

EYEscort: Beacon-driven Navigation Service for People with Visual Impairment

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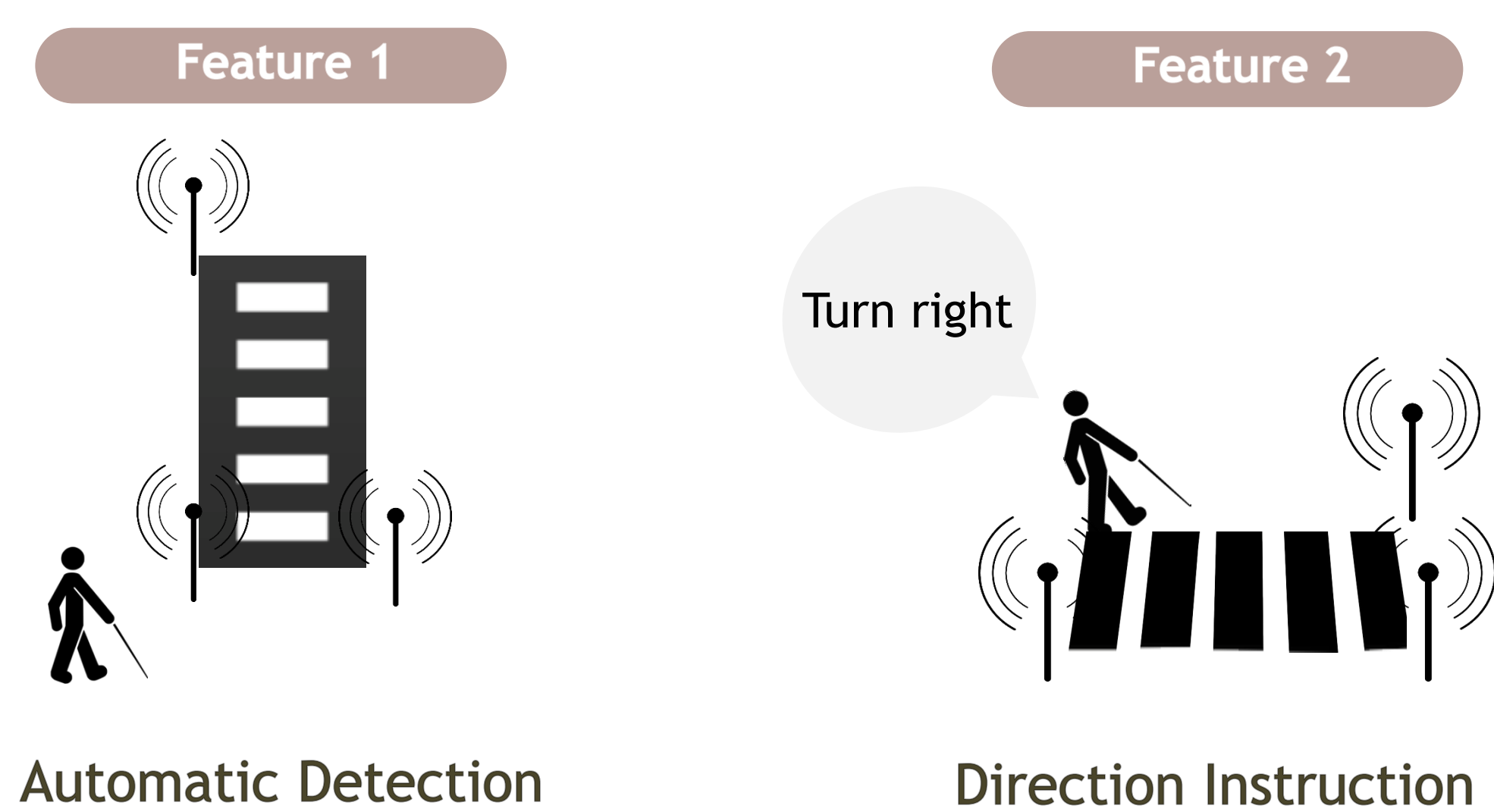


INTRODUCTION

- We propose beacon-driven navigation service for people with visual impairment. EYEscort interacts with beacons to help its users navigate their way around the city.
- We conducted focus group interview on people with visual impairment and reflected their needs, stories, and feedbacks to refine our model.

EYEscort

- Provide guidance and safety for users while navigating
- Provide complete navigation system using Map API and beacon management system



