


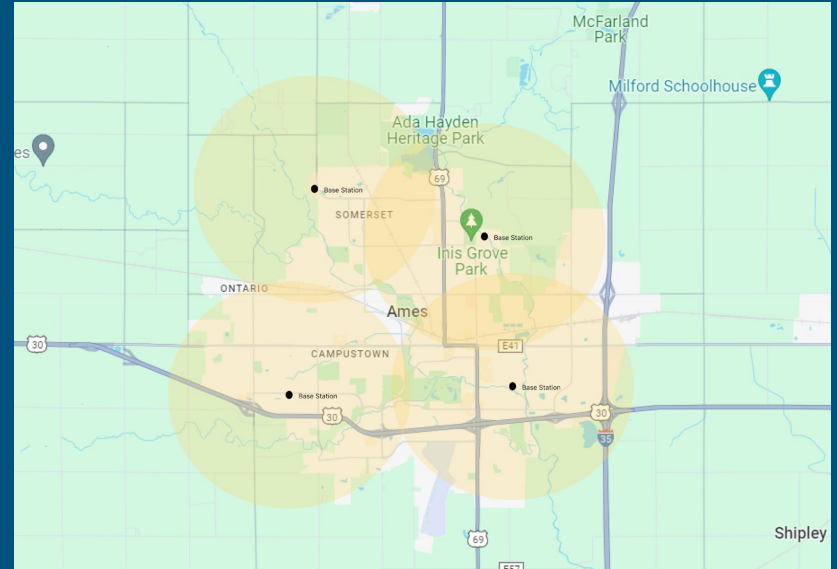
Continuous Visualization of CyRide Through an Interactive Map

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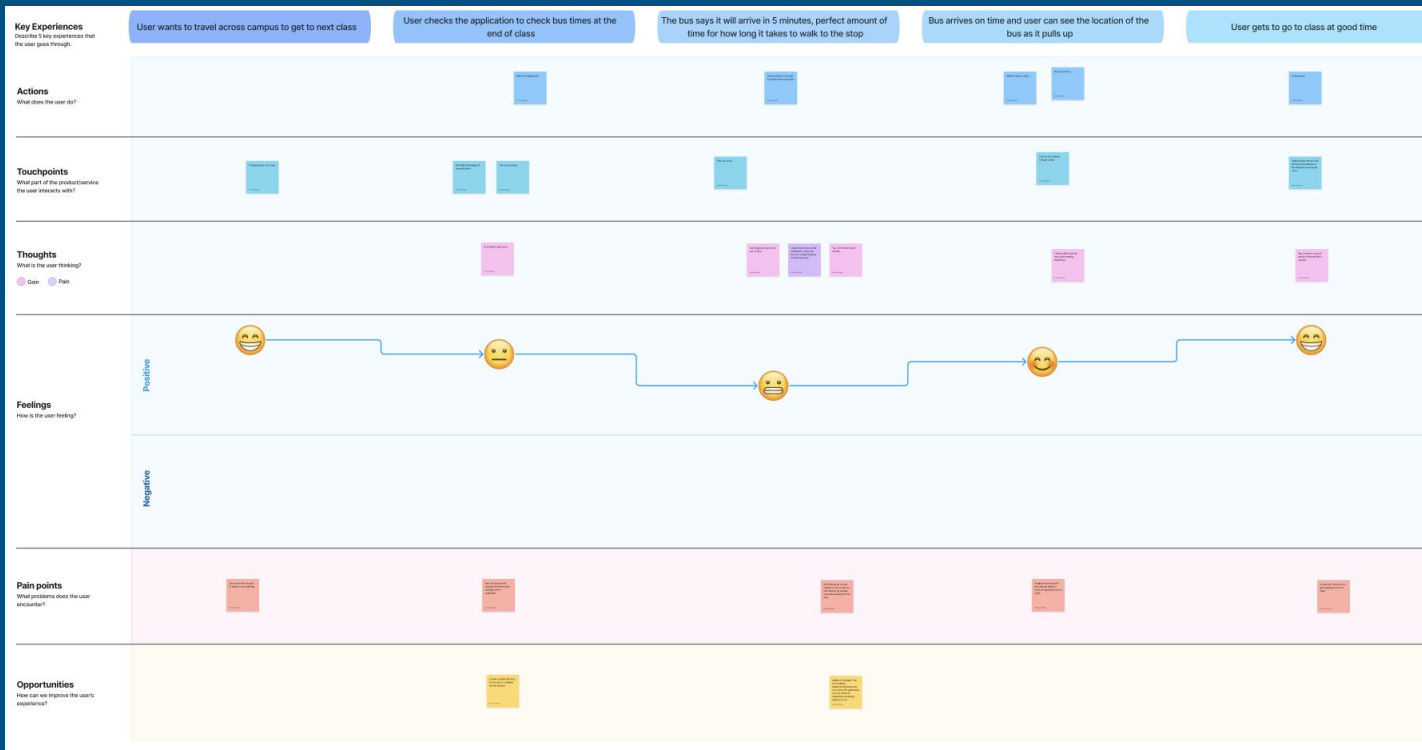


