Distracted driving is a major factor that causes severe car accidents. It has been suggested as a possible contributor to the increase in fatal crashes from 2014 to 2018 and is a source of growing public concern[1]. This project focuses on driver distraction activities detection via images, which is useful for vehicle accident prevention. We aim to build a high-accuracy classifiers to distinguish whether drivers are driving safely or experiencing a type of distraction activity.

The training dataset contains 22,424 images categorized in 10 classes from State Farm®. We randomly split the dataset into two folds: 80% for training, 20% for validation. One category represents safety driving, and other 9 categories represents 9 different distraction activities we consider here.

Images in the dataset have very high resolutions (480 × 360 × 3), and in order to improve the computational efficiency, we preprocessed the images by resizing them to (64 × 64 × 3), followed by flattening the high dimensional image matrix to image vectors as the input to train the classifiers.

The two-layer neural net model gives the best validation set accuracy of 92.2%, which meets our expectation that CNN-based models will have better performance on computer vision task than other modes[2].

For our best model, we studied the per-class accuracy and found out that compared with other class, the model has lowest accuracies on “talking on the phone - left” and “hair and makeup” class, which are below 80%.

### References
