



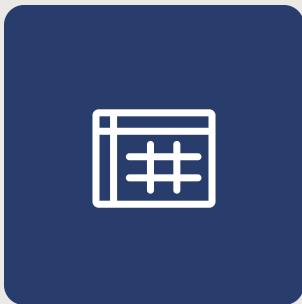
DISTRACTED DRIVER DETECTION

Jordana Tepper

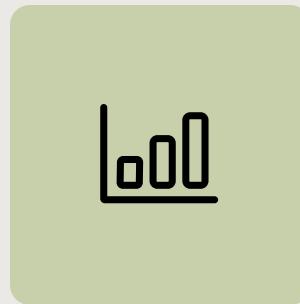
AGENDA



Business Problem



Data Understanding



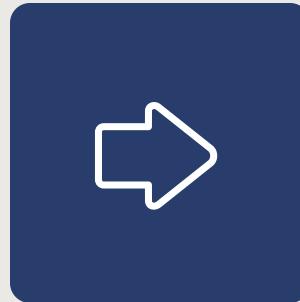
Data Analysis



Modeling



Limitations

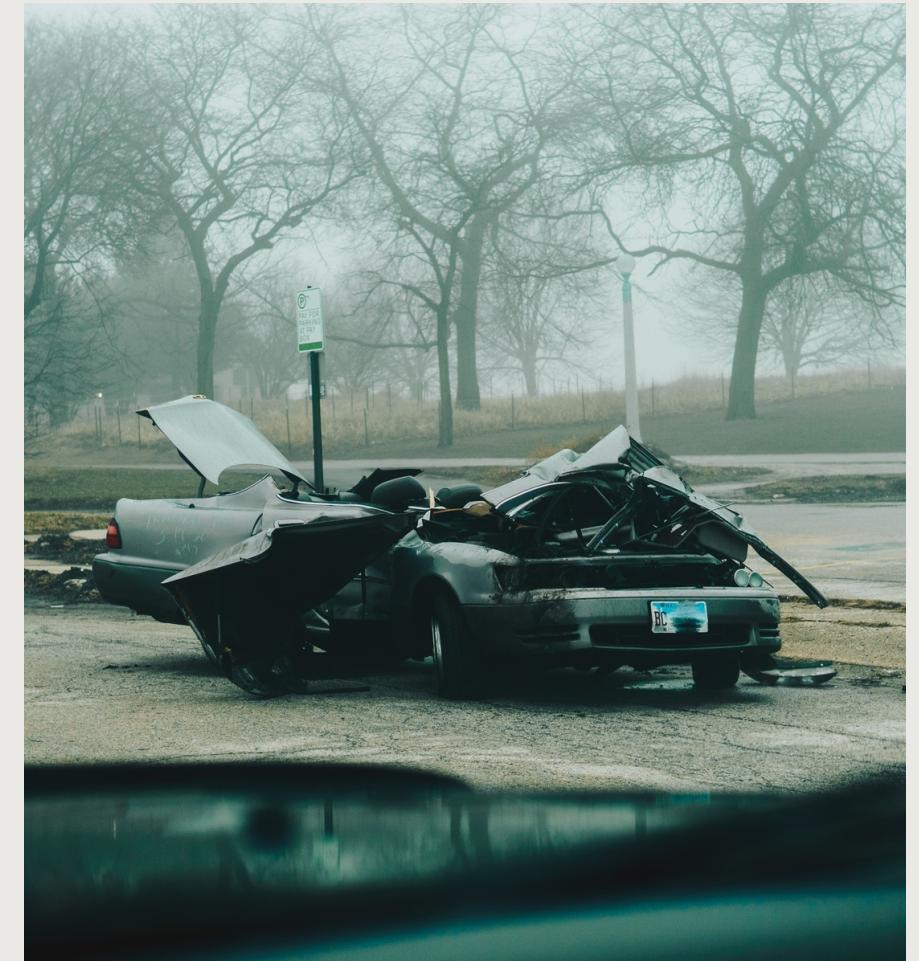


Next steps

BUSINESS PROBLEM

THERE ARE THREE MAIN TYPES OF DISTRACTED DRIVING

- 1 Visual: taking your eyes off the road
- 2 Manual: taking your hands off the wheel
- 3 Cognitive: taking your mind off driving



