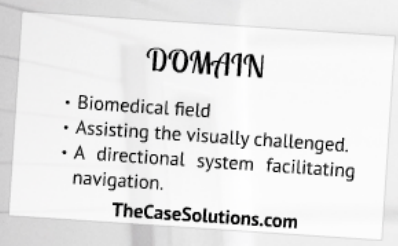
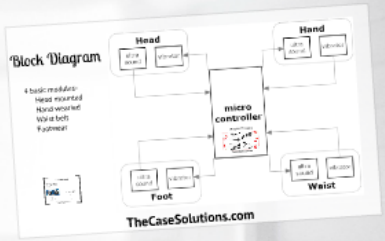
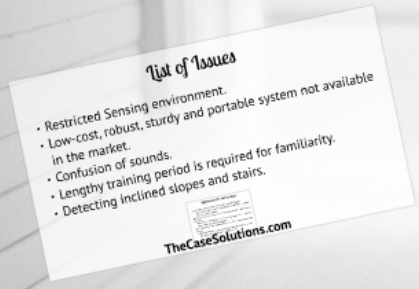
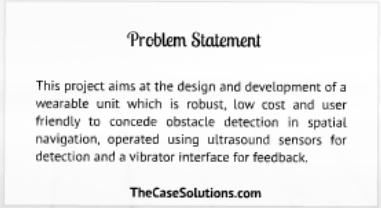
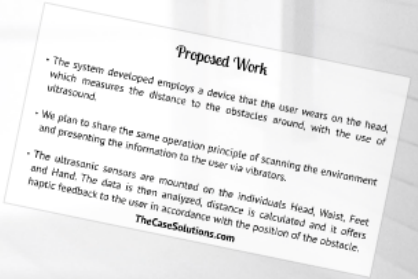
salaUno: Eliminating Needless Blindness in Mexico











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salaUno: Eliminating Needless Blindness in Mexico

DOMAIN

- Biomedical field
- Assisting the visually challenged.
- A directional system facilitating navigation.

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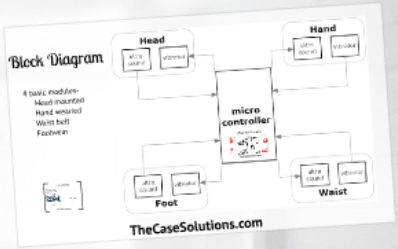

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List of Issues

- Restricted Sensing environment.
- Low-cost, robust, sturdy and portable system not available in the market.
- Confusion of sounds.
- Lengthy training period is required for familiarity.
- Detecting inclined slopes and stairs.

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Problem Statement

This project aims at the design and development of a wearable unit which is robust, low cost and user friendly to concede obstacle detection in spatial navigation, operated using ultrasound sensors for detection and a vibrator interface for feedback.

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Proposed Work

- The system developed employs a device that the user wears on the head, which measures the distance to the obstacles around, with the use of ultrasound.
- We plan to share the same operation principle of scanning the environment and presenting the information to the user via vibrators.
- The ultrasonic sensors are mounted on the individuals Head, Waist, Feet and Hand. The data is then analyzed, distance is calculated and it offers haptic feedback to the user in accordance with the position of the obstacle.

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References with shortcomings

- Smart Cane: Assistive Cane for Visually-impaired People.
  - Cane senses only a limited environment, only frontal detection and it is a costly venture.
- Navigation Using a Haptic Hand-Mounted Device For the Visually Impaired.
  - Difficulty in Orientation, and training required in Landmark recognition and spatial navigation.
- Blind Navigation with a Wearable Range Camera and Vibrotactile Helmet.
  - Wearable Kinect is quite expensive, Precision & Dynamic range still under research, Longer Training period.