Project Overview

Provide a visualization of Cyride movement through mobile UE (user equipment) devices that transmit their locations when in range of given base stations (signal towers). This is called ARA and provides a wireless network to track locations. When outside of that range, it will predict the movement using GPS locations and machine learning. The application will provide updates on the UE connection and predictions for when a UE will be in range of base stations.



Journey Map



Pros/Cons

- Predictable ML
 - Past locations CyRide
 - Higher accuracy, more time
- More user insights
- Less problematic internet issues

Pros/Cons

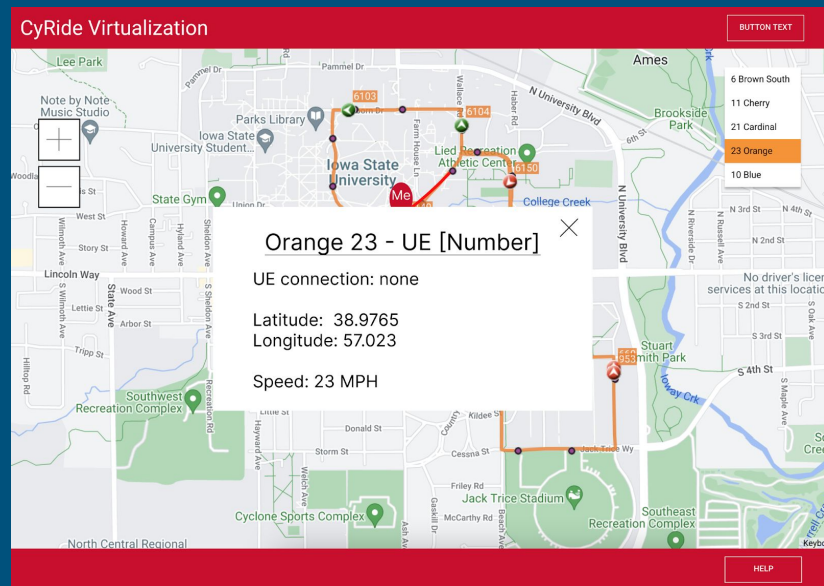
<p>Our application is built using UEs so that researchers can collect the data and improve on the network for ISU.</p> <p>Evan Schlemmer</p>	<p>Our application uses React which is a robust framework for user interfaces. It can also be translated to mobile devices.</p> <p>Evan Schlemmer</p>	<p>Django/React is not as much of a lightweight framework compared to alternatives.</p> <p>Evan Schlemmer</p>	<p>The UE network does not have full range coverage over Ames and will need to supplement with accurate machine learning predictions.</p> <p>Evan Schlemmer</p>
<p>The application will provide more insight into the tracking data and give users more understanding on predictions.</p> <p>Evan Schlemmer</p>	<p>The application is a stand alone solution and won't have extra bloat to the software that could slow runtime.</p> <p>Evan Schlemmer</p>		

Technical Complexity

- Machine Learning challenges
 - Accuracy, learning curve
- Language Barrier
 - Django, MySQL, React
- Real-time location
 - Fetching data from UE device

Human

- Current:
 - Internet connection unreliable
 - Live bus location
 - User friendly
- Improvements:
 - Bus predictability
 - Traffic/crash detectability
 - User notifications



Economic

- New solution for researching mobile UEs
- Allows Ames researchers to collect data from the ARA network
- This will provide live data collection
 - long time frame for accuracy with predictability
- Lightweight alternative to track location data

Technical

- Machine Learning
 - Requires an accurate machine learning model
- External APIs
 - Multiple components communicate to external API libraries
- Security
 - Ensure no threats can access data or servers

Technical

- **Asynchronous**
 - Async calls provide a more efficient backend
- **Big Data Storage**
 - Dealing with big data querying and sorting in efficient time
- **Live Updates**
 - Need fast methods to provide quick updates
- **Many Communicating Parts**
 - Many parts communicate quickly and in different ways

Conclusion

Questions?