

Prime III Ballot Generator Web Portal

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Abstract — Voting technology has never allowed all segments of the voting population to vote privately, securely and independently with equal access. Voting technology has also lacked the ability to generate custom ballots without an experienced programmer while maintaining ease of use for users of all technical backgrounds (novice or expert) and users with disabilities. Disabled voters need to be able to cast their vote without the assistance of others as well as create their own ballot and the solution to this problem should be geared towards their needs. The universal design of Prime III addresses these issues by allowing voting and ballot creation by voice, touch or both. Prime III is one machine that gives equal access to the electoral process for all users.

Keywords — *Universal Design, Voting System, Custom Ballot*

I. INTRODUCTION

Today, Prime III offers a secure, multimodal electronic voting system that delivers the necessary system security, integrity and user satisfaction safeguards in a user-friendly interface that accommodates all people regardless of ability. Prime III implements a universal design. The approach is defined as a design of all products and environments to be usable as possible by as many people as possible regardless of age, ability or situation. Prime III enables those who may have difficulty seeing, hearing, speaking, or reading, as well as those who may have other physical disabilities, such as missing limbs, with the ability to vote securely, privately, and with dignity [4]. Moreover, with the addition of a ballot generator that allows any user to quickly and effectively create a ballot, ultimately makes the Prime III system one of the most complete voting systems ever due to the uncompromised nature of the system and accommodations for both ballot creators and ballot users.

II. RELATED WORKS

A. Voting System

Voting systems can consist of part or total electromechanical components or in conjunction with marksense ballots. A voting system also encompasses objects such as procedures, operating manuals, supplies, printouts, and other software necessities for the system's operation. Prime III encompasses modern voting protocol which allows the users to focus on voting or creating a ballot instead of worrying that all standards are being followed.

B. Speech Recognition

Speech recognition has many commercial and open source systems that are programmed to the needs of professionals and the common user. Prime III uses speech recognition to allow users that might find touch controls hard to execute, the ability to carry out the same actions as they would with their hands but instead in a hands-free solution when voting as well as creating ballot within Prime III.

C. Touch Controls

Touch controls have several advantages such as ease of use, increase in the speed of the required tasks, reduction in the overall size of the computer or device. Prime III uses touch controls to accommodate users with physical limitations that might find using a traditional mouse and keyboard setup difficult to use while voting or creating a ballot.

III. APPROACH

The project approach is to design a ballot generator that can be used in conjunction with the Prime III voting system while maintaining the security of the system (shown in figure 1) and having a universal design. Before I started to design a solution, I constructed two personas (the aspect of someone's character that is presented to or perceived by others) that focused on the technical ability of each person (novice and expert). From the personas, I created reliable and realistic representations of Prime III's key audience segments for reference. From my references, I developed informed wireframes, interface behaviors and labeling for the system.

For example, the approach show below uses a web-based solution that will be constructed using JavaScript, HTML5 and PHP.

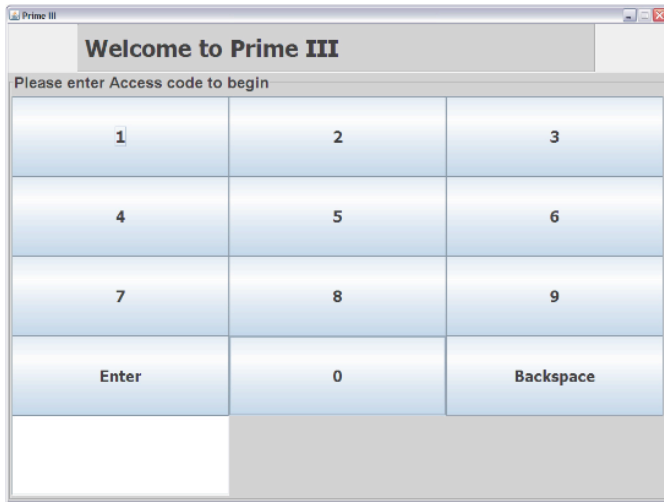


Figure 1. Voting official authentication screen [3]

IV. EXPERIMENT

A. Methods

Koran Wright, Chauncey Rogers, and I, created a list of system needs as well as user needs to determine the scope of the system we needed to develop (as shown in figure 2).