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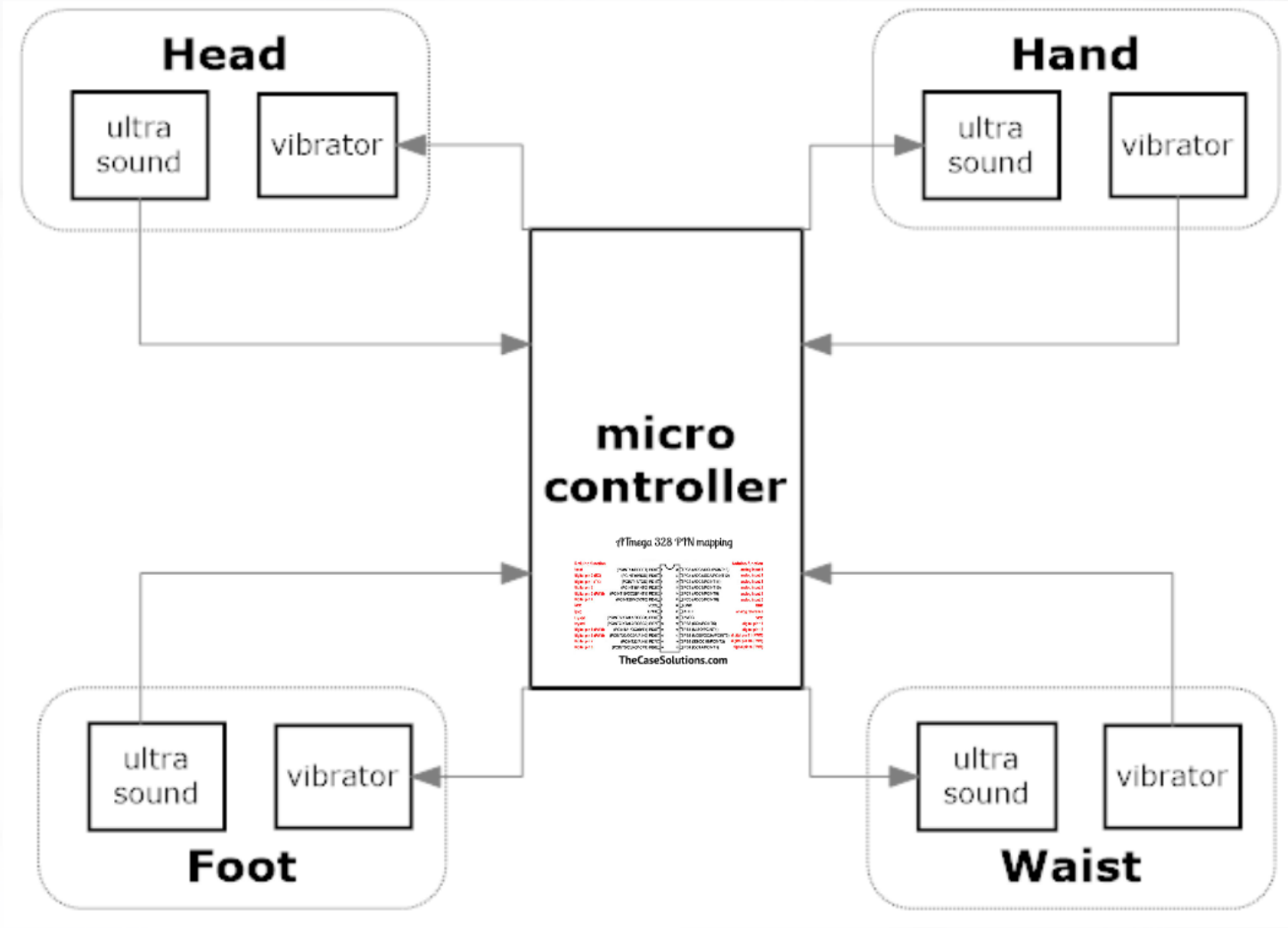
Block Diagram

