

TRIPLE C - DATA SCIENCE - IOT PROJECT

# FATIGUE DETECTION





# Facts and Stats

National Highway Traffic  
Safety Administration

100,000 POLICE-REPORTED CRASHES

1,550 DEATHS

71,000 INJURIES

\$12.5 BILLION MONETARY LOSSES



**180 RGB VIDEOS**

60 Research Subjects x 3 Videos x 10 Min/Video

**LABELS:**

Non-Vigilant

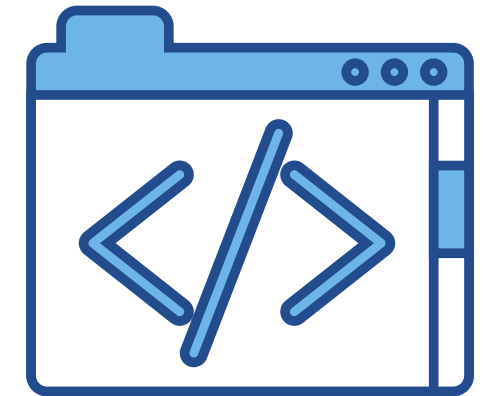
Tired

**UTA REAL-LIFE  
DROWSINESS DATASET**



Software + Hardware

# Project Outline



## HARDWARE

- Fetch live video streams from camera
- Pass to Raspberry Pi

## SOFTWARE

- Process video streams
- Modeling for prediction

## HARDWARE

- Output alarm signal (button + sound)
- Collect feedback

## SOFTWARE

- Speech Recognition
- Model self-correct

# Software: Fatigue Detection

## CV2: Landmark Detection



## Optimal NN Params

- Learning Rate =  $5e-4$
- Epochs = 200 (we used early stop)

