

NIST AVT Workshop – Presentation and Poster Abstracts

Sarah J. Swierenga (sswieren@msu.edu), Michigan State University Usability/Accessibility Research and Consulting

Michigan State University Usability/Accessibility Research and Consulting has three accessible voting projects that we would like to present as posters at the ACT Research Workshop in April. The first provides an overview of a completed project, while the second and third present projects that are currently in progress.

Presentation: Accessible Mobile Voting Systems

The goal of this project is to create an accessible user interface and interaction design for mobile voting systems that can be used by developers to create an accessible mobile voting system. The system would be used by voters to fill out and potentially submit ballots on personal devices outside the polling the place.

We will create detailed user interface designs for all screens and pages necessary to complete the standard NIST Test Ballot, as well as provide for instructions, accessibility options, and review pages. Design specifications will include not only the user interface design, but also a detailed interaction design, indicating what the system should do when any particular action is taken by the user on each screen (including swipes, button hotspots, and object highlighting).

We intend for our final design recommendation to be flexible and current, making use of the latest advances and most accessible systems while still being usable on older and less able devices. For example, it is anticipated that the system will allow the user to employ the standard keyboard input on the device for write-in candidates; however, due to the variation in the accessibility of such keyboards (touchscreen vs. physical buttons, button size, etc.), the system will include a built-in alternative keyboard that is designed to be accessible.

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Poster: Testing Usability Performance of Accessible Voting Systems

The overall goal of the project was to develop a suitable, rigorous test protocol for a Voting System Test Laboratory (VSTL) to conduct usability conformance testing of accessible voting systems with persons who are blind, have low vision, or have dexterity impairments in order to ensure that they can vote independently. We first conducted a gap analysis and formal study of existing conformance tests and methodologies for conducting usability tests for accessibility. We

then developed and refined tests and protocols appropriate to the selected demographic groups, before conducting and analyzing dry runs of the test protocol using multiple voting systems to get expert timings. The materials that were developed are intended to be used in pilot testing. The Final Report includes detailed recommendations on preparing systems for testing (including pre-test accessibility inspections and manufacturer's usability tests), planning a study, recruiting participants (including a screener script), conducting sessions (including a session protocol and moderator script), analyses (with new and revised metrics), and future directions. An Appendix identifies over two dozen specific problems found with existing voting systems, as well as potential solutions for each.

Funded by the National Institute of Standards and Technology.

Presentation and Poster: Smart Voting Joystick for Accessible Voting Machines

The goal of this project is to create a smart single-axis joystick to interact with a voting system.

A team of senior undergraduate students from the MSU Electrical and Computer Engineering Department, working with a team of engineering, usability, and accessibility experts, will create a smart single axis joystick with integral display for voting a ballot on a computer system that will mimic the interaction with a voting system as a "capstone" design project. This "Smart Voting Joystick" will have adjustable tension and will provide the user with auditory, haptic, and visual feedback. The joystick will be programmable so that its operation may be changed through firmware upgrades in the future.

In a separate sub-project, a team of engineering professors, teaching assistants, and professional staff from the MSU Resource Center for Persons with Disabilities will oversee 60 students in 10-12 person teams from an introductory design engineering class (EGR100) at MSU to create multiple options for quick mounting of both the joystick and two-button rocker switch. The objective of the design teams will be to create a universal mounting device that will enable voting precinct staff to quickly position the joystick or switch on a wheelchair armrest, lap tray, or other wheelchair part.

The project team will evaluate the usability of the Smart Voting Joystick and universal mounting devices and with a small group of persons with motoric/dexterity disabilities. Participants will use the joystick to interact with a ballot presented on a computer simulating a voting system.

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