4 basic modules-

- Head mounted
- Hand wearied
- Waist belt
- Footwear



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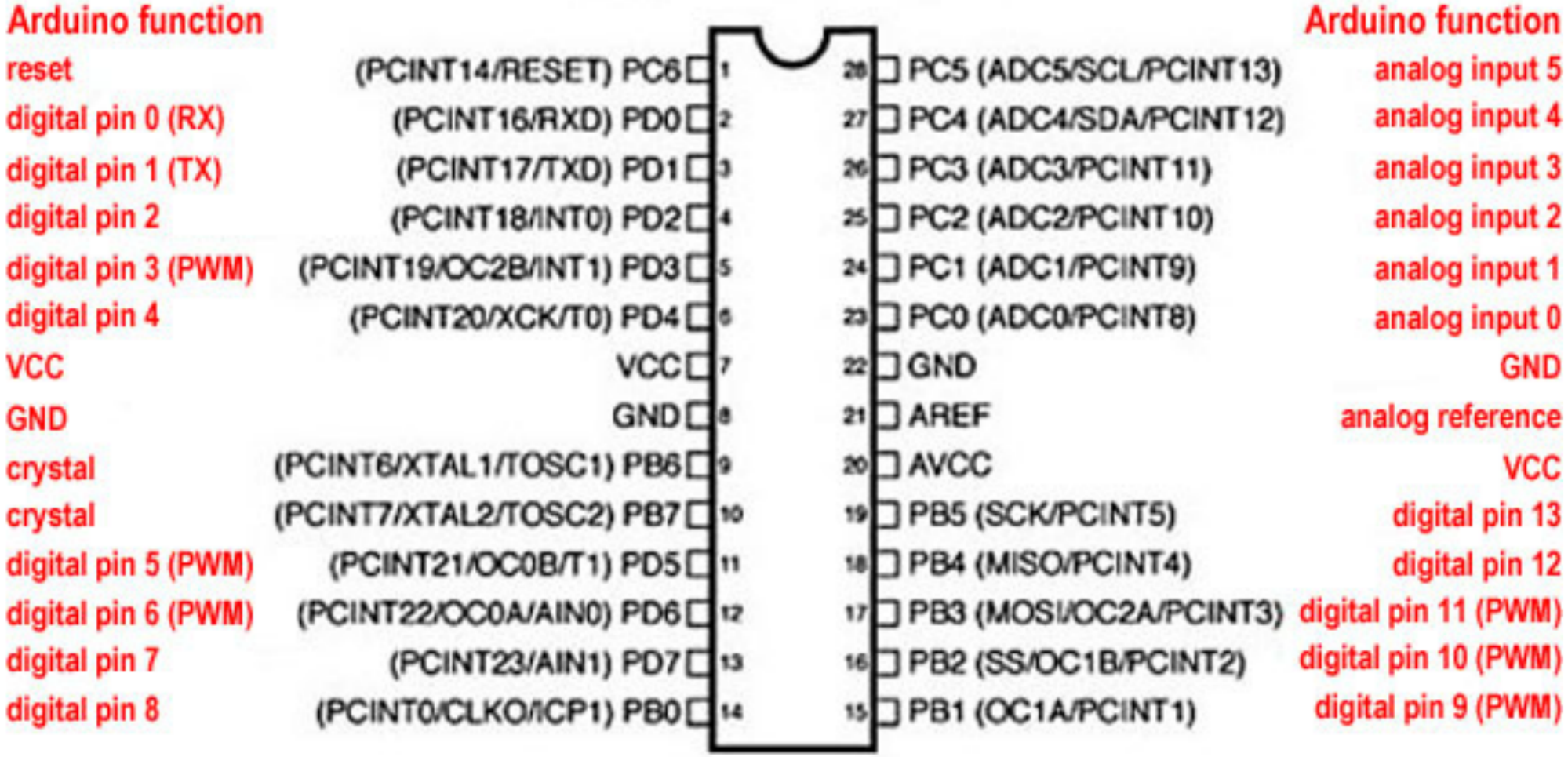
ATmega 328 PIN mapping



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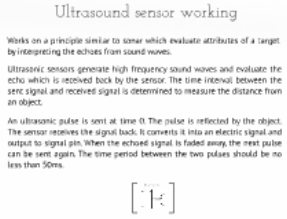
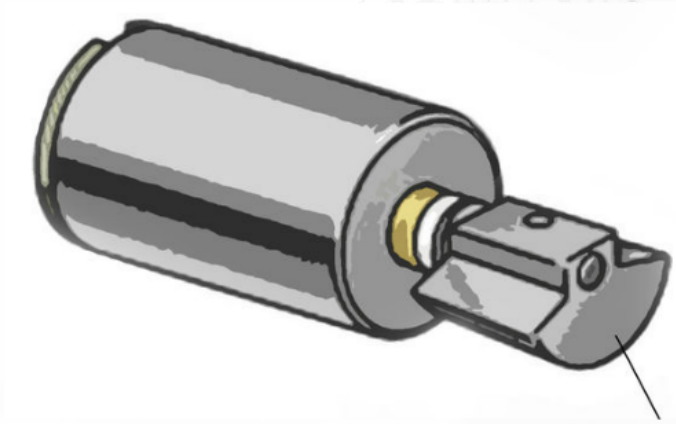
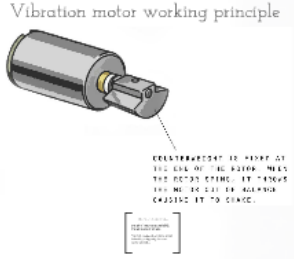
I/O Components

Ultrasonic Distance Measuring Sensor





Vibrating Motor



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