

Continuous Visualization of CyRide Through an Interactive Map

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1 Introduction

1.1 Problem Statement

Currently, rural communities in Central Iowa have limited access to reliable wireless connections. The lack of connectivity restricts communication and results in limited internet access to the greater public. The combination of low population density, a plethora of low coverage areas, and unpredictable weather conditions have left rural communities in Central Iowa stranded from reliable wireless connections.

To solve this issue, the CyRide Visualization project strives to provide some critical data to assist the implementation of wireless connectivity across Central Iowa via a visually appealing predictive mapping interface. By using mobile UE devices stationed on vehicles around Ames, our application will be able to gather location-specific connectivity data and apply it to future data sets. These data sets will then be displayed, helping the ARA team develop a network solution for the rural Ames communities and, eventually, all rural communities in Central Iowa.

1.2. Intended Users

ARA Researchers:

- Needs:
 - ARA researchers, which include our client, manage the UE devices throughout Ames. To better understand the data from each UE, they need a reliable and readable application to display the data on a map. ARA researchers also need a way to display trends and predict wireless connectivity through differing times of day and seasons.
- Benefits:
 - This project provides insights into the base station ranges and where the system cannot connect to provide accurate data in the network. These insights allow ARA researchers to build upon the system efficiently to ensure that Ames is connected to provide continuous coverage of vehicle locations. In addition, by managing the transportation system, ARA researchers can uncover important data such as bus patterns, greater involvement, or even better route optimizations.

Ames Residents:

- Needs
 - Ames residents utilize the internet daily, and need to have assurance that their mobile devices will not fail or slow down due to poor connection. They also need a mapping of low coverage throughout Ames so they can plan intracity travel accordingly.
- Benefits
 - Ames residents will be aware of the locations of low wireless coverage, which will optimize their travel plans and ensure they're as connected as possible all throughout Ames.