Smart Cane

An Annotated Bibliography

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References

[1] M. Lan, A. Nahapetian, A. Vahdatpour, L. Au, W. Kaiser, and M. Sarrafzadeh, "Smartfall: An automatic fall detection system based on subsequence matching for the smartcane," in *Computer Science Department Electrical Engineering Department Wireless Health Institute University of California Los Angeles*, 2009.

> In this paper, the authors noticed that falls were the leading cause of death for elderly. They developed a system that can be installed on a previous SmartCane system they had developed recently. This system uses a method called subsequence matching, which is different from how most other fall detection systems function, and through this have developed a near perfect fall detection system. This sort of technology could be useful in our design as part of an emergency detection system to keep the user safe in the event of an accident.

[2] R. K. Megalingam, A. Nambissan, A. Thambi, A. Gopinath, and M. Nandakumar, "Sound and touch based smart cane: Better walking experience for visually challenged," 2015.

> This paper is an introspective to another design methodology used for an entire product. This time the focus wasn't on cheapness or ease of use, but rather on adding more "smart" features. Their main goals were object detection and integrating that with an Android device via Bluetooth. This will be

useful information as we are also planning on integrating our device with a smartphone app.

[3] J. Sakhardande, P. Pattanayak, and M. Bhowmick, "Smart cane assisted mobility for the visually impaired," in *International Journal of Electrical and Computer Engineering Vol:6*, 2012.

This is a look at a current product on the market. It was developed primarily with ease of use and cheapness in mind. The paper goes into detail on their design process and how they made certain decisions. This will be useful both in seeing what methods they used to keep cost down while also giving an insight into what features are considered the bare minimum for a cane to be called "smart".

[4] A. Serino, M. Bassolino, A. Farne, and E. Ladavas, "Extended multisensory space in blind cane users," in *Association for Psychological Science Volume 18-Number 7*, 2007.

This paper does research into how our body interprets certain stimuli around the hand and how that can help blind people visualize their surroundings. Through their studies, they discovered that using certain methods of audio-tactile feedback greatly expanded the pre-hand space of blind subjects. Interestingly, the space was limited to just around the hand if they held only the handle isntead of the full cane. This paper can give us an insight into what kinds of feedback would be good to use for our device.