BUSINESS PROBLEM

Distracted driving kills

9 PEOPLE PER DAY

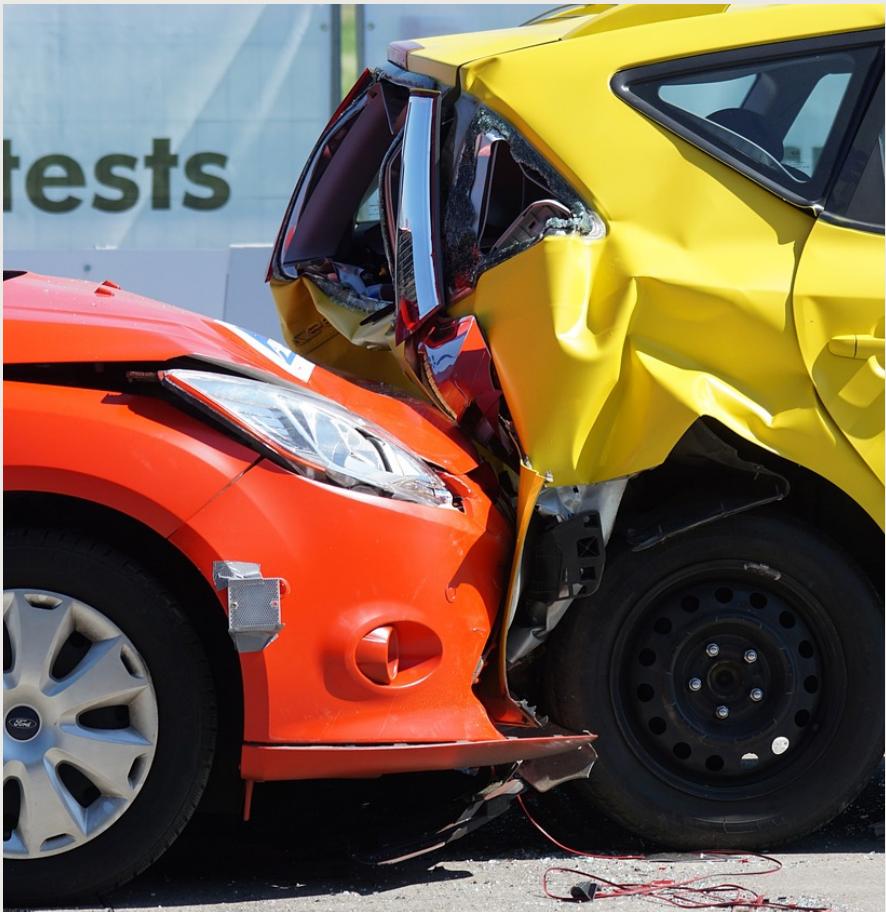
Number of people injured from distracted driving

424,000 PEOPLE

Victims of a distracted driver accident while outside their vehicle

1 IN 5

BUSINESS PROBLEM



STAKEHOLDER:

State Farm

PROPOSAL:

Dashboard camera to detect distracted driving

INCENTIVE:

