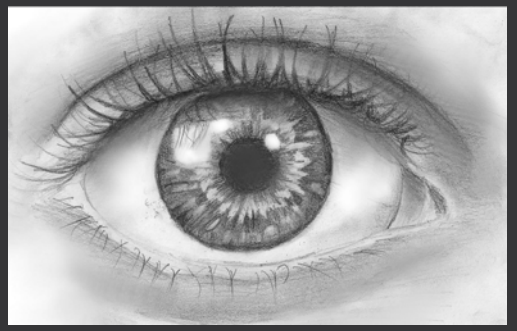
EyeView's Five presents...



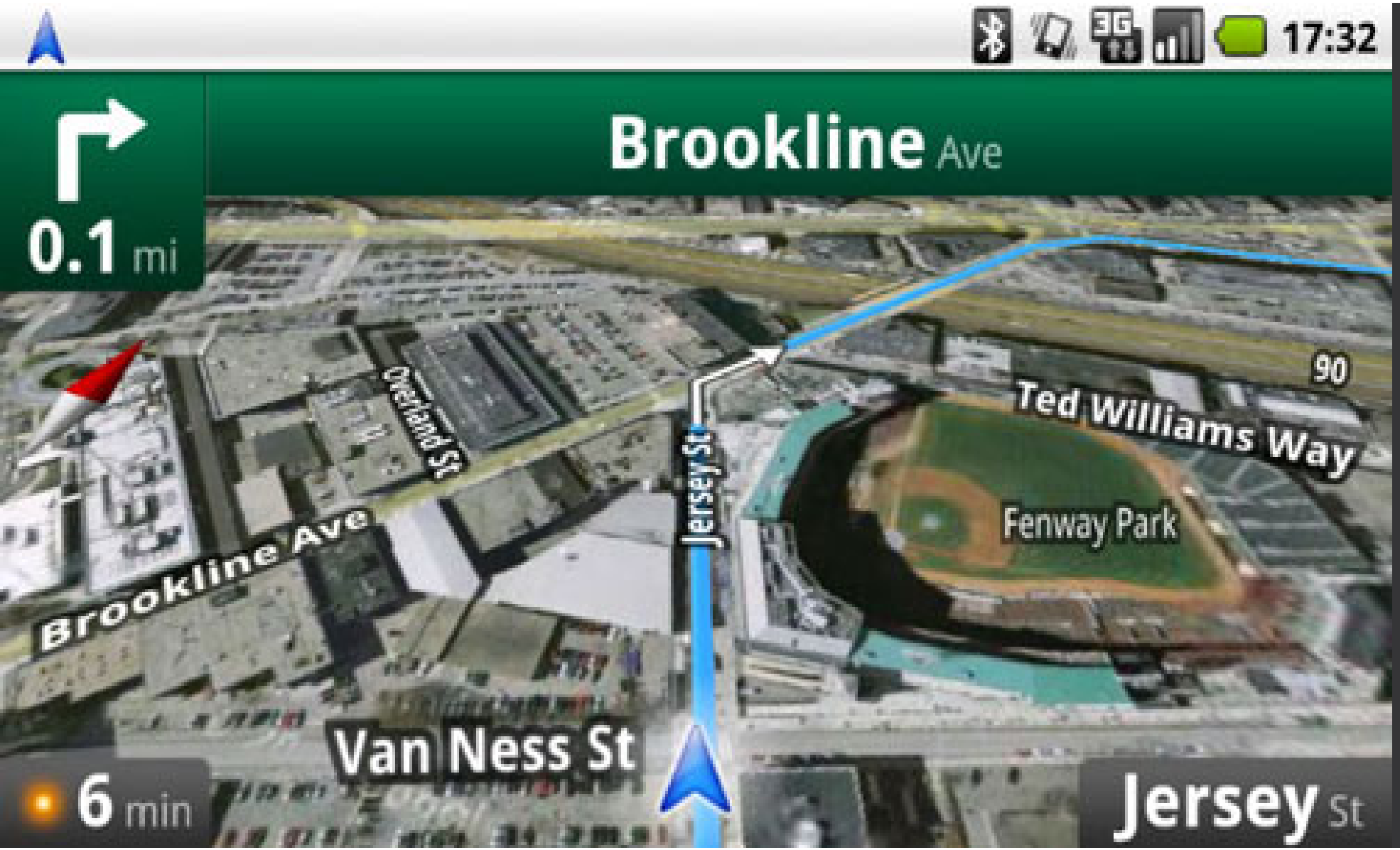
Emmanuel Ademuwagun (EE)
Yusuf Siyanbola (EE)
Patrick Buah (CE)
Zachary Spence (CE)
Jordan Wren (CE)

