CS Senior Design 2014

1. Title, names and email addresses of team members, name (department if not CS) and email address of Faculty Sponsor(s):

   Project Title: Develop *General Electric* Intelligent Transportation Systems Wayside Maintenance Worker Mobile Application

   Department: Computer Science

   Team Members:

   - Roberto Atilho - ratilho2012@my.fit.edu - 2033067249
   - Ronald Pekarchik - rpekarch2006@my.fit.edu - 7328295578
   - Rushil Patel - rushil2011@my.fit.edu - 3215147089

2. **Goals:**

   The scope of the project is to develop a mobile application for use by a railway technician to examine a Wayside Controller and determine what has occurred on the track from any given time beforehand. A Wayside Controller consists of the Switch Control, Crossing Control, Signal Control which all provide different functions for the railway in order to guide the train. Developing this application will prevent the technician from having to use a serial cable to connect to the Wayside Controller, therefore saving the technician time and hassle with inclement weather conditions and legacy hardware. The prototype mobile application will connect wirelessly with any Wayside Controller using cellular hardware. The application will also obtain diagnostic information via cellular connection to the wayside box which will then be presented to

the railway technician.

The application will display the information obtained from the log files such as the timestamp, code thrown, and description. This log file will determine from a codebook what it means in plain english and what the technician is to do next. The application must be user friendly for technicians without an engineering background. The application must also communicate with the server located at the train control center in order to update the system via cellular network. This application will be designed to help cut costs and man hours while promoting safety for the technician and railway conductors.

3. **Motivation:**

- Increase the safety of technicians out in the field
- Help a real company save money and man hour resources
- Expand knowledge on mobile application development (Android)
- Learn how to communicate with diagnostic hardware
- Better understand client server communication

4. **Technical Challenges:**

    1. Programming for the Android platform and API
        1. Eclipse SDK
        2. Android OS 4.0 or above
    2. Understanding the current wayside system and Server Communication Protocol
    3. Interpret and parse their diagnostic data format

        1. Written in ASCII/Hex
        2. Codebook for codes thrown
    4. Working with their current running hardware and technologies
        1. Cellular hardware attachment for wireless systems
        2. Direct serial connection
        3. Standalone networks
    5. Improvements proposed: setup SQL Database, Web Application, secure communication between the devices (use ssh over telnet).

5. **Milestone 1 (Feb 19):**
    1. Setup of Android SDK with Eclipse Plugin
    2. Test Android environment by testing "Hello World" within the Android Emulator
    3. Investigate different wireless communication methods
    4. Investigate/select tools, draft requirement document, design document and test plan
    5. Write application to parse log file from the Wayside controller.
6. **Milestone 2 (Mar 19):**
    1. Store "codebook" inside Android application
        1. "codebook" refers to the translation of log files
    2. Design algorithm to compare error codes and lookup related tasks to perform
    3. Design user interface to display human readable translation of log file and follow up steps for the technicians
    4. Research different ways to automate downloading of log files wirelessly

7. **Milestone 3 (Apr 16):**

    1. Setup wireless connection to the wayside controller via cellular network
    2. Implement user friendly GUI for the technicians to work with in the field
    3. Improve/Test application security.

8. **Task matrix for Milestone 1**

Task	Rushil Patel	Roberto Atilho	Ronald Pekarchik
Investigate Tools/Technologies	34%	33%	33%
Requirement Document	30%	40%	30%
Design Document	40%	30%	30%
Test Plan	30%	30%	40%

9. **Approval from Faculty Sponsor:**

    "I have discussed with the team and approve this project plan. I will evaluate the progress and assign a grade for each of the three milestones."

    Signature: _____ Date: _____