Fig. 1. PRT - Morgantown, WV. Adapted From [1]

Improving the PRT through Data Capture and Analysis

PRT Capstone (Group 4)
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1 Project Goals

1.1 Outline

The PRT capstone group will implement data collection technology to address a fundamental lack of ability to gather information about PRT car GPS location, capacity, and power utilization. Implications of this project include increased safety and the ability to analyze collected data to make generalizations about PRT usage and provide new, efficient solutions to common issues.

1.2 System

Collection of PRT usage data will be done via a telematics device that is equipped to a PRT car. This solution is considered a subsystem of the larger PRT System as its operation is separate. The work done by this project group will be done in addition to the typical operation of WVU's PRT System, ensuring the solution does not interfere with the expected daily operation of the PRT.

The PRT data collection system will be implemented on each car, forming a larger network of Raspberry Pi devices. The following report describes the individual Raspberry Pi collection device, but it should be noted that the concept is scalable.

2 Design Requirements and Constraints

2.1 Technical Requirements

2.1.1 Functional Requirements

2.1.2 Engineering Requirements

2.2 Broader Constraints

2.2.1 Public Health, Safety, and Welfare

2.2.2 Global Constrains

2.2.3 Culture Constrains

2.2.4 Social Constrains

2.2.5 Environmental Impact

2.2.6 Economic Factors

Marketing Requirements

Mapping of Marketing Requirements to Engineering Requirements

Engineering and Marketing Requirements Trade-off Chart

2.2.7 Industry Standards

Applicable Constrains and Standards

3 Project Management

In the development of the project throughout the design semester, our project management approach most closely followed the Agile development lifecycle. While we did not spend too much time laying out our approach, we used previous experiences to create a development process that works best for each member of the group. The features of such process, completed weekly or biweekly, include a weekly group meeting to discuss project progress, individual work time, group testing, and a reevaluation of progress upon each deliverable or goal met. The goals for each cycle of our development were determined on a rolling basis, opting to identify which aspects of the project should be focused on for the week that we met.

We schedule non optional meetings at least once a week, with occasional meetings occurring after class on Wednesdays and Fridays as needed for group work and testing. Our document organization was done through common cloud platforms such as Google Drive, GitHub, and Discord. In the future, a more rigid set of rules for a development lifecycle would lend the group well to meet more deadlines, as spending time each week to decide goals can become inefficient.

4 System Design

4.1 Overall Architecture

4.2 System Design

4.3 Risks

4.4 Test Plans

GPS Data Visualization Proof of Concept:

Current Clamp Testing with Space Heater:

5 Individual Contributions

5.1 Andrew DeGarmo

5.2 Samesh Desai

5.3 Emma Kupec

5.4 Kevin Meyers

5.5 Omar Ndiaye

5.6 Greyson Weimer

6 Lessons Learned

6.1 Documentation

6.2 Lessons Learned

7 References

7.1 Sources

[1] N. M, “Prt - morgantown, wv,” Sep 2018. [Online]. Available: https://www.flickr.com/photos/nick-m/2861037302

7.2 Contribution Table

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