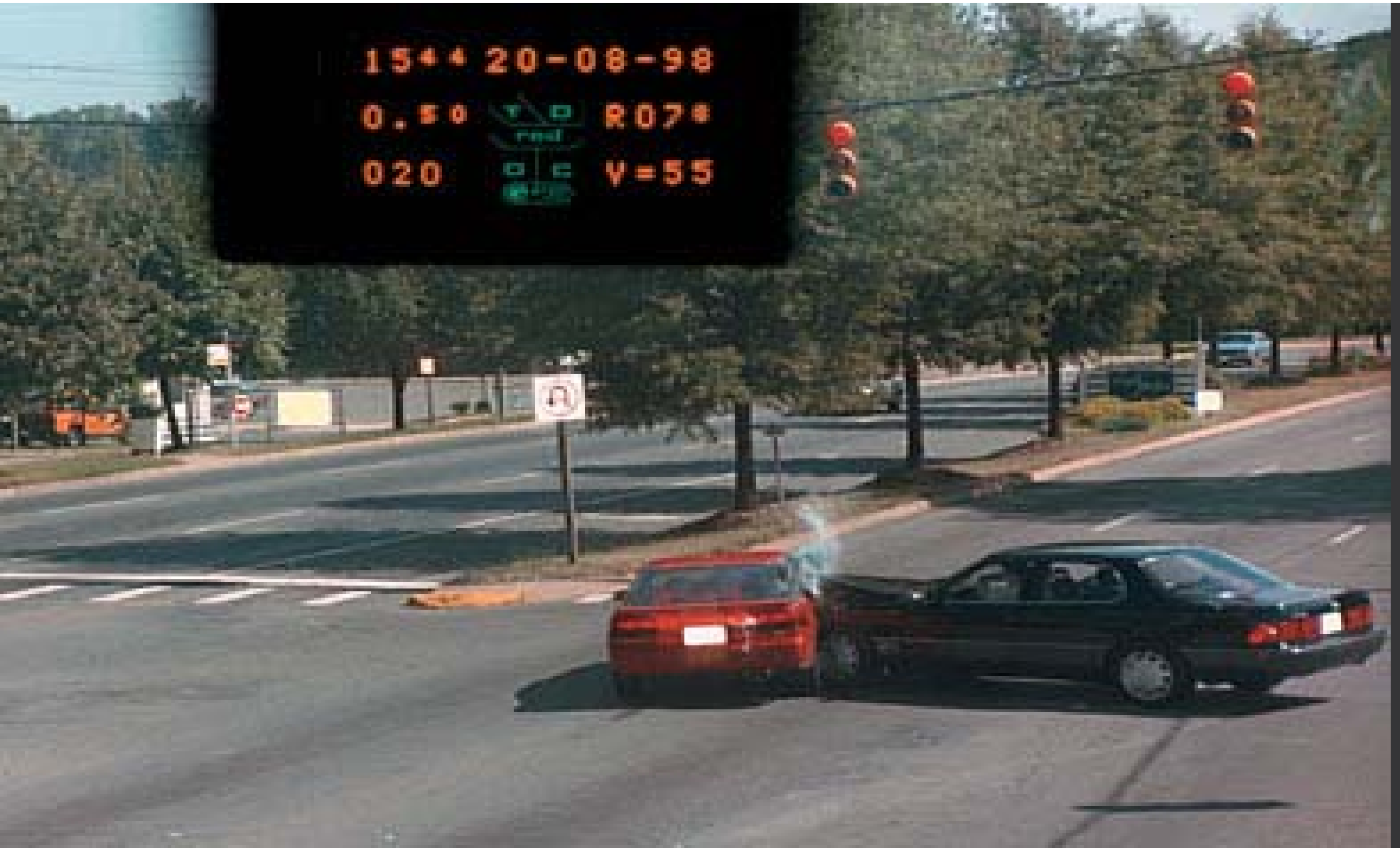
EyeView Navigation

...A NEW PERSPECTIVE...THE IDEAL ALTERNATIVE...NEVER GET LOST

Order of Presentation

- Background
- Problem Statement/Definition
- Current Status of Art
- Design Requirements
- Solution Approach
- Resources and Cost
- Project Management
- Questions


17:32
Brookline Ave
0.1 mi
Overland St
Brookline Ave
Jersey St
90
Ted Williams Way
Fenway Park
Van Ness St
6 min
Jersey St


15:4 20-08-98
0.5° R07°
020 Y=55

Background

- Drivers still make the wrong turns, get redirected in circles, and even get lost because there is still a huge gulf between the navigation interface and the real world driving experience
- Distracted driving, which might be caused by GPS navigation, usually lead to accident at street lights

Problem Statement

"

We wish to develop a navigation device that takes a driver from Point A to Point B with a navigation interface displaying a live stream of the driver's eye view with his route overlaid on the video stream. The navigation device will also have an option to alert the driver when he or she is approaching a traffic light that is on red.


12:33 PM
294
NORTH
40 min


BAND
MEDIA
SOUND
MUTE
MAP
NAV
SETUP
GUIDE
Adjust Display
Make sure that it is safe to back up!
PASSENGER AIR BAG OFF


13°C
Information
Traffic signs
PRNDS
E
002975 mls

Current Status of Art

- **Google Street View** adopts a collection of outdated photos in the Street View navigation feature available on Android phones
