

Abstract

The purpose of this project is to design a control module/interface which enables a motorized system to follow a user. The control module allows for seamless switching between manual and semi-autonomous mode. A motorized wheelchair is used as the motorized system.



Project Motivation

- Automation, machine learning, and robotics are becoming more prevalent and are replacing or assisting manual labor in many fields
- These concepts can be applied to a motorized cart semi-autonomously following a user instead of a user manually pushing a cart

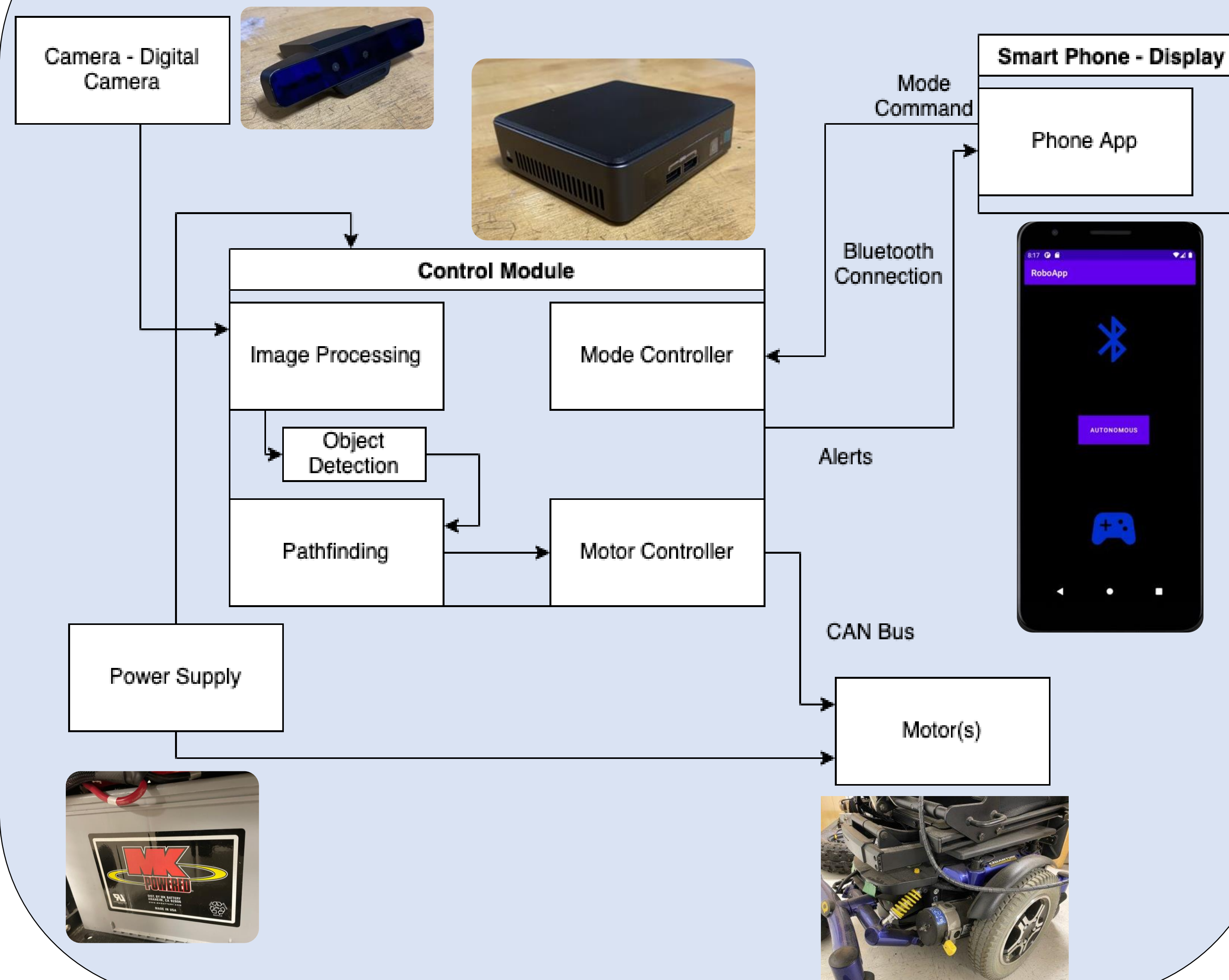


Applications

Some applications this may be used in include but are not limited to fulfillment centers, grocery stores, hospitals, etc.