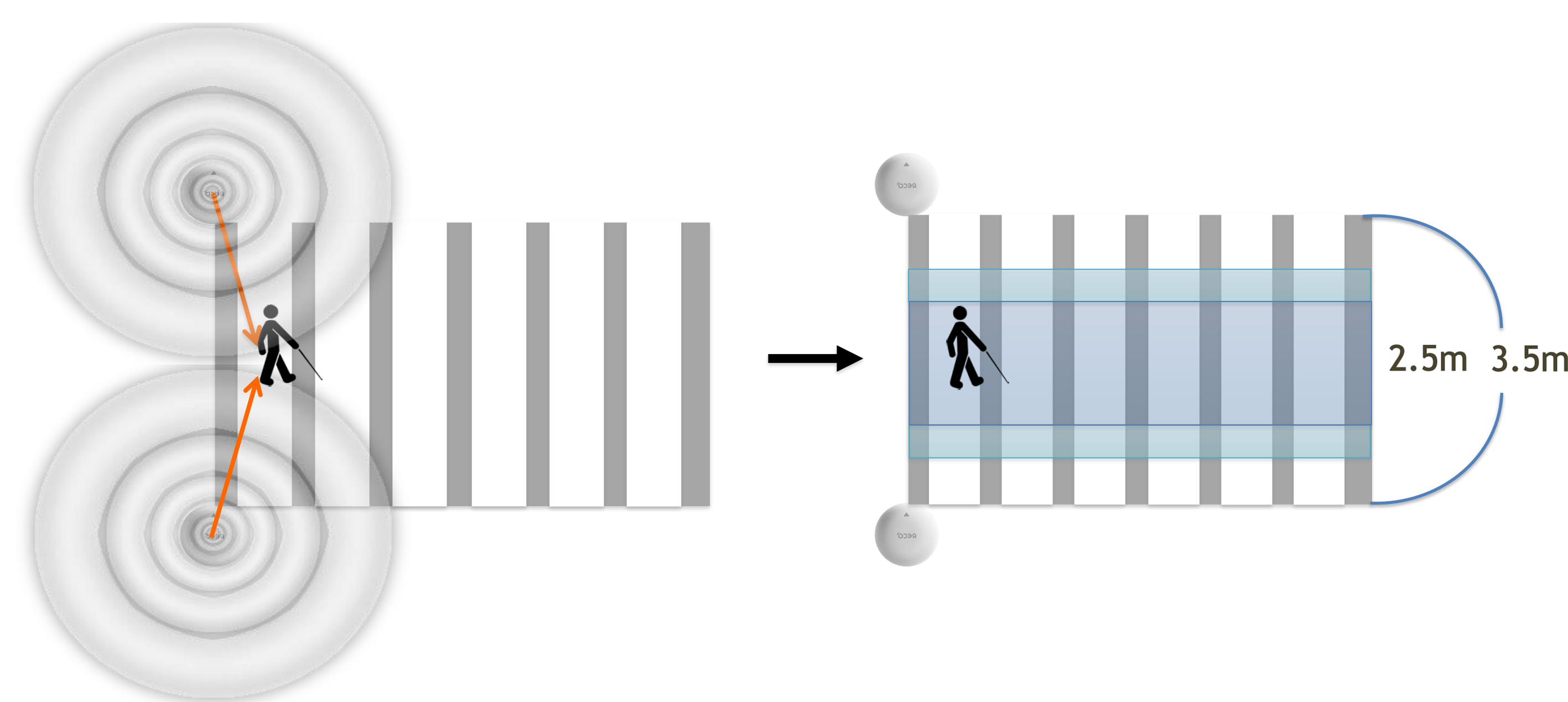
The basic objectives are illustrated above

EXPERIMENT

- Demonstrate usability of EYEscort in helping its users navigate and cross road safely
- Assess whether the proposed method satisfies users' needs
- Measure UX using a qualitative survey (4 usability experts)
- Consideration of multiple scenarios based on user stories
 1. User uses application on his/her own to set up navigation without others' assistance
 2. Guardian sets up navigation route for user
 3. User uses EYEscort to contact guardian in case of emergency
 4. User checks his/her current location in order to confirm that he/she is heading in the right direction
 5. User receives vibration cues to walk straight while crossing the road

EXPERIMENTAL SET-UP

- Place two beacons 3 meters apart
- Considering the delay from beacon signals, safety zone width is set as 2 meters
- Program EYEscort application in a way so that as soon as the distance difference between first and second beacon signal increases over 0.4 meters, it alarms its user



Experimental Implementation

RESULTS

Interface	Satisfaction Evaluation
android app	"It is very easy to use. One good thing about using smartphone app is that everybody already has one and thus does not need to buy or carry additional device."
phone speakers and Bluetooth headset	"Volumes of phone speakers can be adjusted and be heard even when surrounded by noisy environment." "The Bluetooth headset that I use has an External Sound Awareness function which lets me hear outside noises with my headset on, so I think this can be a good option."
sensory cues and notifications	"Voice guidance, vibration cues for direction notification, informing distance in approximate 'number of steps' and not 'meters' is very fitting for the blind."
Functions	Usefulness Evaluation
inform distance to opposite side	"This gives me more control over my actions when crossing the street. It is what I needed."
notify when users deviate from their pedestrian crossing	"Alerting users with vibration cues is very helpful. I will definitely use it when I go out."
allow users to navigate from starting location to destination	"This function is extremely useful. I wouldn't be lost even at complicated intersections."
contact guardian in case of emergency	"Being able to notify registered guardian of my location and call him/her will come very handy in case of emergency."

CONCLUSION

- EYEscort can be an optimal navigation service for people with visual impairment