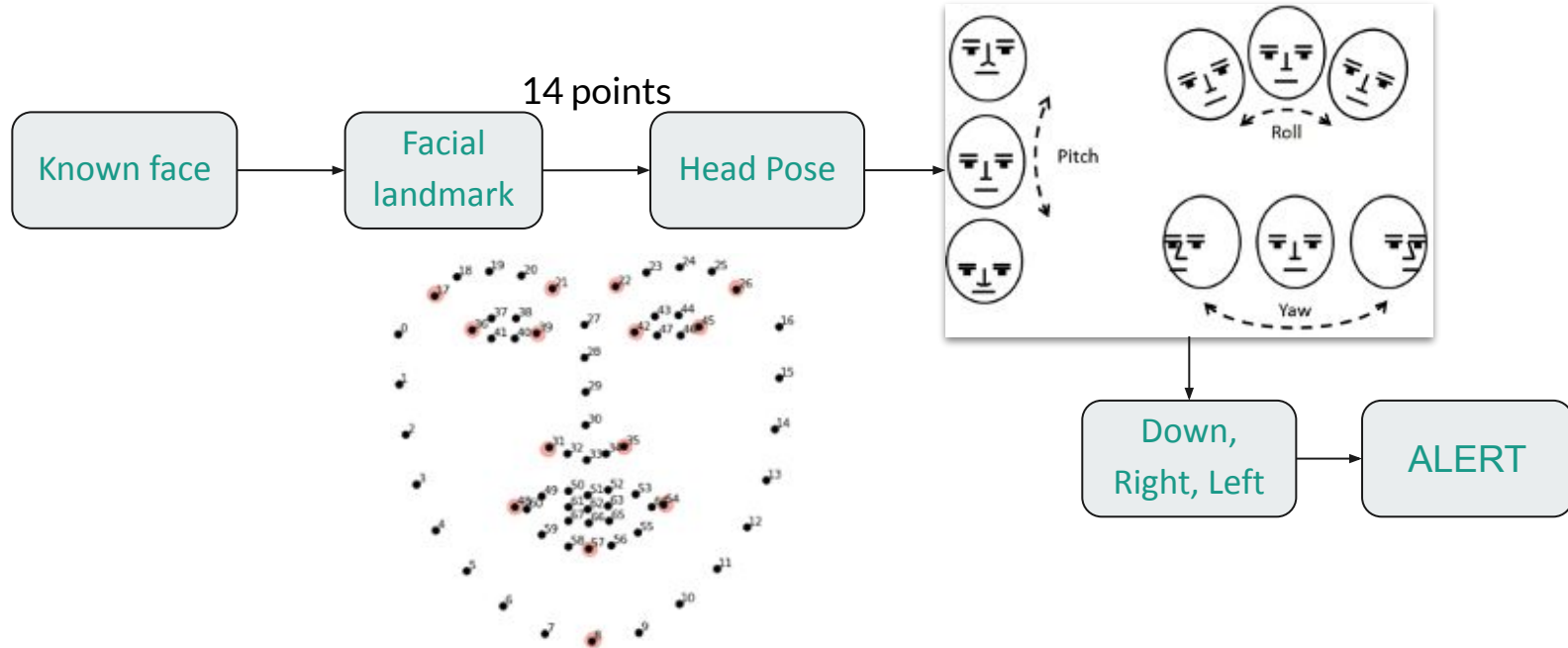
Face Recognition

face_recognition and dlib library



Head Pose Estimation

face_recognition and dlib library





Conclusion & Problem



- Detect headphones are not as good as they should be.
- Detect as an iPad instead of the back of a cell phone but the system can bounding box to describe the spatial location of an object.
- The angle of position of each person is different
- Student image should be good quality

Future Work

- Increase the number of training images.
- Image augmentations (blur, zoom, rotate, flip)
- Try another model
- Dynamic headpose threshold