Disabilites and their effect on Transportation Kiosks

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Abstract

In our research we found that there are 60,000 people who are legally blind acording to a survey done by the city of New York[3]. This represents 0.07% of New York City's population acording to a 2016 estimate of the population[1]. In this paper we will dicuss alternate user interface types and interactions to help better accomodate the large percentage of New Yorkers who have some kind of visual impairment

1 Categories of Visual Impairment

Partialy Sighted This class of visual impairment is characterized by some kind of vision loss resulting in the need for some kind of visual accomodations.[2]

Low Vision "Generally refers to a severe visual impairment, not necessarily limited to distance vision. Low vision applies to all individuals with sight who are unable to read the newspaper at a normal viewing distance, even with the aid of eyeglasses or contact lenses. They use a combination of vision and other senses to learn, although they may require adaptations in lighting or the size of print, and, sometimes, braille"[2]

Legally Blind "Indicates that a person has less than 20/200 vision in the better eye or a very limited field of vision (20 degrees at its widest point)"[2]

Totally Blind No visual sense information is avalible to a person.[2]

2 Challenges for the Visually Impaired

The visually imparied have a number of challenges they deal with in their daily lives that effect what they can and cannot do. West et al. performed a study to find out to what extent visual impairement has on daily activities. The study found specific tasks that become very difficut for those with visual impariment.

Some of these tasks include plug insertion, key insertion, and dialing a phone[4]. These tasks are generalized to spatial awareness which appears to be heavliy impacted by visual impairment. Subjects in this test were also asked to read printed text which was also heavliy affected by their visual impairment.

3 Interface Accomodations

3.1 Spatial Identification

Kiosk Location In our research we found that many of that visual impairment affects the ability to place opjects in a spatial enviroment like placing keys in a key hole or in our case locating the ticket kiosk. We propose adding a theremin directly under the kiosk machine so that support cane users can find the machine by moving their support cane close to the machine. When this happens they will hear a different tones as they get closer to the machine.

Payment Location One of the key issues that we identified was that it may difficult for our visually impaired users to use the payment system in the kiosks because as Kelly et al. pointed out these users have a difficult time placing objects in an open space[4]. For example in their paper they pointed at many examples of users having a difficult time placing one object in another one. This could present a challenge when trying to place dollar bills in the kiosk or a credit card of some kind. **As a solution to this problem we propose adding the same kind of thermin around the location of the payment collection parts of the kiosk.**

General Accomodations We plan to add a zooming feature to our interface to help accomadte those who still have some ablity to see contrast or large letters. Recent versions of Google Chrome have an ability to smoothly zoom in an interface. Adding a read a loud feature is also a requirement for the revised interface.

4 Revised Use Case

4.1 Main Path

1. User is given the option to use a speak aloud interface
2. User can either a “One Time Pass” or “Multi-day pass”
3. The selects one of the two options.
4. The system will prompt the user to select a destination in the case of the one time pass.
5. Once a destionation is entered into the system. The system will display a total for the user.

6. The can input cash, credit or debit.

7. The transaction is completed, and the system will ask if the user would like a printout of the directions to their destination.

8. The user will be given a pass and directions if the user selected it.

4.2 Alternative Paths

4.2.1 User Pass Options

1. The user places their New York City transport pass on the card reader

2. The system will display the amount of credit on the card and the multiday pass expiration dates. The system will also give the user an option to refill the credit on their card or add a day pass.

3. The user chooses one of the two options

4. The user inputs how much credit they would like to add to their card.

5. The system will prompt the user for payment

6. They system will collect payment

7. The user will confirm and leave the kiosk.

4.2.2 Multiday pass actions

1.3 The selects "Multiday pass" and the user is prompted to select 7–day, 30–day or a 1–pass.

4. The user selects one of the passes and the system will prompt the user for payment.

5. The system will collect payment.

6. The user will confim and leave.

5 Conclusions

We found in our report that there were many different forms of visual impariment that could prevent a user from using our original interface adequately. Thus we proposed three key additions that would accomadte those users. First we will implement sound based markers to help the our users with total vision loss locate the kiosks. Second we will be adding a speak a loud option to help users with both total vision loss as well as our other low vision users. Third we plan to add the option to zoom in on any part of the interface to users with poor vision to navigate the kiosk interface.

References

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