Safe driving practices = Better car insurance

DATA UNDERSTANDING

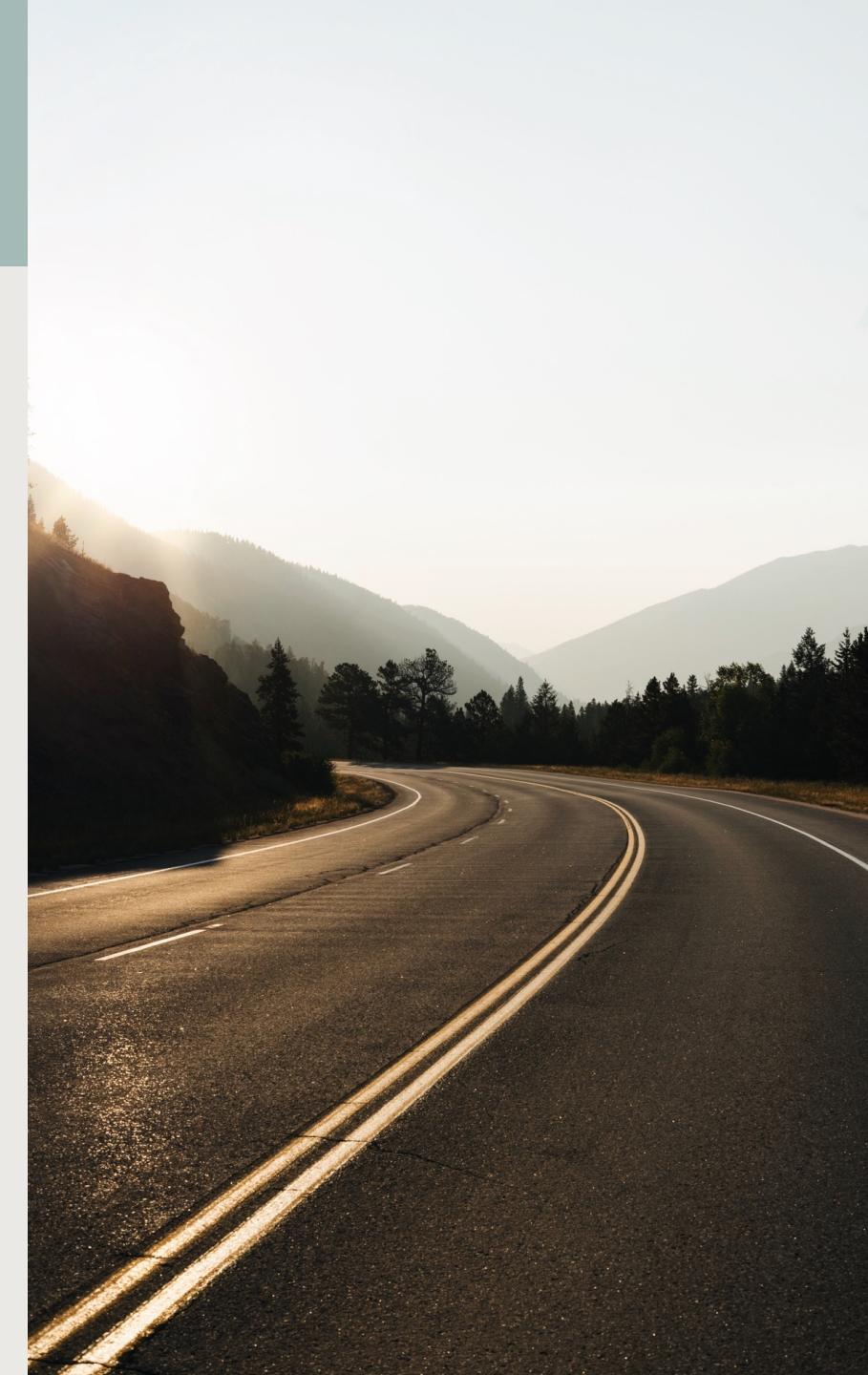
Data Source: Kaggle

Train Size: 17943 images

Validation Size: 4481 images

Test Size: 338 images

Number of Classes: 10



DATA UNDERSTANDING



CLASSIFICATIONS

c0: Safe Driving

c5: Operating the radio

c1: Texting with right hand

c6: Drinking a beverage

c2: Talking on the phone
with right hand

c7: Reaching behind

c3: Texting with left hand

