



# Driver Drowsiness Detection System

**CSE 495**  
**Preliminary Meeting – 1st Presentation**

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- In this project we have a system that gives an alarm if driver is detected as drowsy.
- Drowsiness detection works on two different situations :
  - If driver is closing their eyes for an amount of time
  - If driver can't keep their head up for an amount of time (moves the head to any side without turning head)



When driver is  
detected as drowsy



# Project Design Plan and Timeline

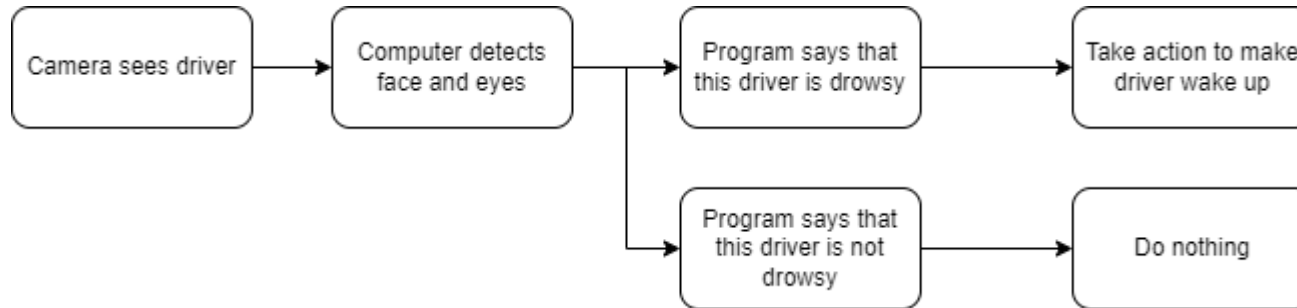


If driver is detected as drowsy, raspberry pi sends a notification to the phone and alarm rings.

24.10-06.11	07.11-18.12	02.01-15.01
<ul style="list-style-type: none"><li>• Get ready the hardware (Raspberry pi, camera etc...)</li><li>• Determine datasets to be used</li></ul>	<ul style="list-style-type: none"><li>• Installing needed libraries to the hardware.</li><li>• Development of mobile app</li><li>• Training models and compare models with each other to determine success rates.</li></ul>	<ul style="list-style-type: none"><li>• Test the system with different drivers.</li><li>• Determine success rate of the project</li></ul>



# Project Design and Timeline



Different techniques can be used:

- Machine Learning and Image Processing options:
  - OpenCV, Keras and Tensorflow (Sequential-InceptionV3)
  - OpenCV, YOLOv5 and Pytorch (YOLO Model)
- Hardware Options:
  - Raspberry Pi
  - Nvidia Jetson Nano



# Project Requirements - 1

- In this project, we will have these requirements:
  - Face and Eye detection algorithm should be developed with Machine Learning and Image Processing techniques.
  - A large dataset should be used to train algorithm with these classifications: closed eye, open eye, not yawning face, yawning face
  - Face should be recognized on video stream
  - Detected face should be given as input to the trained algorithm.
  - If this face is detected as drowsy, alarm should ring and a notification sent to the mobile app.



# Project Requirements - 2

- For face and eye detection, OpenCV library is required.
- Keras and Tensorflow libraries is required to build classification model of the images to be trained.
- An alarm sound is required to wake the driver up
- A mobile application developed on Flutter language to send notifications to the selected persons.
- A camera should be able to see the driver clearly.
- Well classified dataset used to train model.
- Raspberry Pi 4 Model B
- Raspberry Pi Official Camera Module V2
- Micro SD Card
- Power Supply
- HDMI Cord



# Success Criteria

- True prediction with rate of 90% drowsiness of driver.
- Predicting the drowsiness of the driver in 5 seconds at max
- 10% reduction in accidents caused by drowsiness.





# Resources and References

1. <https://www.nauto.com/blog/introducing-driver-drowsiness-alerts> (Drowsy driver in Project Definition page)
2. <https://www.canstockphoto.com/the-view-inside-the-empty-car-the-54421487.html> (Empty car inside view used in Project Design Page)
3. <https://dergipark.org.tr/en/download/article-file/19838> (Analysis of Traffic Accidents in Turkey, Islim Sungur, Recep Akdur , Birgül Piyal)
4. Poursadeghiyan M, Mazloui A, Nasl Saraji G, Baneshi MM, Khammar A, Ebrahimi MH. Using Image Processing in the Proposed Drowsiness Detection System Design. Iran J Public Health. 2018 Sep;47(9):1371-1378. PMID: 30320012; PMCID: PMC6174048.
5. Identification of Driver Drowsiness Using Image Processing K.Praveen Kumar, Srinivasa Rao Thamanam, M. Naresh Kumar
6. Gilbile, P., Bhore, P., Kadam, A., Balbudhe, K. (2019). Driver's Drowsiness Detection Using Image Processing. In: Pandian, D., Fernando, X., Baig, Z., Shi, F. (eds) Proceedings of the International Conference on ISMAC in Computational Vision and Bio-Engineering 2018 (ISMAC-CVB). ISMAC 2018. Lecture Notes in Computational Vision and Biomechanics, vol 30. Springer, Cham. [https://doi.org/10.1007/978-3-030-00665-5\\_70](https://doi.org/10.1007/978-3-030-00665-5_70)

