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Proposal: Food·E

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A. Abstract

Food·E will be an autonomous robot that could enrich the experience of a grocery store shopper. As a prototype Food·E will be the size of a small basket, rather than a shopping cart but will fulfill a similar purpose. In addition to following a shopper, Food·E will account for the items given to it and can respond to queries about the inventory.

B. Introduction

Knowledge about what people eat is valuable data for nutrition, health, and consumer spending. A smarter shopping cart could make this data acquisition easy.

C. Sensors

- For the primary mission the robot will have a forward facing camera to track the position of the VIP relative to the robot. A second camera may be needed for stereo depth perception.
- For the secondary mission the robot will have another camera looking top-down into an opaque basket.
- Two ultrasonic sensors will be mounted on the face of the robot (left and right) to aid in collision avoidance.

D. Materials

Purchased Items	Number	Cost
Raspberry Pi 2	1	\$39.95
Teensy++ 2.0	1	\$24.95
Touchscreen for RPI	1	\$79.95
Ultrasonic Sensors	2	\$53.90
Shaft Encode Motors	2	\$69.90
Plastic Casters	2	\$7.90
Motor driver	1	\$4.49
2 Wheels and mounts	1	\$23.65

Necessary Items	Number
Lipo Battery	1
USB Webcam	2

E. Timeline

Task	Date
Debug all measurement and control signals	Feb 1
Complete physical build	Feb 15
Obtain satisfactory results with special sensor	Mar 7

F. Special Sensor

1. Primary Mission

The special sensor in the primary mission is the camera and computer vision needed to track a VIP. My first attempt will be a Kalman active contour.

2. Secondary Mission

The special sensor in the secondary mission is the task of identifying what has been put into the basket. Object recognition could result from shape/color recognition via an artificial neural network, near field communication tags, or barcode scanning.