

Title : IOT BASED WALKING STICK

PRESENTED BY

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PROBLEM STATEMENT

Visually impaired people and elders are facing difficulties in identifying obstacles around them especially during walking and crossing the road which may lead to accidents and lack of confidence in them.

OBJECTIVE

- ▶ IOT is an emerging topic of technical, social, and economic significance , it extends internet connectivity beyond devices like mobile , desktop , tablets to a diverse range of devices.
- ▶ This smart stick is assembled with the ultrasonic sensor, PIR sensor, flame sensor, gas sensor and 3-axis accelerometer inbuilt in NI-myRIO; all of these components can detect the dangers and alert the user regarding the same. Both ultrasonic sensor and PIR sensor contribute for obstacle detection, while the ultrasonic sensor can sense non-living and stationary objects, PIR sensor can detect living beings or more specifically warm bodies

SOLUTION TO THE PROBLEM

- ▶ The proposed prototype is an electronic device that constitutes of obstacle detection module, a fall detection module, hazard detection module, navigation module combined with GPS and IOT, alert system along with distress button and the main processor used here is powered by an external battery which is National Instruments myRIO.
- ▶ All the mentioned components are combined and mounted on to a walking stick.
- ▶ The project also incorporates IoT technology to interconnect the fall detection, obstacle detection, and hazard detection modules with the internet and thus report any instances of a fall and/or abnormal conditions which the holder may have to face to the family member(s) of the vulnerable person via Email through LabVIEW software.
- ▶ A special distress button will be used by the vulnerable person in a situation where they come face to face with dangers unexpectedly, to connect with the family immediately.

FEATURES

- 1.Obstacle-Detection-Module
- 2.Flame detection module
- 3.Navigation module
4. Alert system
- 5.Fall detection system