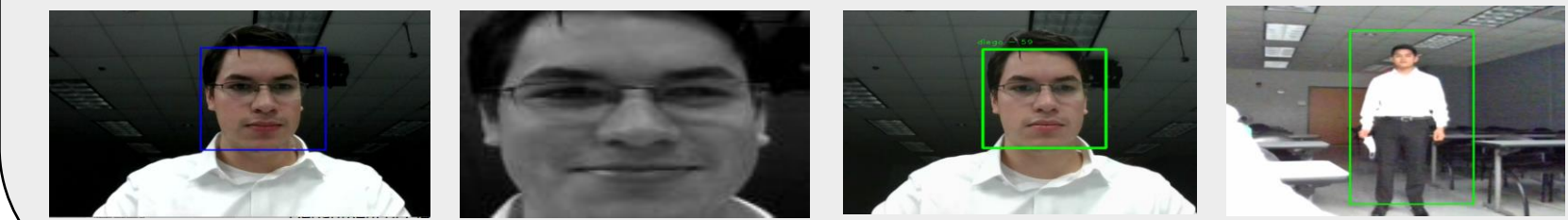


Preliminary Detailed Design



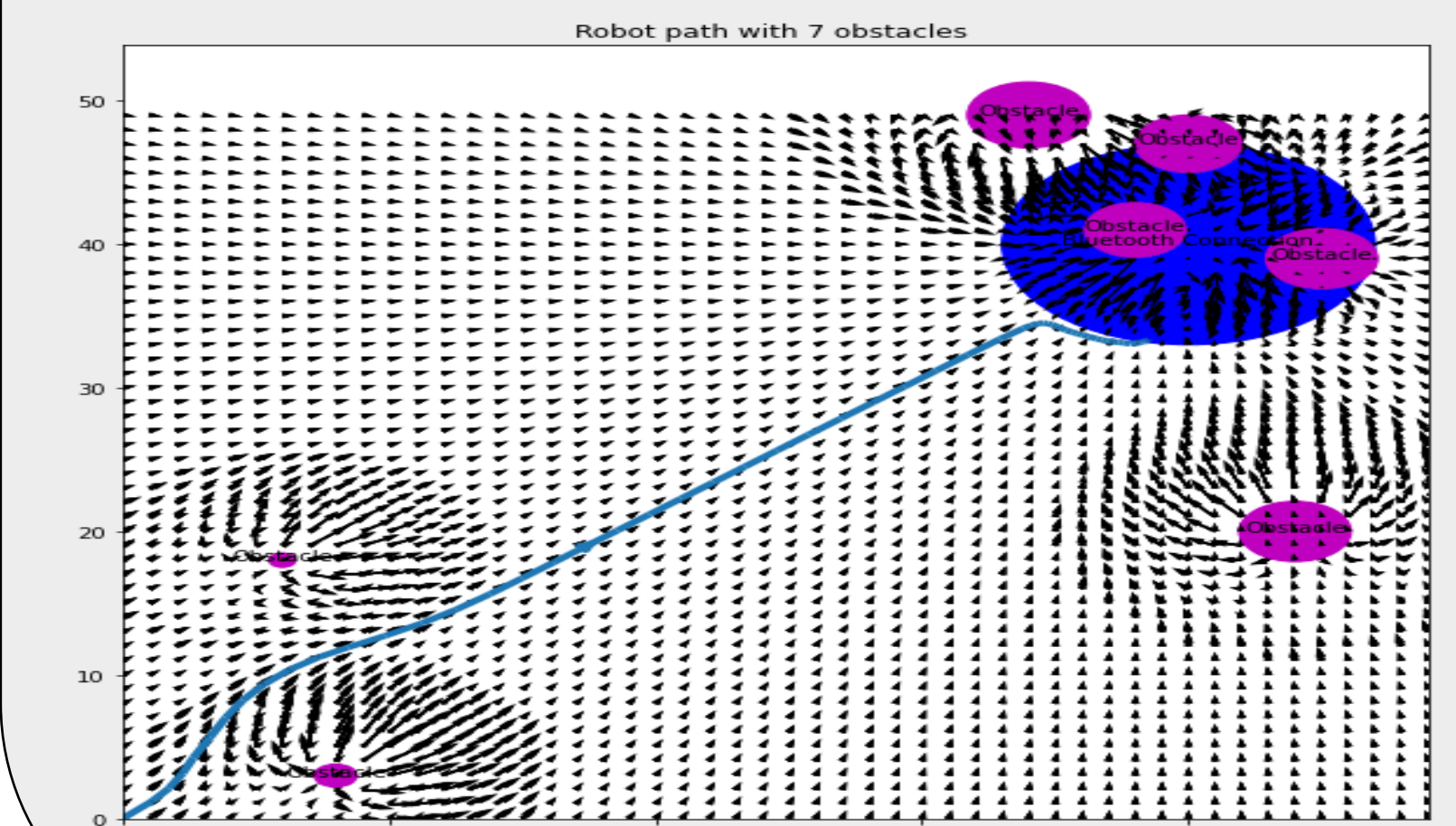
Camera/User Detection

- Image processing on live video feed
- YOLO algorithm
- Decipher between the user and other people/objects
- Determine distance to the user and other people objects

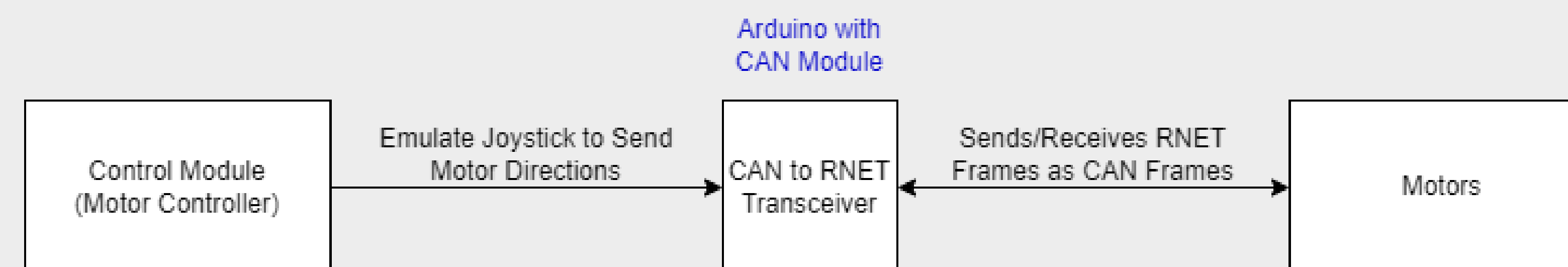


Pathfinding

- Create path to the user based on camera input
- Artificial potential fields
 - User is the attractive force
 - Other people/objects are repulsive forces



Motorized System Communication



Phone App

- Select between Manual Mode and Semi-Autonomous Mode
- User receive alerts when:
 - Connected to Service Robot
 - Robot requires assistance
- Communication via Bluetooth Technology