- **Rear-View Camera technology** that incorporate safety lines on a camera feed
- **Advanced Car Systems** that can detect traffic lights ahead

Samsung GALAXY S4

android

intel Atom inside

ALTERA Cyclone IV

Design: The Main Actors

- Android Phone equipped with the EyeView App
  - EYEVIEW App
    - Takes in destination address from the driver
    - Connects to a navigational data provider to retrieve route data
    - Send route data to processor
- DE2i Kit
  - The brain of the system
- EyeView Camera
- LCD Display

Design: Compliance

- Federal Communications Commission's (FCC) Part 15 rules with respect to GPS systems
- FCC regulations on Specific Absorption Rate (SAR) of electronic devices (Electromagnetic Radiation from the DE2i Board)
- V C Section 26708 Material Obstructing or Reducing Drivers View

Solution Approach: Scenario I (General)

- Pre-condition(s)
  - Driver has an equipped EyeView Device (DE2i Kit + LCD) connected to a ready EyeView Camera mounted behind the rear view mirror
  - Driver has an Android device with the EyeView App Installed
- The driver connects phone via USB/Bluetooth to the EyeView Device
- He/She launches the EyeView app and a connection is established between the phone and the EyeView Device
- The driver enters his/her destination address in the app
- The route of the driver is overlaid on top of the video stream (received from the Camera) displayed on the LCD

