**CSE 535 Project Proposal**

**Title:**​Fuel efficient navigation application

1. **Project Idea**

The app will allow the user to select two points as a starting point and a destination within certain area of Tempe and optionally with stops in between and it will give the most fuel-efficient route to the user between a start point and a destination. The app will utilize the current user location, pre-calculated timing of the specified route to show the ultimate route that will conserve fuel. The timing of the specified route is compared with Google Maps and is report displayed to allow the user to select the most convenient option.

**3. Plan to use external sensors**

For the scope of this project, we do not require any external sensors.

**4. Type of platform being used**

The app should work on Android phones with Android API Level 22+ (Lollipop and above).

1. **Development setup** IDE: Android Studio 3.4 Source Control: GitHub

Testing: Emulator (AVD), Personal Cell Phones. Personal cars.

1. **Specification of context-aware behavior**
   * We will be using GPS to get user’s location on map for turn-by-turn directions
   * We will be using real time traffic data and traffic light data to give the best route for least fuel consumption
   * The data relevant to the route changes constantly based on time of day and day of the week

1. **20 tasks for the project**
   1. ​Pick area to define the scope of the project
   2. ​Examine light signal timings along route for various times of day (morning,afternoon and evening including peak hours and off-peak hours)
   3. ​Ask City of Tempe for data about light timings
   4. ​Determine how much fuel per minute cars use while idling (such asstopped at red light)
   5. ​Get user location via GPS
   6. ​Get traffic data along possible routes
   7. ​Determine algorithm for computing fuel consumption along a graph
   8. ​Build an internal representation of relevant streets for app to compute routesalong
   9. ​Design input data formula for driving time and fuel consumption calculation.
   10. Display route on map that user should take
   11. ​Add traffic/construction/accident info around route
   12. ​Give estimated fuel consumption and trip time for selected route
   13. ​Let user optionally add stops to trip
   14. ​Compute average green light percentages given light timing data
   15. ​Compute in app the single shortest path given traffic and green lightpercentages to find an estimated path with least fuel consumption
   16. ​Determine if we can export route to Google Maps to give user turn-by-turndirections/navigation
   17. ​Drive along computed route and a different route and compare fuelconsumption between them during morning (Weekday and weekend)
   18. ​Perform test during afternoon,evening (Weekday and weekend)
   19. ​Compare output of our app to google maps directions frequently, see howmany times they converge and how many times they differ
   20. ​Testing end to end functionality in android app, using different androidphones and compatibility of UI (User interface)