

Smart-Cane Technical Survey

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1 Summary of pages cited.

1.1 Smart cane that detects obstacles and water puddles in the way.

This project is very similar to what we are planning to do. It uses a whole system comprised of a walking stick, an Android mobile application, a Raspberry Pi, a GPS, and sensors. It also uses an app that can make the user communicate with their family or friends during an emergency by tapping the power button multiple times or by shaking their smartphone. We can use the idea similarly by having it call 911 or campus staff instead of their family members. This way they can get help during an emergency in a much faster way.[1]

1.2 Smart cane using Arduino.

This, again, is very similar to the ideas we have for our smart cane. This uses Ultrasonic sensors to detect obstacles and potholes, which correlates to our obstacle-detection idea. Instead of using an iOS mobile app, this uses an Android mobile app, but it is still the same logic: have the sensors send feedback to the phone and then the phone gives speech output to the user. This along with the use of GPS and an emergency alarm make it a good project to look into and try to improve it in our version.[2]

1.3 BlindSquare: an app for the blind

BlindSquare is a mobile app that determines your location and gives navigation feedback back to the user. It can tell the user if it is nearing a cafe, or some other place of interest. It also takes interactions, like shaking the device, to give information about the nearest intersections and streets. We can use this for our app and our cane to direct the users to the buildings and rooms that they want to get to. [3]

1.4 Using a cane with haptic and auditory feedback on Virtual Reality

Although this is all made in virtual reality simulations, it was made to test the effectiveness of audio/haptic feedback by a cane and how beneficial it could be for those who are visually impaired. The study showed that using said device did help the test subjects to navigate through the virtual world (they were blind). Since our

cane will also have the options of having audio and/or tactile feedback, then this study can help us see how these stimuli can affect the users. [4]

References

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- [3] "What Is BlindSquare?" BlindSquare. Accessed February 10, 2020. <https://www.blindsquare.com/about/>.
- [4] Zhao, Yuhang Bennett, Cynthia Benko, Hrvoje Cutrell, Edward Holz, Christian Morris, Meredith Sinclair, Michael. (2018). Enabling People with Visual Impairments to Navigate Virtual Reality with a Haptic and Auditory Cane Simulation. 1-14. 10.1145/3173574.3173690.