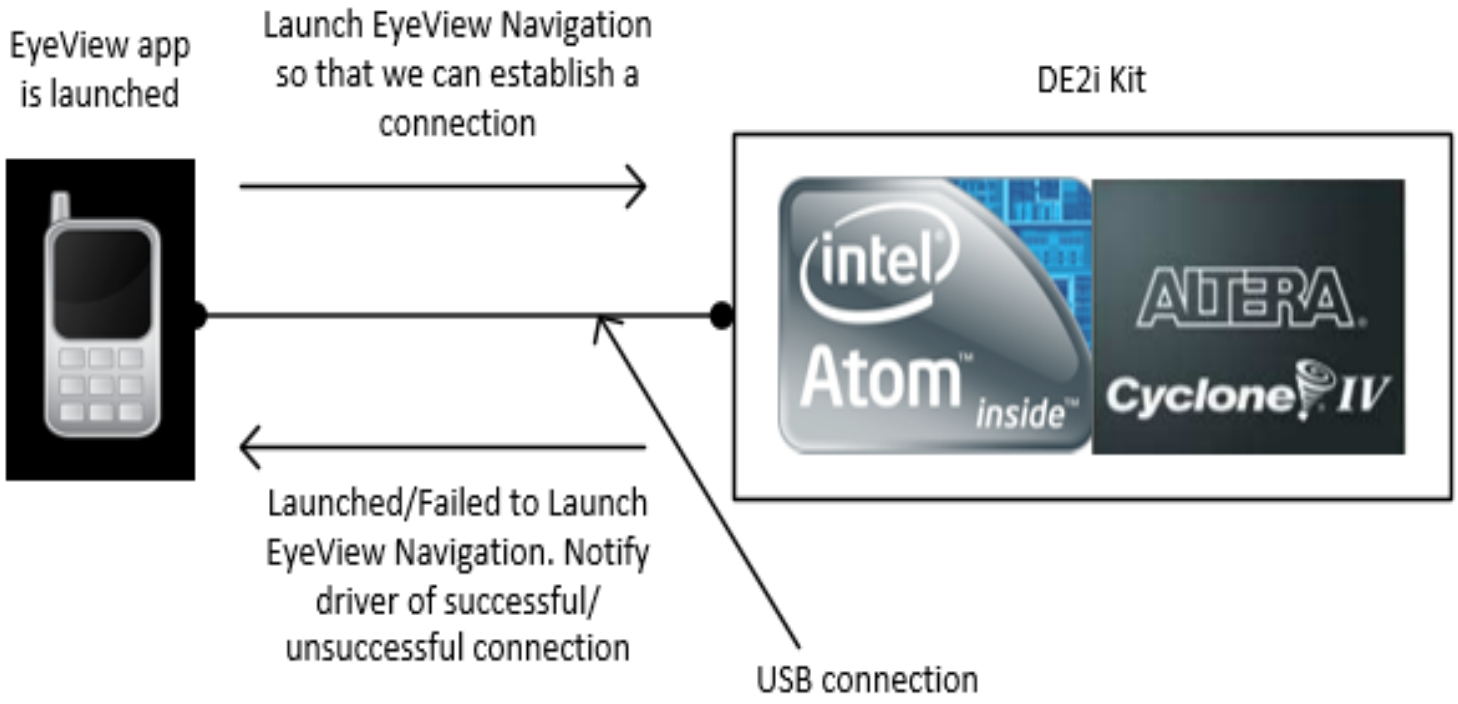
Solution Approach: Scenario II (Rerouting)

- Pre-condition(s)
  - The driver is driving and all connections have been established
- If the driver derails from the path provided, a request is made from the EyeView Device to the EyeView app to generate a new set of route data
- After the route data is requested by the app, the new information is transmitted to the EyeView device and an updated route is overlaid on the video stream

