NavPal Outdoor App

Android outdoor navigation application for blind travelers

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Introduction and Motivation
- More than 10 million people are blind or visually impaired in the US
- Limited tools for navigation
- Limited information about the environment
- Limited modalities for in-depth safe travel
- Limited accessibility

System Design and Overview

Fig 1. Strategies blind travelers utilize to navigate
Fig 2. NavPal indoor interface

Objectives
- Develop main architecture of the NavPal outdoor application: localizer, route planner, and path extractor
- Make interface highly accessible for blind users
- Develop an interface for trusted user contribution to app
- Breadcrumb approach for users to customize their route information.
- Make the app’s interaction user customizable

Fig 3. NavPal outdoor interface
Fig 4. NavPal Outdoor App architecture
Fig 5. Route planning
Fig 6. Direction and Coordinate extraction
Fig 7. Interface for trusted user data contribution

References

Acknowledgements
- Special thanks to Bernardine, Aaron, Byung-Cheol and Ermine for tolerating my barrage of questions and helping me out during my research. I would also like to thank all the participants who volunteered for the user testing.
- Thanks to the RISS team for giving me this unique opportunity.

Initial User Testing
- Aim: To study app’s accessibility level
- Participants: 4 Blind and visually impaired
- Experiment: The users were given a demo for learning and later were asked to use the app. Each area was rated based on some predefined command flow.

Feedback from participants
- “Would like variable verbosity.”
- “Would like traffic and crossing information.”
- “liked breadcrumb waypoints approach.”
- “Highly recommend the application.”

Conclusion
- NavPal outdoor app’s basic architecture was developed and tested with blind users. The apps performance with respect to the initial user testing, showed that the app was highly accessible and easy to use.

Future Work
- Some of the future work for NavPal outdoor app, is to remove the dependence on the google servers, and to make custom routes based on users preference.
- Other works include user testing on app’s navigation performance and interface like breadcrumb approach.