Using Radio Frequency Energy Harvesting in Near Field EEPROMs to Assist the Blind in Urban Environments

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This project was done in order to design a system that could assist the blind by providing information of their location. It was hypothesized that it could be possible to design a system capable in using radio frequency energy harvesting to power a near field EEPROM which can transmit information to a near field reader in order to assist the blind in providing crucial location information. To support this hypothesis, or design goal, a unit was integrated using an NFC antenna, NFC reader/writer, Arduino processor, and text-to-speech module. Also, trials were done measuring reading distances of NFC through various materials. This was done in order to determine the mounting height of the antenna off the ground when the unit was incorporated to the blind cane. The trials showed that there were not significant changes in average reading distance when reading through various materials. The NFC antenna was able to read NFC tags through linoleum tile, ceramic tile, carpet square, turf square, and oak block. The farthest average distance for the antenna to be able to read the NFC tag was through the linoleum tile at 23.69 mm. The shortest average read distance was 20.807 mm through the ceramic tile. The range of the average distances was only a mere 2.883 mm. Also, information was gathered through these trials showing that the NFC antenna was unable to receive information through the copper tile, demonstrating that NFC could not transmit information if metal covered the antenna or tag.

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