SignalGrab: A Machine Learning Approach to Helping Color Blind Drivers

Mandic, Bora (School: Saint Paul Academy and Summit School)

There are nearly fourteen million individuals with color blindness in the United States. Many individuals with color blindness struggle with differentiating between red and green traffic signals, particularly at night when other visual cues are unavailable. This can lead to traffic hazards for both them and those around them. SignalGrab is a novel approach to solving this problem through a machine-learning-powered mobile app that drivers can use to easily recognize traffic signals. A specialized dataset was created, containing nearly six thousand labeled images of traffic signals at night in diverse conditions. This dataset was used to train a custom machine-learning algorithm that was embedded in an Android app, built using Android Studio. The app has a minimalistic user interface and provides audible information about the type of approaching traffic lights to minimize driver distractions. SignalGrab reliably solves the issue of traffic light recognition for color-blind drivers. In real-life testing, SignalGrab correctly recognizes traffic signals with an accuracy of 97.1 percent.

Awards Won:
Fourth Award of $500