Project Proposal: Smart Blind Walker

Background

Globally, an estimated 40 to 45 million people are totally blind, 135 million have low vision and 314 million have some kind of visual impairment. The incidence and demographics of blindness vary greatly in different parts of the world. In most industrialized countries, approximately 0.4% of the population is blind while in developing countries it rises to 1%. It is estimated by the World Health Organization (WHO) that 87% of the world's blind live in developing countries.

It is estimated that by the year 2020, all blind-related numbers will double.

Our solution is to provide an embedded system that can provide real time guidance about the number of safe steps the user can make.

Description

Tool

The tool is a belt like a wearable item which consists ultrasonic sensors and a headset as basic components. A complete user manual is included with the instrument for the walker to get started with the help of another person.

Basic Logic

- SMART BLIND WALKER is a Galileo Gen2 based embedded system project that supports blind people. The tool will be adjusted on the waist of the user that has three basic ultrasonic sensors
- A sensor focused degrees straight on the face of the walker.
- Two sensors angled 60 degrees from the basic sensor focusing the left and right-hand side in front.
- The tool would initially refer to the sensor in front and details about the path in front (up to 300cm) will be taken into account. If the path is clear a voice output is generated indicating the walker can move forward.
- In case that the sensor focused forward identifies an object within the reach of 30cm (adjustable), the tool invokes a voice output indicating you cannot walk forward anymore and starts referring to the other sensors (focused sideways)
- The two sensors would measure individually their paths in front and take distance measurements of the paths (up to 300cm). Number of safe steps the user can make in both sides will be indicated to the user with a voice output.

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Project Requirements

Functional Requirements.

- Able to calibrate the step size of the user.
- Guide the user with audio instructions.
    - Indicating the user whether he/she can move forward (if yes provide number of safe steps he/she can make also) or not.
    - Indicating the number of safe steps, the user can make in left, right directions.
- To be able to work in dynamic environment.
- Control the volume of the output audio.
- Manually allow the user to get number of safe steps that he/she can make in left, right directions.

Non-functional Requirements.

- Need to use in dark time also.
- Portability – Belt like wearable thing.
- Need to last up to 20 hrs.
- Less heat dissipation – as the user may need to wear the belt for longer time.

Objectives

- Get sensor distance reading.
- From the reading calculate number of safe steps the user can make assuming a step size of 30 cm.
- Generate proper audio output.
    - Case 1 (Number of safe steps > 0)

      Indicate the user that he/she can move forward and provide the number of safe steps he/she can make.
    - Case 2 (Number of safe steps == 0)

      Indicate the user that he/she cannot move forward.

      Indicate the number of safe steps that he/she can make in left, right directions.
- Calibrate the step size of the user and use that as the step size.

Group Members

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