c8: Hair and makeup

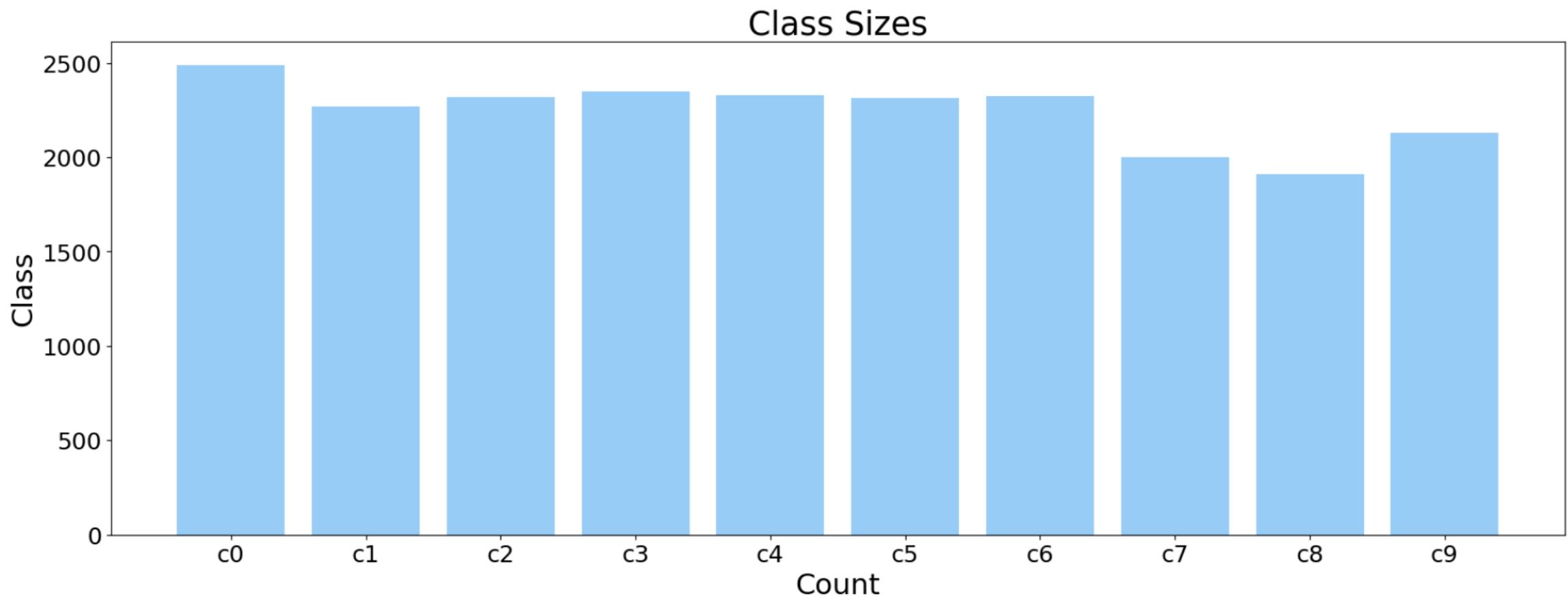
c4: Talking on the phone
with left hand

c9: Talking to passenger

DATA UNDERSTANDING



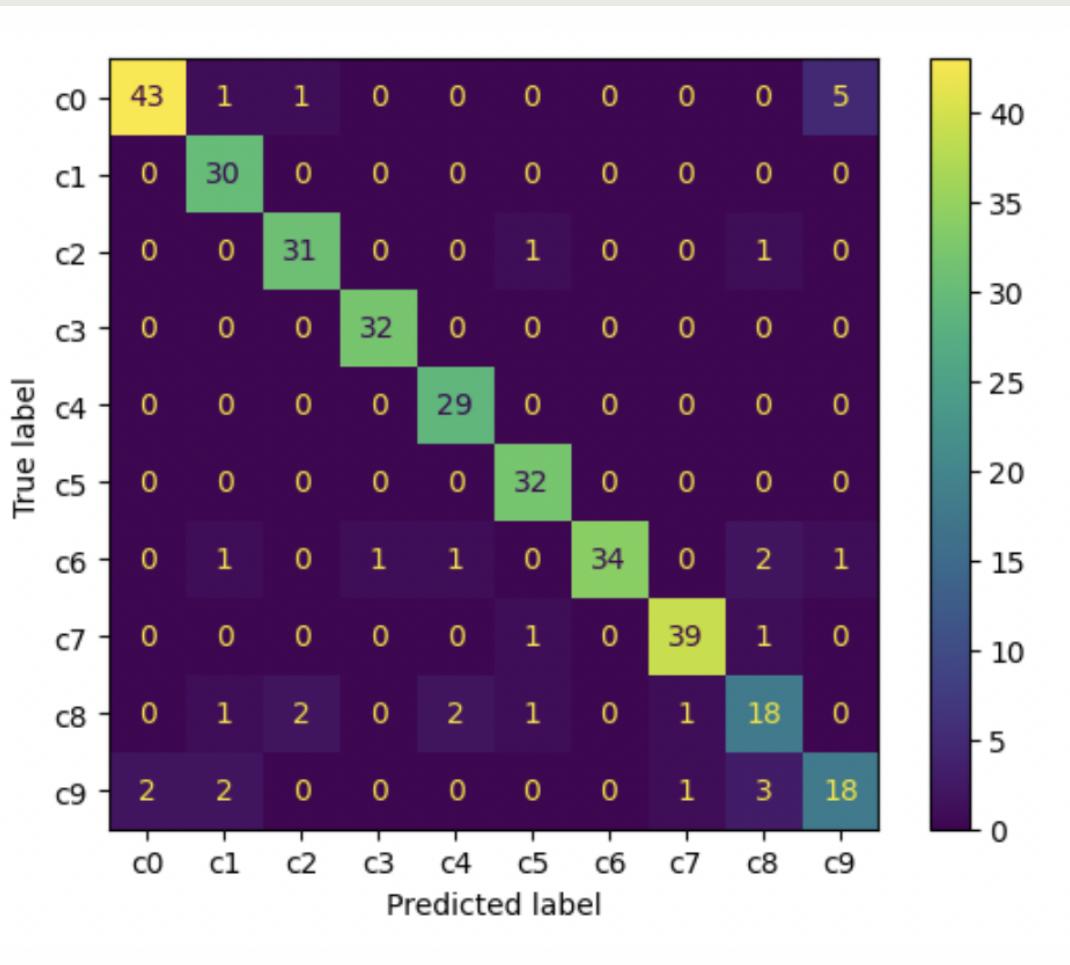
DATA ANALYSIS



MODELING

Model	Train Accuracy	Train Loss	Validation Accuracy	Validation Loss	Test Accuracy	Test Loss
Baseline (CNN)	1.00	0.0012	0.9838	0.0590	0.4408	4.1131
Model 1 (CNN)	0.9987	0.0094	0.9883	0.0849	0.5473	5.8523
Model 2 (CNN)	0.9996	0.00	0.9860	0.1069	0.6036	3.6994
Model 3 (ResNet50)	0.9923	0.0292	0.9615	0.1578	0.4142	3.1874
Model 4 (InceptionV3)	1.00	0.00	0.9515	0.2741	0.3787	5.5575
Model 5 (VGG16 - A)	1.00	0.00	0.9911	0.0939	0.7811	2.0332
Model 6 (VGG16 - B)	1.00	0.00	0.9916	0.0872	0.8254	1.9352
Model 7 (VGG16 - C)	1.00	0.00	0.9916	0.0692	0.7811	1.9868
Model 8 (VGG16 - D)	1.00	0.00	0.9916	0.0906	0.9053	1.1780
Model 9 (VGG16- E)	1.00	0.00	0.9927	0.1202	0.8876	1.7527

