BUOY

IPRO 310

Assistive Devices for Blind and Visually Impaired Swimmers

I Swim, You Swim, We All Swim

Agenda

- Problem Statement
- Mission
- Team Organization
- Goals
- Progress
- Team Specific information
  - Current obstacles & solutions
  - Anticipated challenges

Statement of the Problem

Background:

- 1.8 million people in the US are completely blind (US Census)
- 7.8 million blind and visually impaired (BVI) people in the U.S (US Census)
- Up to 80% abandonment rate of Assistive Tech. (Michigan Dept of Education)
  - Did not match needs, lack of training, family/school/workspace non-accepting

Problems:

- Safety
- Independence
- Concealment of device
- Detect obstructions

Buoy Mission Statement

"To develop, test, and implement assistive technology with the community to promote safety and improve independence of blind and visually impaired (BVI) swimmers."

Team Organization

Active Team 1: Invisible Fence Tech.
Coleman Baar (ME): LEAD
Kevin Kruse (BME)
Li Li (EE)
Maggie Ng (BA)
Zhi Ma (EE)
Ryan Freund (CE)

Active Team 2: Sonar Tech.
Meghan Murdock (ME): LEAD
Lorne Turrentine (ME)
Hsuen Yew (BME)
Bingjian Zhang (EE)
Jeff Reilly (Physics)
Mohammed Rehman (ECE)

Documentation
Jeff Reilly (Active 2): LEAD
Coleman Baar (Active 1)
Lorne Turrentine (Active 2)
Ryan Freund (Active 1)

Media
Li Li (Active 1): TEAM LEAD
Bingjian Zhang (Active 2)
Mohammed Rehman (Active 2)
Zhi Ma (Active 1)

Survey
Maggie Ng (Active 1): LEAD
Meghan Murdock (Active 2)
Hsuen Yew (Active 2)
Kevin Kruse (Active 1)

Faculty and Advisors
Frank Lane (Rehab Psych), David Gatchell (BME), Ken Schug (Chem)

Goals

Progress

IPRO It takes a team! INTERPROFESSIONAL PROJECTS PROGRAM

IPRO 310 | **Devices that Assist Blind & Visually-Impaired individuals in Swimming and Other Exercise Activities**

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Suggested links

Chicago Light House for the Blind

Yale University – Cr. Roman Kuc

Duke University

American Foundation for Blind

Notre Dame University

I swim, you swim, we all swim

.: Introduction

The problem posed with blind and visually impaired (BVI) swimmers is one of safety and independence. BVI individuals need to be able to orientate themselves in a swimming pool and avoid obstructions like lane-lines, pool walls and other swimmers for a safe experience. Additionally, it is important to BVI swimmers to maintain their independence and maintain a low profile during this experience. The Buoy team will focus on the design, testing and implementation of assistive technology focused on a pool environment with continuous input and feedback from the BVI community. A current passive device created in previous IPROs will be field-tested in a BVI pool for the semester in order to identify failure-modes of the device and collect real-world BVI user feedback to discover areas for improvement. Additionally, two groups have been organized to assess the use of invisible-fence and ultrasound technology in the creation of new assistive technology. Surveys and interviews will be conducted with the BVI community on a continuous basis to ensure the Buoy team is meeting the needs of the market.

Research/Survey Sub-team

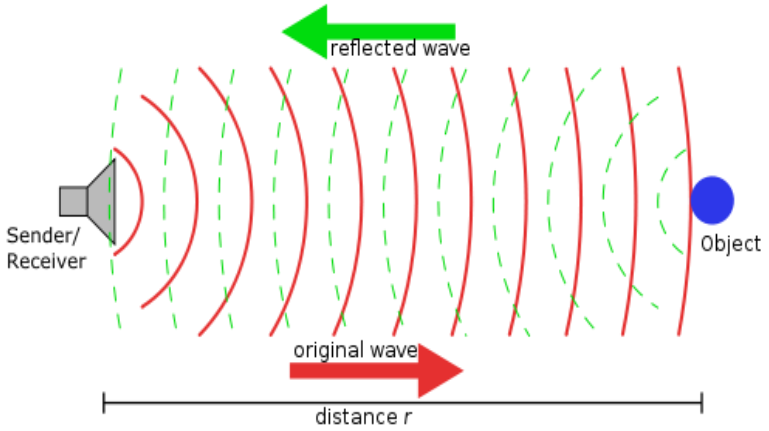
Current Obstacles & Solutions:

- Location to test passive device
  - Wisconsin Center for the BVI
- Modified “user-needs” survey
- Liability & consent
  - Working with IIT Legal & IRB (Institutional Review Board)

Anticipated challenges for this semester:

- Administer survey at The Chicago Lighthouse
- Train Wisconsin Center staff on the installation, storage and maintenance of passive device

Sonar Technology



Invisible Fence Technology

Sonar Technology

Current obstacles & solutions:

- RHIT pilot ruled out sonar
  - Device on swimmer
- Test plans created
  - Preliminary testing of sonar device performed

Anticipated Challenges for this semester:

- Angle and range of sonar detector
- Refraction through changing mediums
- Adjust frequency to pass through water

Invisible Fence Technology

Current obstacles & solutions:

- Build new or utilize existing technology
- Ordered device
  - Researched various brands
- Test plans without device
  - Tentative test plans created

Anticipated Challenges for this semester:

- Creating perimeter of invisible fence
- Modification of the receiver
- Ease of installation

Needs / Questions / Requests

Continued use of Subject Matter Experts

- Military expert
- Research & Development @ Invisible Fence Co.
- Dr. Roman Kuc (Yale University, Intelligent Sensors)
- The Chicago Lighthouse for the Blind

Q & A