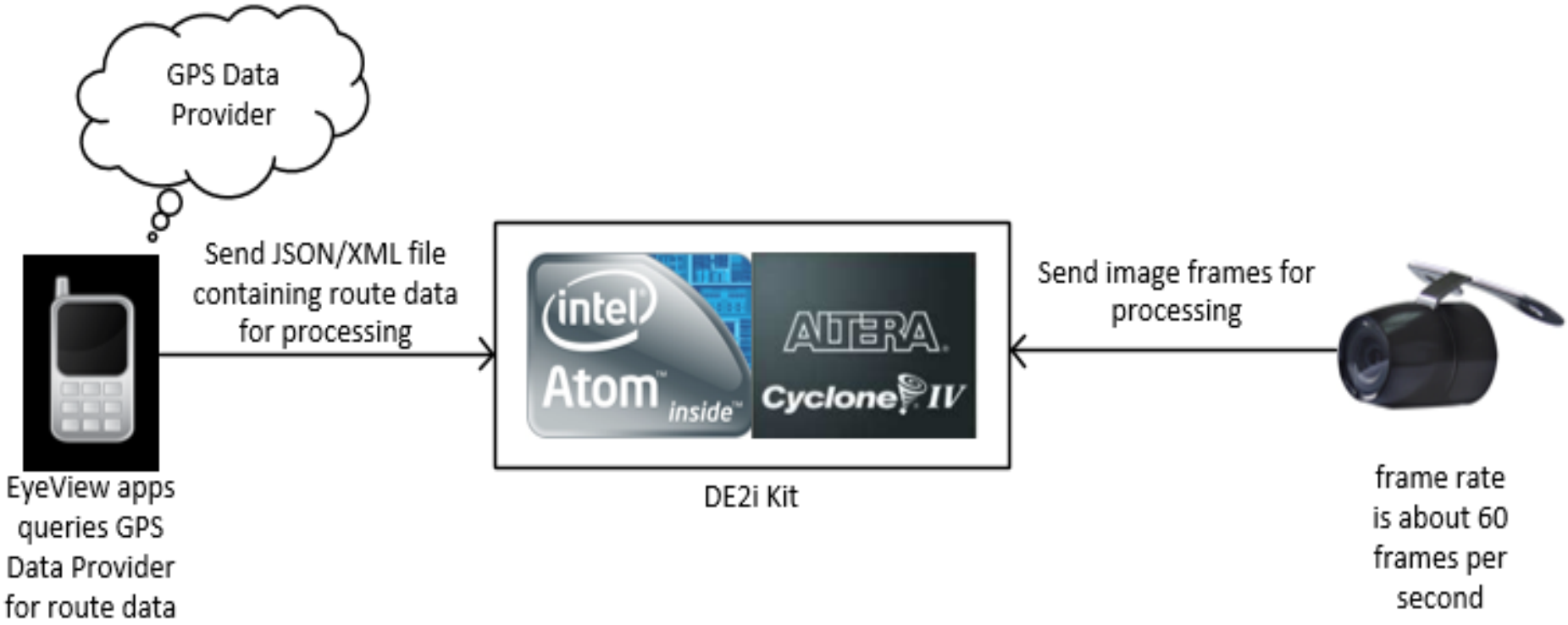
Solution Approach: Scenario III (No Road)

- Pre-condition(s)
  - Driver is currently not on route, and route data is presented to the EyeView Device
- **Road Recognition** (preferably **Lane Recognition**) is the answer in this scenario
- If no road is recognized, no route is presented on the screen

OPERATIONAL PHASE I: Two-way Handshake



OPERATIONAL PHASE II: Data Acquisition and Processing



Data from mobile phone

- XML/JSON file is parsed and the data is interpreted
- Constantly receive updates of the driver's current location
- Calculations are made to determine how to overlay the route on each frame from the camera given the data provided by the mobile app and the longitudinal and latitudinal location of the driver

- Each frame is tested for the presence of a traffic light that is turned red.
- If tested positive, then electric signals are sent to speakers to notify the driver

Frames from Camera

Overlay route on frames and include other navigational elements

Modified frames to be displayed

LCD Display

Resources and Cost

- Capable Smart Phone: $199 – 900
- 5 – 7” LCD screen: $50 – 200
- DE2i Board (Intel Atom + Altera): Free
- External Cameras: $50 – 500