MODELING



Train Accuracy Score: 1.00

Train Loss: 3.2605e-08

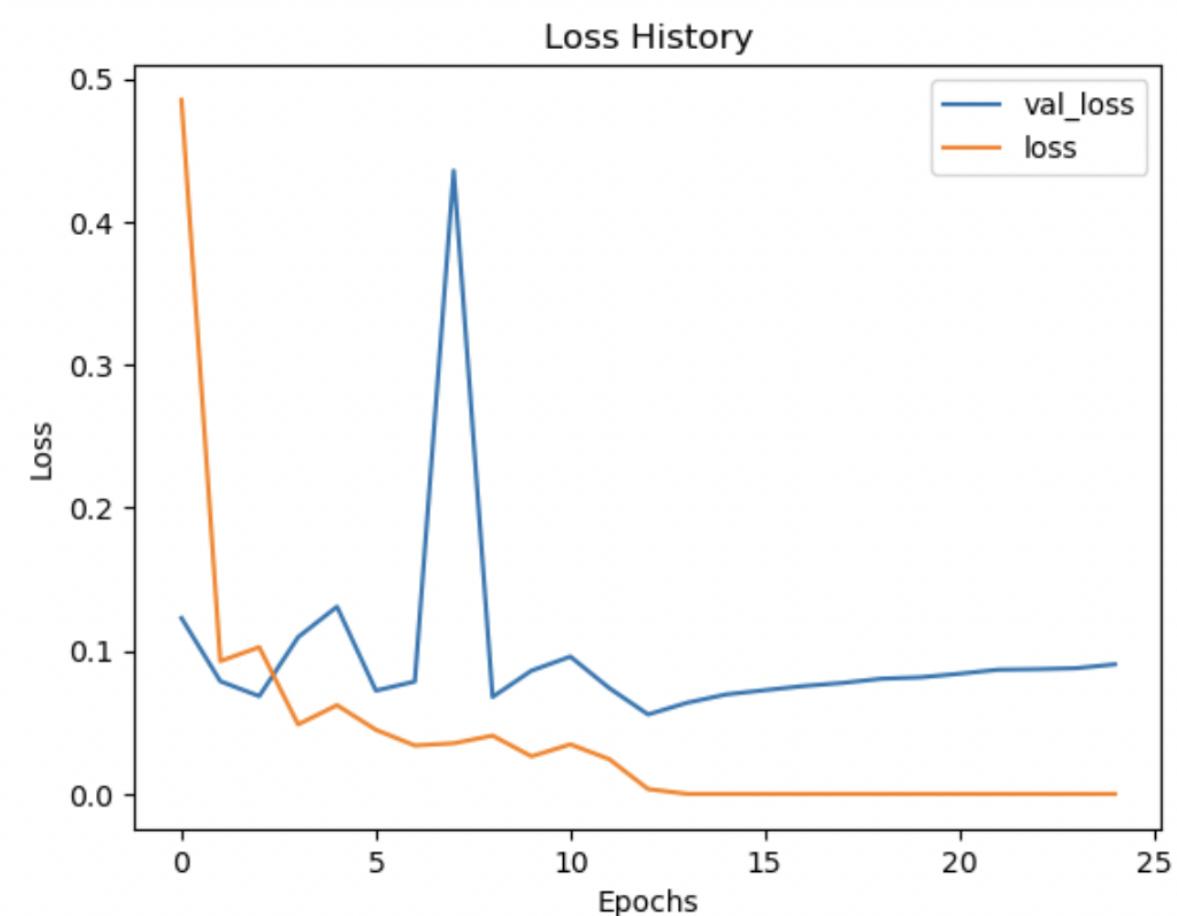
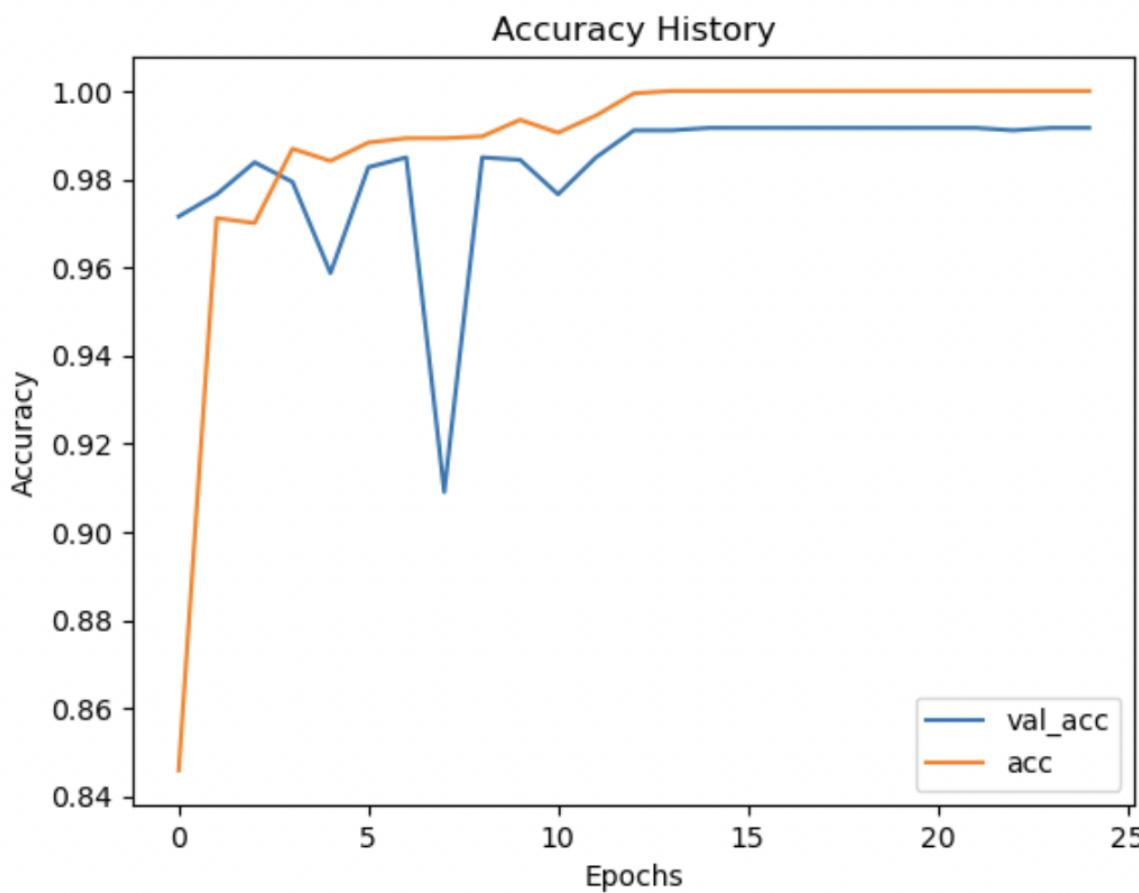
Validation Accuracy Score: 0.9916