Prime III Voting System System Needs	1.) Ability to accommodate all users despite technical ability	2.) Ability to add contest, party and candidates details	3.) Ability to create, edit, duplicate and delete ballots quickly
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Figure 2. System needs

As a result, we created our own ballot creator design and received feedback from users on what they liked and dislike about each design respectively. I formulated a demo script as well as a user testing script to perform all my testing. During my testing, I asked users to perform the following task:

1. “Since you know you have access to this product, how would you access it?”
2. “How would you create a user account?”
3. “How would you create a ballot?”
4. “How would you edit a ballot?”
5. “How would you duplicate a ballot?”
6. “How would you delete a ballot?”
7. “How would you access the ballot generator’s settings?”
8. “How would you access the system’s accessibility settings?”
9. “How would you access help for the system?”

Using the data collected from the questions above, I was able to make key adjustments in each iteration of my personal design (as shown in figures 3-5). We all had multiple iterations, in which every time we tried to accommodate the user’s needs more efficiently. Following our fifth iteration,

we once again came together to weigh the pros and cons of each design.

B. Results

From my first iteration, users recommended condensing the options (preview, duplicate, delete and finalize ballot) into buttons that can be accessed from the overview tab, where all the ballots can also be viewed. Also, users preferred to have a dedicated home button incorporated into the navigation bar.

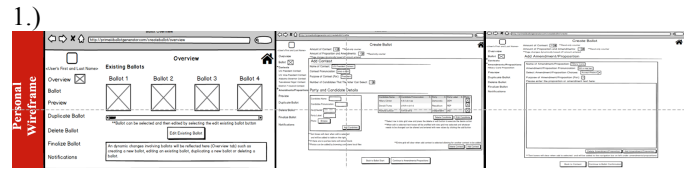


Figure 3. My personal wireframes

From my second iteration, users recommended making the add contest process easier to understand while still having all the needed tools to view and add contests. Also, the users preferred to have instructions on how to start editing, duplicating and deleting ballots.

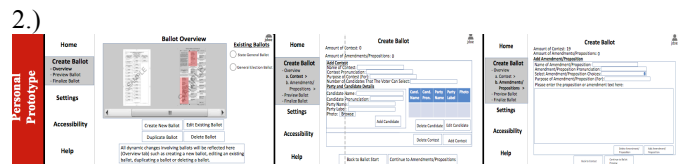


Figure 4. My personal prototype

To formulate the third and final iteration, we compared the pros and cons of each of our personal designs and merged them into one. Ultimately, we decided to use my overall layout and features while improving on all of our cons. For example, one of my biggest challenges was adding contests in a user-friendly manner while having minimal clutter.

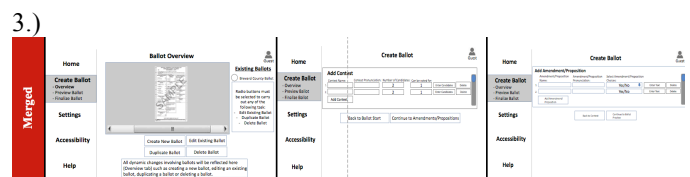


Figure 5. The merged prototype

V. ANALYSIS

Ultimately, the problem was the lack of a ballot generator to use in conjunction with Prime III. Hence, prior to development an experienced programmer was required to generate the needed ballot. Although, now, due to our research and design, Prime III will have a ballot generator design that effectively accommodates the following content: touch controls, hit targets, text size, contrast, spacing and distortion. It is our belief that the introduction of several new features and a new design will encourage users to not only view their available content but to also generate new content.

VI. CONCLUSION

In conclusion, Prime III allows voters to confidently cast their ballots and generate custom ballots in a private and secure environment. A voter can vote or elected officials can create ballots using voice, touch or both. This is accomplished by providing a multimodal user interface. The multimodal user interface allows every registered user to cast their votes or create ballots equally using one system. This is a major convenience for all users regardless of ability or disability because Prime III has multiple safeguards measures in place to ensure the best experience [3].

VII. TAKEAWAY

During my design process, I have learned that developing a user-friendly application involves an extensive amount of time gathering user feedback to create the best design possible. As a result, my original design completely evolved due to the feedback I received at different stages in the process (wireframe to prototype). Also, in the future, the goal is that the design will be implemented as a part of the Prime III system.

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