

Distracted Driver Classification via Neural Networks

A Case Study for DS 4002 - Luke McMeans



Distracted driving has continued to be an issue in the United States and affects thousands each year. According to the National Highway Traffic Safety Administration (NHTSA), 3,275 people were killed in 2023 as a result of these improper and illegal habits. In 2019, the NHTSA estimated that over 420,000 injuries were caused by accidents involving distracted drivers. With the rise of machine learning technology, we want to learn how to mitigate the accidents and fatalities caused by distracted driving.

In this data science project, you will build a Multilayer Perceptron (MLP) model to classify driver behavior from images to detect various forms of distraction. Using PyTorch, the MLP will classify images into 10 categories: safe driving, texting (phone in left/right hand), talking on phone (phone in left/right hand), adjusting radio, talking to passengers, drinking, applying hair and makeup, and reaching behind.

This case study introduces key machine learning concepts, including image preprocessing, normalization, neural network architecture design, and model evaluation using a confusion matrix. All relevant components are housed in a GitHub repository, which is linked below. Now, it's your turn to reproduce the results and help reduce distracted driving, ultimately leading to fewer accidents.

GitHub Repository: <https://github.com/McMeans/ds-4002-cs3>

References:

- [1] National Highway Traffic Safety Administration, "Distracted Driving Dangers and Statistics," *NHTSA*, 2024. [Online]. Available: <https://www.nhtsa.gov/risky-driving/distracted-driving>. [Accessed: Dec. 8, 2025].
- [2] D. Feng and Y. Yue, "Machine Learning Techniques for Distracted Driver Detection," CS 229 Project Report, Stanford Univ., Stanford, CA, USA, 2019. Available: <https://cs229.stanford.edu/proj2019spr/report/24.pdf>. [Accessed: Dec. 8, 2025].