Validation Loss: 0.0906

Test Accuracy Score: 0.9053

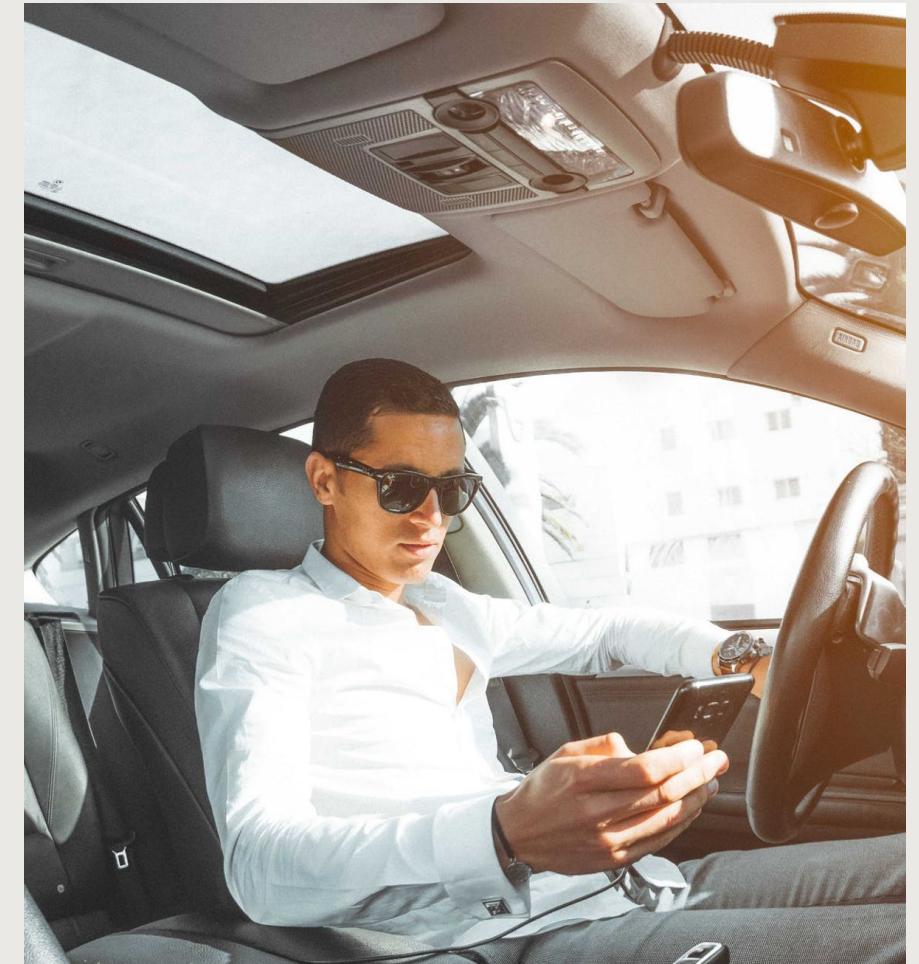
Test Loss: 1.1780

MODELING



LIMITATIONS

- 1 The test images had to be manually labeled, and as a result, the size of the test data is small
- 2 The images are from a single angle, so in practice, the State Farm DashCam would need to be positioned the same way



NEXT STEPS



- 1 Obtain a greater amount of labeled test data
- 2 Build the model based on images from various angles
- 3 Analyze a potential relationship between the use of a DashCam and improvements in driving behaviors



CONTACT INFORMATION

@ jtepper724@gmail.com

 linkedin.com/in/jordana-tepper/

 github.com/jordanate