

Remote controlled indoor cart using mobile application

Overview

We are going to build a remote controlled indoor cart that can be controlled by a mobile application. The cart will have a sonar sensor so that it can detect obstacles in its path and respond appropriately. Additionally, if time permits we are going to attach more sensors with our first choice being temperature and light sensors, and with the data obtained from these sensors we will build a very simple “heat map”.

Background

Building remote monitoring can be a useful tool for facilities managers who need to know the building's ambient conditions such as light and temperature, and take appropriate actions if necessary. Our remote controlled indoor cart can be deployed at nights and weekends to automate part of these tasks. Furthermore, the cart should be “smart” enough not to damage itself by running into obstacles.

Assumptions

- *Environment*: the cart will operate indoor at temperatures between 0 to 45C. The cart will move in a flat surface like the floor. Although the cart will stop if it finds a raised obstacle, it won't be able to detect gaps in its path such as steps going down. In short, the cart will be constrained to move in a 2D surface.
- *Usage*: an operator will use a mobile application to control the cart. In addition, the cart can be controlled via a terminal with access to a server that relays communication to the cart.
- *Others*: the cart is assumed to be in the range of the wifi signal.
- *User Interface*: the mobile application will be only for Android.

Deliverables

Category	Design Objective	Deliverable	Status
Power	Battery Availability	Using AA batteries	
Communication	Wireless communication	Wifi nordic	
Control Protocol	Control the cart	Design of control and data messages	
Control Protocol	Control the cart	Design two state machines, one for	

		cart and for control app.	
Cart	Safe halting	Sonar	
Cart	Ambient reading	Light sensor	
User Interface	Mobile control	Mobile Application for Android. Includes a halt message.	
User Interface	Server control	Terminal application	
User Interface	Ambient reading	Light readings	

Block Diagram

