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## LOW COST ULTRASONIC BASED WIDE DETECTION RANGE SMART WALKING STICK FOR VISUALLY IMPAIRED

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### ABSTRACT

Blindness is a medical condition that requires approaching life in different ways. Unfortunately blindness still lacks proper care in the world. Many investigations have been carried out to facilitate the self-sufficient movements for the blind. The basic elementary instrument used is the traditional white cane. Many electronic travel aids have been introduced to the global market. However, more consideration is required for drawbacks of high cost, less user friendliness and less accuracy in these electronic travelling aids. Overcoming the challenges for visually impaired victims this article proposes a low cost ultrasonic based smart blind walking stick. This is a technological upgrade to the traditional white cane normally used by the blind. This device assists the victims to walk more confidently and independently. Most of the visually impaired belong to the low income community. Hence the main consideration was developing this device with Low cost and best achievable performance. This design for the visually impaired is integrated with a water sensor and ultrasonic obstacle detection sensors. The different obstacle conditions namely; mud puddles, low lying objects, ascending stairs, descending stairs and head high obstacles can be effectively and accurately detected. Early warning of danger is conveyed to the user due to the feature of wide obstacle detection range. The user is alerted by unique fingertip vibrations and sound patterns corresponding to the relevant user alert. The innovative design of the stick enables more compatibility and a wider obstacle detection range for the device with high accuracy. The low cost achievement of this design is outstanding with a total cost of less than 30 US dollars which can be further reduced in mass production.

**Keywords:** Electronic Travelling Aid; Low cost; Ultrasonic sensing; Obstacle detection; Vibration alerts