Unbind the Blind: Engineering an Emergency Evacuation Solution for the Visually Impaired

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The hazards of fires are some of the most dangerous matters emergency-dispatchers deal with. A myriad of fatal-risks are linked to fires, including the quick spread of inhalable toxic-fumes, the high-temperatures that can cause life-threatening burns, and the difficulty of escaping. Although fires are fatal to all, disabled-individuals suffer most in these situations. Particularly, for those who are visually-impaired, navigating through fires is difficult and ease of escaping is essential to preserve life. This project aimed to engineer a systemic, affordable, and simple-to-use guide-cane geared to aid in escaping house-fires, one of the leading causes of death. The cane was built from an affordable base-model and was outfitted with immediate one-click SOS assistance along with a live night-vision rotatable camera that pairs with a one-click cell-phone dispatch-connection application. The single-touch solutions allowed blind-individuals to quickly call for help, and the camera allowed emergency-dispatchers to verbally-guide the individual regardless of smoke or position. The engineered-cane was compared to a regular guide-cane in various 10-meter escape tests, and on average, the engineered-cane had an average rate-of-escape at 31.203-seconds for the full 10-meter course, as opposed to the regular guide-cane at 75.826-seconds. The engineered-cane displayed a much faster escape-time, which is critical considering a spark can spread to a full-fire in just 30-seconds. The engineered-cane with the guided-camera was successful in evacuating a blind person within the 10-meter tests. By providing one-click accessibility, the evacuating individual could focus their mobility on the cane and guidance.

Awards Won:

Fourth Award of $500