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Senior Project Functional Description – GUIDEBOT

Objectives

The Autonomous Interactive Mobile Multimedia guide is essentially a semi-intelligent robot capable of navigating a specific place via mapping software as well as dispensing information about it. Using a touch screen for input, people can use GuideBot to learn more about where they are. In addition, if they desire, they may ask GuideBot for directions and it will take them there using its mapping software. It would be most useful at places like malls or theme parks, with a variety of places to go and information about them.

Project Description

The GuideBot is comprised of an autonomous moving platform and an interactive touch screen interface controlled by an onboard miniature PC. The platform has sensors to detect distances from objects as well as sensors to detect motion. Thus, the platform is able to move around a room or hallway and alert the PC to call out to passerby. The system uses a microcontroller to interface to external distance and motion sensors to allow for accurate mapping and navigating. Connected to this platform is a telescoping arm attached to the touch screen display and speakers. This multimedia system is driven by an eBox or similar mini PC.

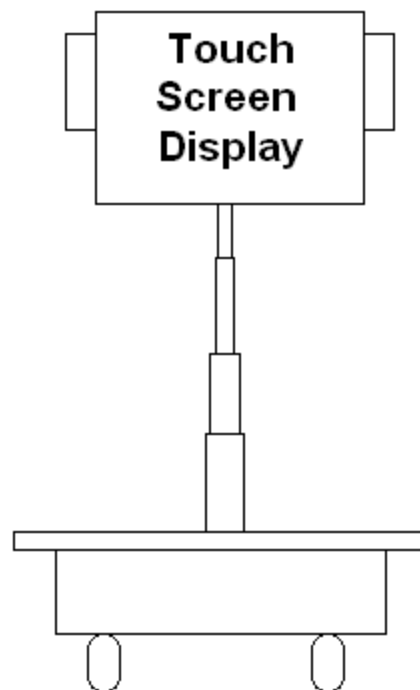


Figure 1. System Diagram

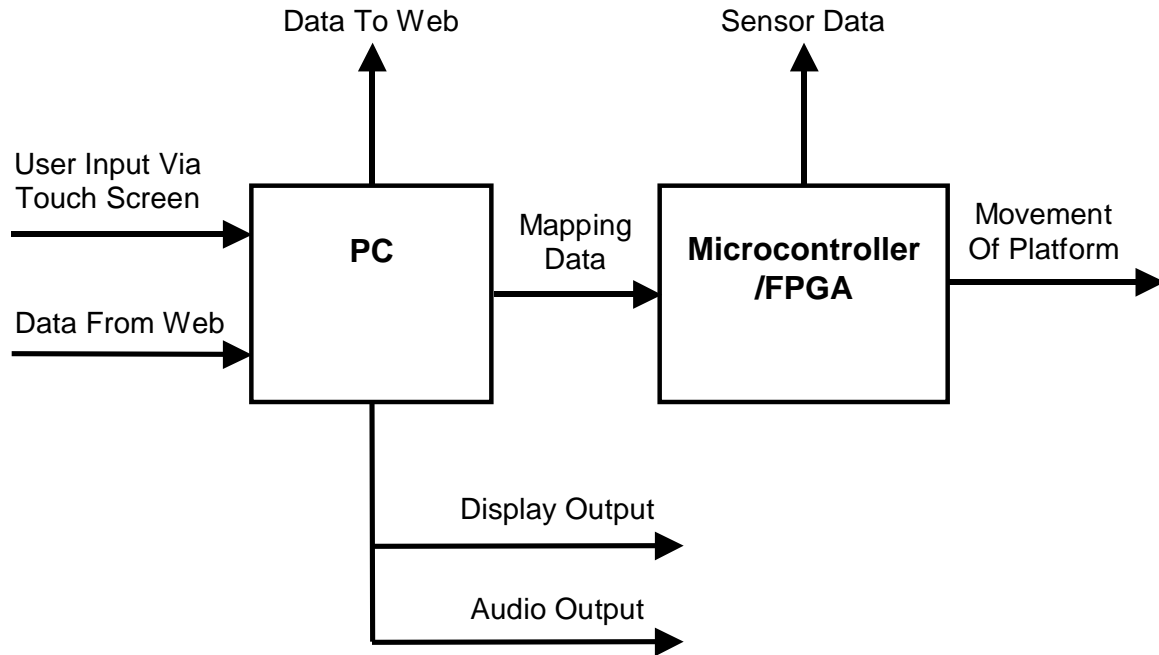


Figure 2. System Block Diagram

Modes of Operation

GuideBot has four main modes of operation. The initial mode is an idle state in which GuideBot will remain stationary and dormant until a sensor detects movement or a user interacts with the touch screen interface. Once interaction has occurred, GuideBot shifts to its second mode in which it uses both visual and audio outputs to help the user choose their desired information. In this mode, the user may select information from GuideBot but may also request its help in finding a destination. The guide mode involves GuideBot traveling to the desired destination while using its sensors to avoid obstacles. The final mode includes GuideBot moving around its designated area searching for possible users that may need assistance.

<u>Mode 1</u>	<u>Inputs</u>	<u>Outputs</u>
Idle/Wait	Motion Sensors Touchpad	Audio Visual
<u>Mode 2</u>		
Help/Assistance	Touchpad	Audio Visual
<u>Mode 3</u>		
Guide Function	Sensors	Audio Visual Movement
<u>Mode 4</u>		
Search	Sensors Touchpad	Audio Visual Movement

Figure 3. Modes Of Operation

Goals

The primary goal for this project is to create an autonomous, interactive guide capable of successfully navigating a previously mapped location while dispensing information about that location in a user friendly manner. Additionally, there is the possibility of adding wireless Internet capability in order to get updated information about a place and provide users with a familiar web interface that they could use to give feedback about the system.