The Sensor Embedded Cane for the Visually Impaired

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The white cane, due to its current design, is unable to offer the visually impaired a level of independence that is achievable with modern technology as it can only detect obstacles up to knee -level of the user and detect obstacles in motion at a limited distance range, denying the user enough time to react appropriately for example, when a vehicle is involved. The sensor embedded white cane looks to upgrade the current cane by increasing obstacle detection and safety of the user. This was done by including a Passive Infrared sensor which detects obstacles in motion due to the presence of constituent slots that record differential changes- positive and negative- of infrared signals. This occurs when a warm body body enters or leaves the sensing area. The ultrasonic sensor is also used to detect potential obstacles at a far distance from the user through the use of a proximity sensor. The vibrating motors are used to alert the user of these obstacles via haptic feedback. The pitch of the beep given by the buzzer depends on the distance of the obstacle from the tip of the cane. The closer the obstacle the higher the pitch of the beep. Observations and basic testing confirm the effectiveness of the vibrations in the handle and the accuracy of the ultrasonic sensors up to 1.5 metres past the tip of the cane. This distance may be adjusted during coding of the final product. An Arduino micro-controller controls the sensors. A radio frequency transmitter can be used to remotely track the cane in the case where it is lost or misplaced. The Arduino can be re-coded to suit the preferences of the user. This technology can also be expansively used to create a haptic shoe. All this is aimed at providing mobility with certainity.

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