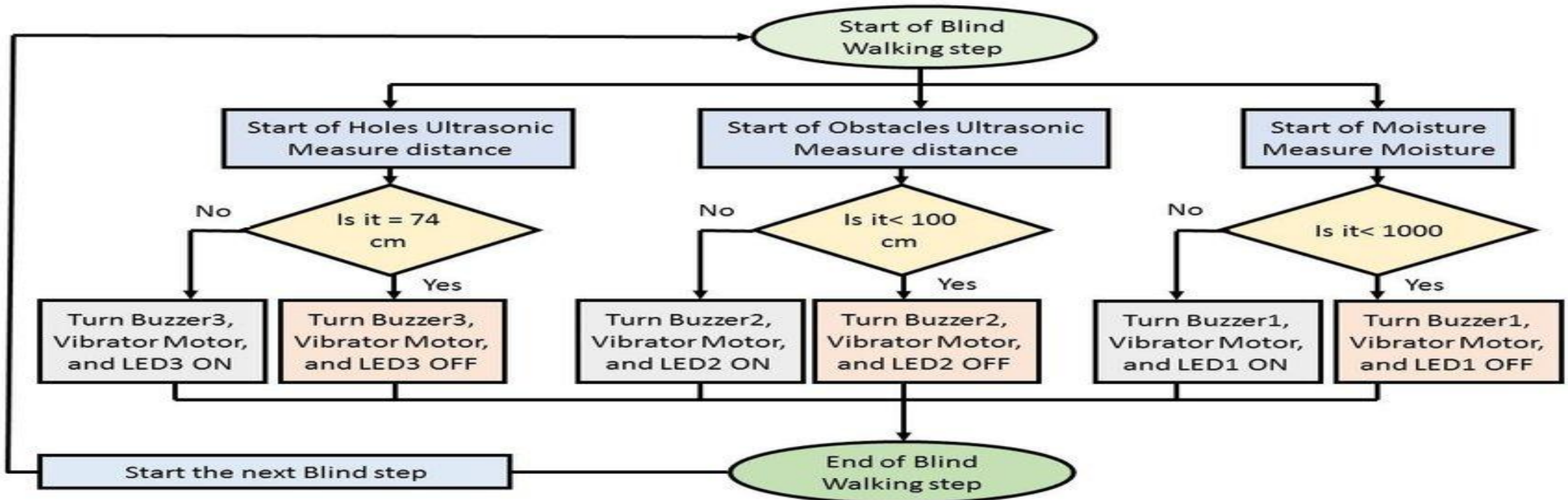
SPECIFICATIONS

- This smart stick is assembled with the ultrasonic sensor, PIR sensor, flame sensor, gas sensor and 3-axis accelerometer inbuilt in NI-myRIO.
- This myRIO is the hardware which can execute the instructions that we design in the LabVIEW which is the software which acts as the interface between hardware components and myRIO. Obstacle-Detection-Module consists of two sensors (i) ultrasonic sensor (ii) PIR sensor. Flame detection module contains a flame sensor.
- It can detect infrared light with a wavelength ranging from 700nm to 1000nm. The NI myRIO is an embedded design device which was created for students to —do real-world engineering. It features a 667 MHz dual-core ARM CortexA9 programmable processor and a customizable Xilinx field programmable gate array (FPGA) that can be used to start developing systems and solve complicated design problems faster.

LOGIC

This stick is equipped with infrared sensors to detect stair cases, and a pair of ultrasonic sensors to detect any other obstacles in front of the user, within a range of four meters. A water sensor is also used in the system, which detects water on the user's path.

PROCESS FLOW MODEL(Diagram)



MARKET ANALYSIS

1. Most commonly, stick is use by blind and elderly people as a support for their body to stand and walk.
2. The smart blind stick can be trained for more number of objects which in turn would help the blind person to move around in various neighbourhoods with increased level of safety
3. In the future, the stick can be used for face detection.

COMPETITIVE DIFFERENTIATOR

Currently there is no competitive product that helps visually impaired people and elders during walking to detect obstacles or objects. So our product can help them.

STAGES OF WORK

- ▶ Stage 1 : Literature Study ,Customer Survey
- ▶ Stage 2 : Developing database and storing contents in it
- ▶ Stage 3 :Camera and speed detector installation at signals
- ▶ Stage 4 :Integrating cameras, speed detector and lights
- ▶ Stage 5 :Testing and debugging

Project Milestones

Milestone	Month1	Month2	Month3	Month4	Month5
Literature Study & Customer Survey	1 Month				
Mobile App Integrating Camera API, Adding Toggle Button		1 Month			
Identifying the object, Tracking the motion of the object			1 Month		
Enabling Auto Switching between front and rear camera				1 Month	
Testing					1 Month December 2022

Effort Estimation

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Key activities	Estimated Efforts	Remarks
Literature Study & Customer Survey	Duration – 1 Month 4 Hour / Week / Member 4 x 4 x 2	32 Man Hours
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Effort Estimation

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<ul style="list-style-type: none"> • • 	<p>Duration – 1 Month</p> <p>4 Hour / Week / Member</p> <p>4 x 4 x 2</p>	<p>32 Man Hours</p>
<p>Enabling Auto Switching between front and rear camera</p>	<p>Duration – 1 Month</p> <p>4 Hour / Week / Member</p> <p>4 x 4x 2</p>	<p>32 Man Hours</p>
<p>Testing</p>	<p>Duration – 1Month</p> <p>4 Hour / Week / Member</p> <p>4 x 4 x 2</p>	<p>32 Man Hours</p>
<p>Total Effort</p>	<p>Man Hours</p>	

Entry Criteria

- ▶ In the existing applications there is no automatic switching function available to identify and track the objects in the mobile camera
- ▶ A New Toggle button added to the Video Call Screen to automatically switch between the front camera and rear camera by capturing and tracking the object.

Exit Criteria

- ▶ Commercialized to one entity which will detect the obstacles in a particular distance only because of the safety purpose. It will have a huge impact in future and we can avoid most of the accidents of the blind peoples.

Commercialization

- ▶ Commercialized to one entity which will detect the obstacles in a particular distance only because of the safety purpose. It will have a huge impact in future and we can avoid most of the accidents of the blind peoples

Future Enhancements

The smart blind stick can be trained for more number of objects which in turn would help the blind person to move around in various neighborhoods with increased level of safety. In the future, the stick can be used for face detection.

Thank You

