Exploring Screenless Browsing for Blind and Visually Impaired Users

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Existing Mobile Systems for BVI Users
Slide Rule
Touch Screens > Physical Buttons

- Layout feedback unavailable on touch screens
- Difficult to develop muscle memory or motor learnability on touch screens due to lack of haptic feedback
Using Slide Rule
Using Slide Rule
Using Slide Rule
Voice Commands

What can I help you with?

"Remind me to pick up my dry cleaning"

OK, I'll remind you.

Reminder

- Pick up my dry cleaning
- Remove

Insertions for Easter"
Voice Commands

Social Concerns

Safety

Privacy
Voice Commands

The dinosaur walked towards me.
Why should we be forced to interact with a physical device to access web services?

Can we decouple the mechanical interaction with the device from the navigation experience?

How can we bypass the screen or the device to help users navigate more efficiently and discreetly?

This opens up a new design space where we focus on reducing the friction of device interaction in navigation experiences.
Screenless Access

Navigate Mobile Web Services through simple hand gestures
Screenless Access Components

Hand gestures
To reduce device friction

Aural Cues
For instant feedback and orientation

Web Services
For content richness and navigation experience

Picture Courtesy
Screenless Access in Action

https://drive.google.com/open?id=0B7-DJnQ9NQs-WVpUdFJNLWR4U3M
1. Binary Aural Browsing

Example: Yelp

Binary division of app content

Hand Gestures

- Double tap - Select
- Make fist - Help
- Wave right - navigate right
- Wave left - navigate left
- Spread - Cancel

2. Free flow navigation

3. Dynamic menu sorting

- More
- Reservations
- Delivery
- Favorites
- Restaurant
- Coffee & Tea
- Bars

- Wasabi
- Qdoba
- Olive Garden
- Osteria Pronto
- Buca di Beppo

- Navigate
- Call
- Bookmark
Our Screenless Access Prototype
**Gesture Mapping**

- **Wave Left** - Move to the previous item
- **Wave Right** - Move to the next item
- **Fist** - Contextual Help
- **Finger Spread** - Navigate back
- **Double Tap** - Select an item
Binary Aural Navigation
Aural Free Flow

Phone

Received  Dialed  Missed  Help  Favourites

2  3

Aural Free Flow
Options read out recursively till users interacts with the system through a hand gesture

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Call in Progress ...
Dynamic Menu Items

Uber

- Fare Estimate
- Arrival-Time
- Help
- Request Ride

- Select Pickup Location...

- Pickup location selected. Select destination...

- Destination selected. Driver Arriving in...

Dynamic menu Items
Based on usage frequency
Initial user study in the works

- Currently designing user study at BOSMA and ISBVI for gauging early feedback on conceptual fit and usability

- Designed so far for very simple navigation tasks. Need for exploring more complex patterns to support navigation in content-rich applications

- Should work well also for sedentary scenarios (not necessarily walking), when environmental distractions are minimal and hands can be fully free

- Interested in broader applicability of the concept to more applications and scenarios (sighted and BVI)
Limitations of the MYO

Gesture recognition is inaccurate at times

Only 5 programmable gestures are available

Takes 1-2 minutes to sync the first time
ANDROID PROJECT

This is the link to the source code:
https://github.com/joeabhishekJ/Audio-Sword
THANKS!

Any questions?

You can find me at
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Some Questions that you might have

- How much will the whole system cost?
- How frequently will I need to charge the MYO?
- Can I hear other sounds when the earphones are on?