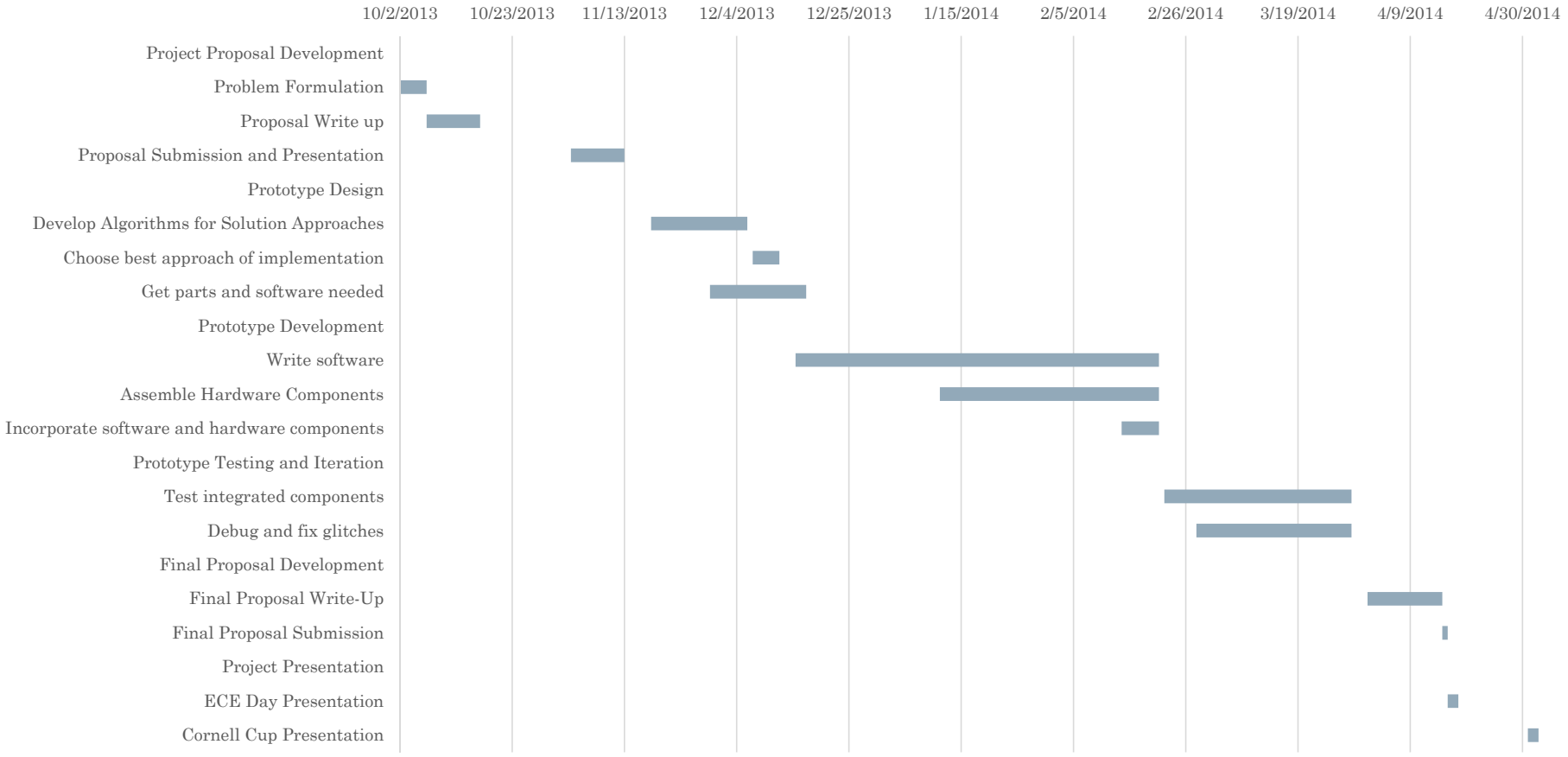
- Cornell Cup Budget: $1,500

Project Management

- **Tasks:**
- Software Development (Emmanuel Ademuwagun)
- Software Test (Zachary Spence & Jordan Wren)
- Program Management (Patrick Buah & Yusuf Siyanbola)

- **Milestones:**
- Project Proposal Development – November 2014
- Prototype Design – December 2014
- Prototype Development – February 2014
- Prototype Testing and Iteration – March 2014
- Final Proposal Development – April 2014
- ECE Day Presentation – April 2014
- Cornell Cup Presentation – May 2014

Gantt Chart: Timeline




Questions