CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36684

Project Title

BliPC: A Low Cost Computer for the Blind Using a Raspberry Pi and Cloud Technologies

Abstract

Objectives/Goals

Create and program a computer for the blind community at a low price using inexpensive modern technologies. The computer should be able to allow the blind to 1) View and Edit Word Documents, 2) Send an email, and 3) Use Search Engines to browse the web.

Methods/Materials

Material: Raspberry Pi Model 2B running modified version of Debian OS. Wireless Keyboard with Braille Stickers. Wi-fi Module for Internet Connectivity. Open Source Libraries: Chromium, ChromeVox, iSpeech TTS, Cepstrial TTS. Developer#s Guide for Chrome Extensions, Apps, and Plugins(developer.chrome.com/extensions/devguide) outlining steps to developing applications for Chromium.

Methods: 1) Connecting Hardware Components. 2)Programming and Developing Hardware Components. 3) Testing and Modification of Software Components. 4) Final Usability Testing.

Results

What Worked:

Developed computer in the $300 range which is roughly $1000-5000 cheaper than other braille computers. Users are able to create documents, send emails, and use popular search engines such as Google to browse the web. The 4 main BliPC software and applications for Chrome worked smoothly. BliPC Screen Reader worked perfectly, with no errors at all and the BliPC WebText worked smoothly as well, converting most websites to all text and removing all images. The BliPC File Manager worked every now and then, and the BliPC TTS engine was the backup incase the Cepstrial TTS engine failed. BLIC, a brand new computer language for the blind, worked perfectly with the compiler compiling programs correctly.

Improvements to be Made:

The TTS engine malfunctioned every now and then, making it harder for the user to understand what was happening on the computer.

Conclusions/Discussion

BliPC met all of the original expectations the computer should be able to perform. Reliability of BliPC#s TTS Engine continues to be a problem and needs work to be done. All components of the BliPC aside from the TTS engine work smoothly. Since BliPC shows promise as an inexpensive computer for the blind, I have released the project#s source code on GitHub for the community to help build a stable version of BliPC in the future.

Summary Statement

I created an inexpensive computer for the blind using modern technologies and the cloud, and developed a computer language that developers and the blind can use to enhance user experience on the BliPC.

Help Received

I designed and programmed the project myself. I read quite a bit of articles on the Internet, and researched on the Google Developer Database. I found the motivation to create my project from my Science Teacher and Parents.

Preliminary