Eye Tracking System

James Zhang
Zhonglei Wang
Kalindu Sembakutti

Distracted Driving

- A serious problem / A big opportunity for us

- Death and Injury.
- Activities lead distracted driving: using cell phone, talking to others...
- Ontario data on collisions from 2013 show:
  - one person is injured in a distracted-driving collision every half hour
  - a distracted driver is four times more likely to crash than a focused driver

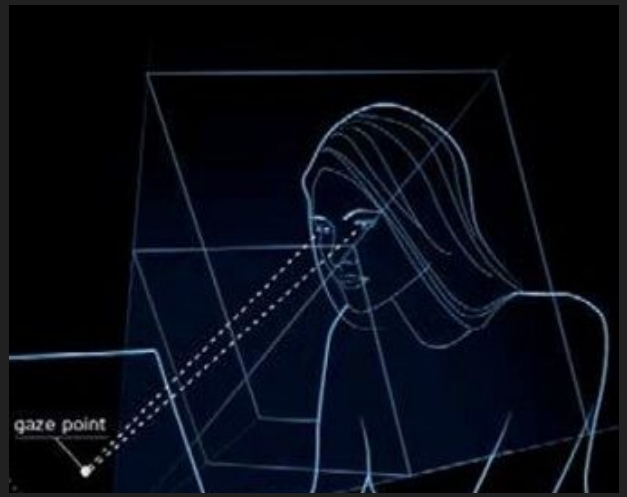
According to a Survey

Our Solution - Eye Tracker

- What is an Eye tracker?

Sensing Device:

Software Algorithm:



Eye Tracking Device

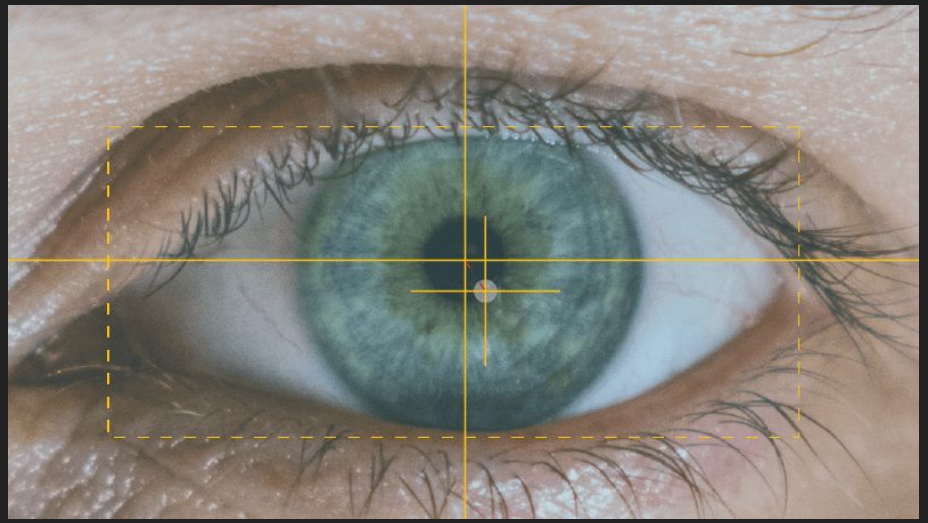
- Device mounted on dashboard
- It detects gaze direction of driver
- If driver is distracted,
  - Audio/Visual Alerts
  - Seat/Steering Wheel vibrate
  - OnStar intercom
  - Notify police/emergency
  - Automatic pull over

Eye Tracking Device

- Device has infrared light/camera
- Near-infrared directed to eyes
- Camera picks up reflections
  - Both Pupil and cornea
  - Vector btw 2 reflections calculated
  - Method: Pupil Center Corneal Reflection
  - Acronym: PCCR
- PCCR calculates gaze direction of eyes

Pupil Center Corneal Reflection (PCCR)

- The Pupil Center Reflection
- The Corneal Reflection
- Camera picks up the reflections
  - Both Pupil and cornea
  - Vector btw 2 reflections calculated
- Relative distance = gaze direction of eyes



Initial Calibration

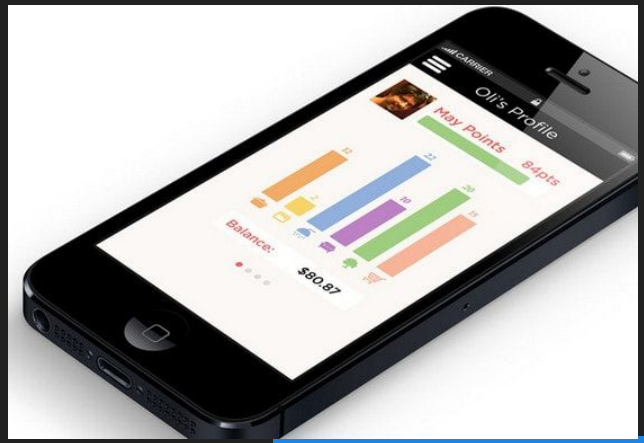
- Software application will
  - Instruct to look at Key Areas
- Driver follows these instructions
- Device is calibrated
  - Based on gaze direction of driver on these Key Areas

Gaze Direction / Eyesight Data

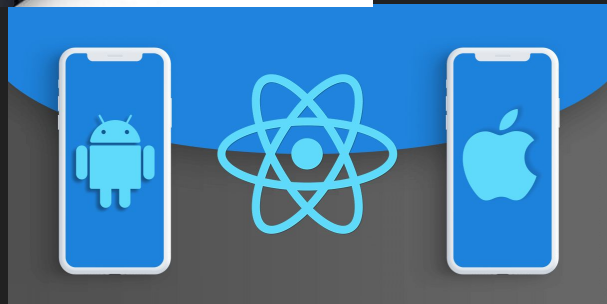
- System records gaze direction
- Driver can view **eyesight statistics**
- On a mobile phone app & web UI
  - Information center
  - Provide insight into driving habits
- Driver can share statistics to get a discount on car insurance

User Interface - Android & Apple

- **React Native** mobile apps
- User-friendly mobile phone apps
  - Graphical Information - Bar Charts
  - Provide insight into driving habits
- Unified data management system
  - Same for both mobile & web
- User interface is customized for each operating system
- https://wangz229.wixsite.com/eyetracksys



Web App



Summary - Thank you for listening

- System records gaze direction
- Driver can view **eyesight statistics**
- On a mobile phone app & web UI
  - Information center
  - Provide insight into driving habits
- Driver can share statistics to get a discount on car insurance