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Photobot

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Abstract

Photobot is an autonomous robot that will navigate its way around a room searching for people that will allow Photobot to take and print a picture of the person(s). The idea is that Photobot will approach the person(s) and introduce itself. It will offer to capture a photo but will wait for permission before proceeding. This permission will be granted by the user verbally or by tapping yes of the touch screen provided. After a quick countdown, a picture will be taken. The picture will then be printed for the user. After the photo has been collected by the user or if the user declined, Photobot will continue to move on to look for more people.

Photobot will have an Odroid XU4 that will be handling the high level functions including the image processing. A camera will be connected providing the images, a USB Wi-Fi adapter will provide the internet, and an onboard printer to print the image captured. This high level device would need to support these devices and also be able to communicate via serial to a low level device.

The low level device will be an Arduino Mega. This device will communicate with motors and proximity sensors while taking commands via serial from the high level device.

Introduction

Today many jobs are becoming automated. One job that can easily be given to an autonomous robot is a photographer at an event or theme park. Photobot will be able to locate people, ask for permission to take a picture, then print it instantly.

Integrated System

- High Level
    - Odroid XU4 utilizing Ubuntu, OpenCV, Python
    - Logitech 720p Webcam
    - eMMC
    - Photosmart A617 printer
    - DROK LM2596 Numerical Voltage Switching Regulator DC Buck Converter
- Low Level
    - Arduino Mega
        - Interface sensors and motors

Mobile Platform

- 11 x 14 wooden base

Actuation

- 100:1 12V Gearmotor with Shaft Encoder (2)
- 120x60mm Wheels (2)
- 10A 5-25V Dual Channel DC Driver

Sensors

Photobot will use ultrasonic range finders to avoid obstacles.

- Ultrasonic Sensors (4)
- IR Sensors (2)

Photobot will also need a sensor to detect when a photo hasn't been retrieved.

- Ultrasonic Sensor (1)

Behaviors

Photobot will have 6 main behavior modes.

- Search Mode
  - Locates people to approach
- Introduction Mode
  - Gives audible introduction and requests permission
- Input Mode
  - Mode for Photobot to wait for input from user
- Picture Mode
  - Photobot counts down and takes a picture
- Print Mode
  - Prints the picture
- Wait Mode
  - Waits for the picture to be taken by user

Conclusion

Photobot will be able to capture pictures of people at an event or theme park, then print them instantly for the end user. The is capable by an Arduino Mega handling low level function like obstacle avoidance and PWM and have the image processing, decision making, and printing performed by the Odroid XU4.