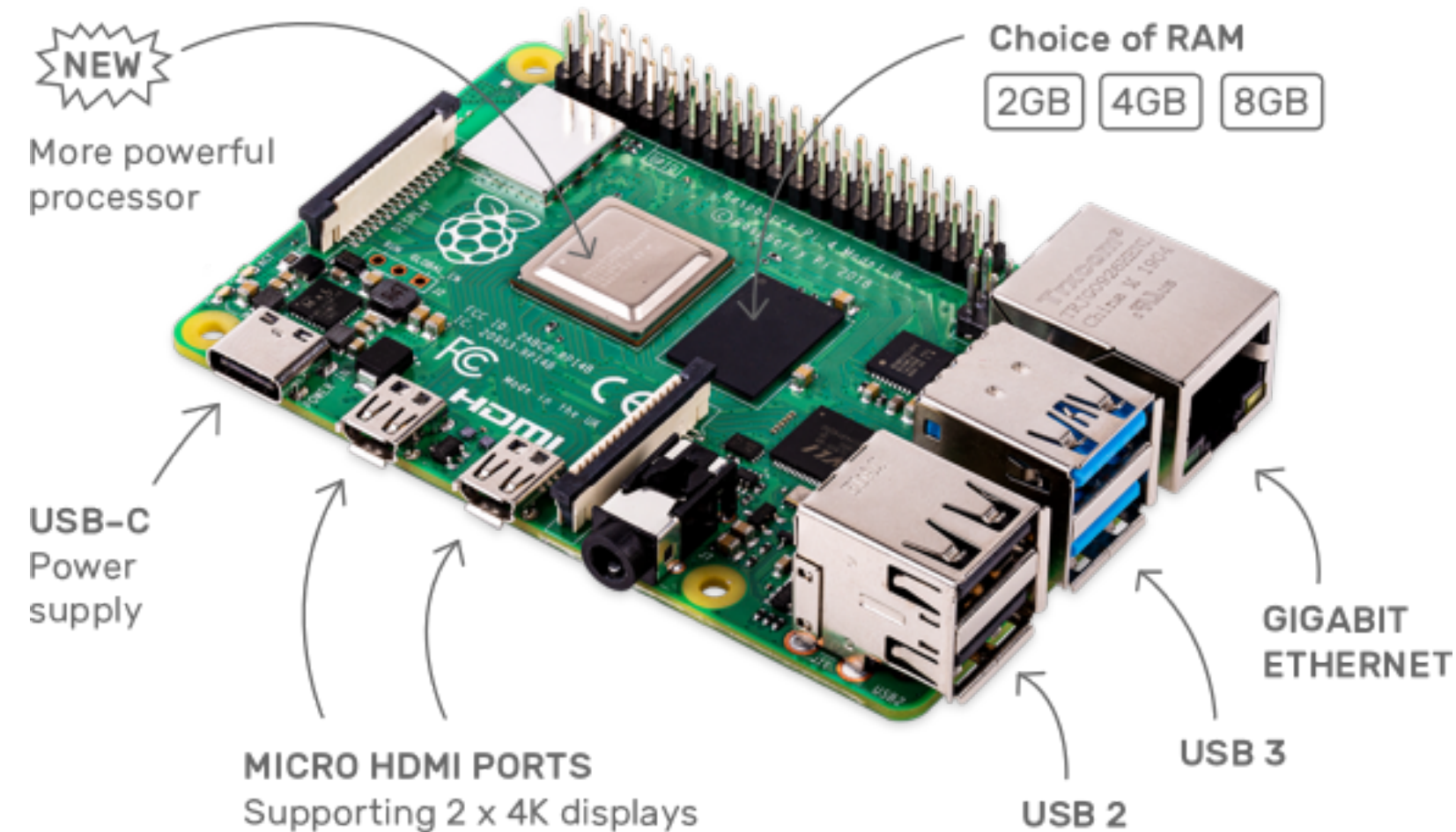
## Optimal Performance

- Train Loss = 0.49
- Test Loss = 0.43
- Test Accuracy = 0.93
- Test F1-Score = 0.90

## Speech Recognition

# Hardware: IoT Input + Output

## Raspberry Pi

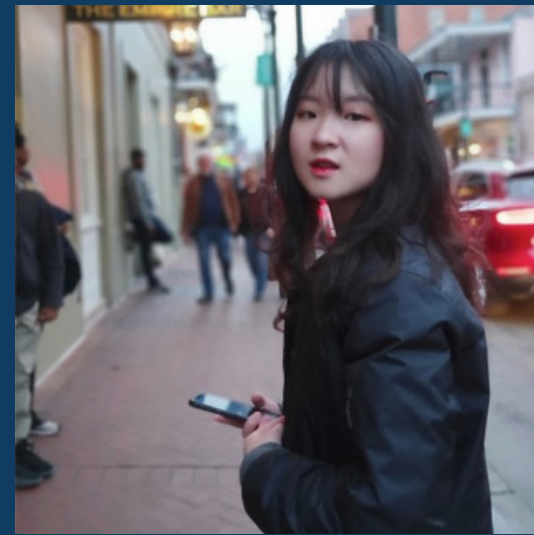








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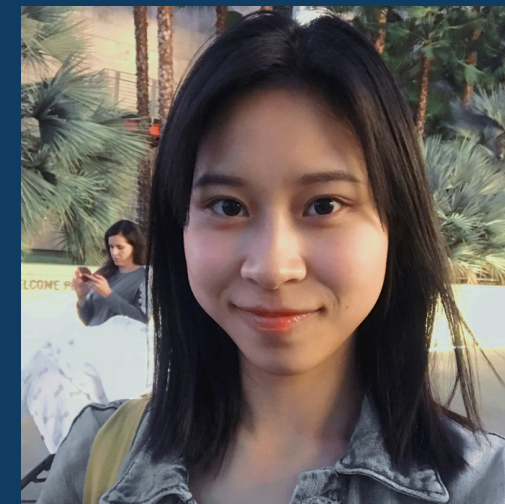
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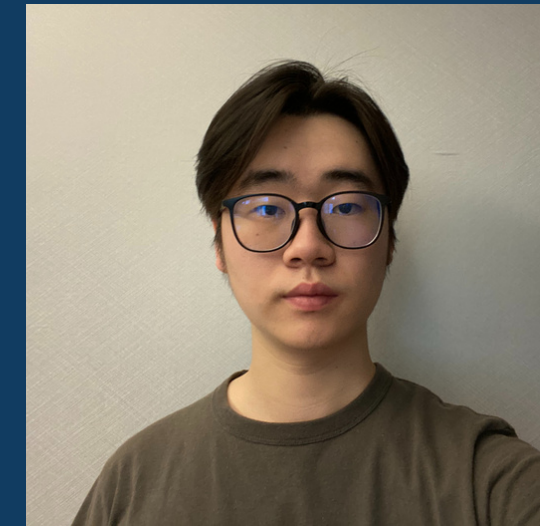
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GO TEAM!





# References

<https://drowsydriving.org/about/facts-and-stats/>

<https://sites.google.com/view/utarlidd/home>