Collision Avoidance

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Concept

- Arduino rover with the following capabilities…
  - Mobility
  - Two-way Bluetooth Comms.
  - Sensing
    - Ping Sensors
    - Image Capture
  - Autonomous Collision Avoidance Logic

Background

- Image Processing and Android
- Existing Arduino Collision Avoidance Systems
- Existing Android-to-Arduino Bluetooth Implementations.

Image Processing and Android

- “Distributed Mobile Computer Vision and Applications on the Android Platform.” By Olsson, S. and Åkesson, P.
  - Largely focused on object recognition using Android device and server backend.
  - **Inspiration:** Server-to-Handheld → Handheld-to-Arduino and handheld image processing techniques.

Arduino Collision Avoidance Systems

- “Neural Network Robot Using Microcontroller Atmega32”
  - Implementation of “spiking neural model,” an input capture and output behavior model.
  - **Inspiration:** Adopting similar, simplified version of model for our autonomous implementation.
  - Link: http://www.circuitlake.com/neural-network-robot-us

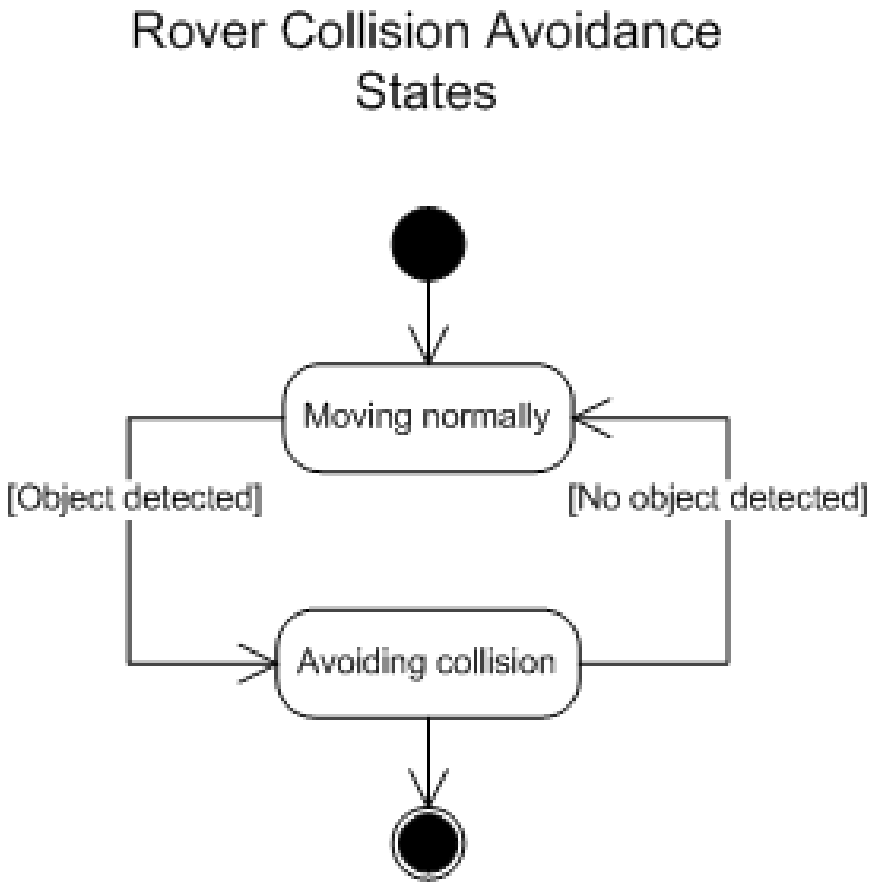
Bluetooth References

- “The Blue-tooth Setup” by Joseph Gundel and Brian Chamba
  - One-way communication between Android handset and Arduino rover.
  - **Inspiration:** Adapt and reuse to allow two-way communication.
  - Link: http://robotics.fau.edu/2010/10/10/76/

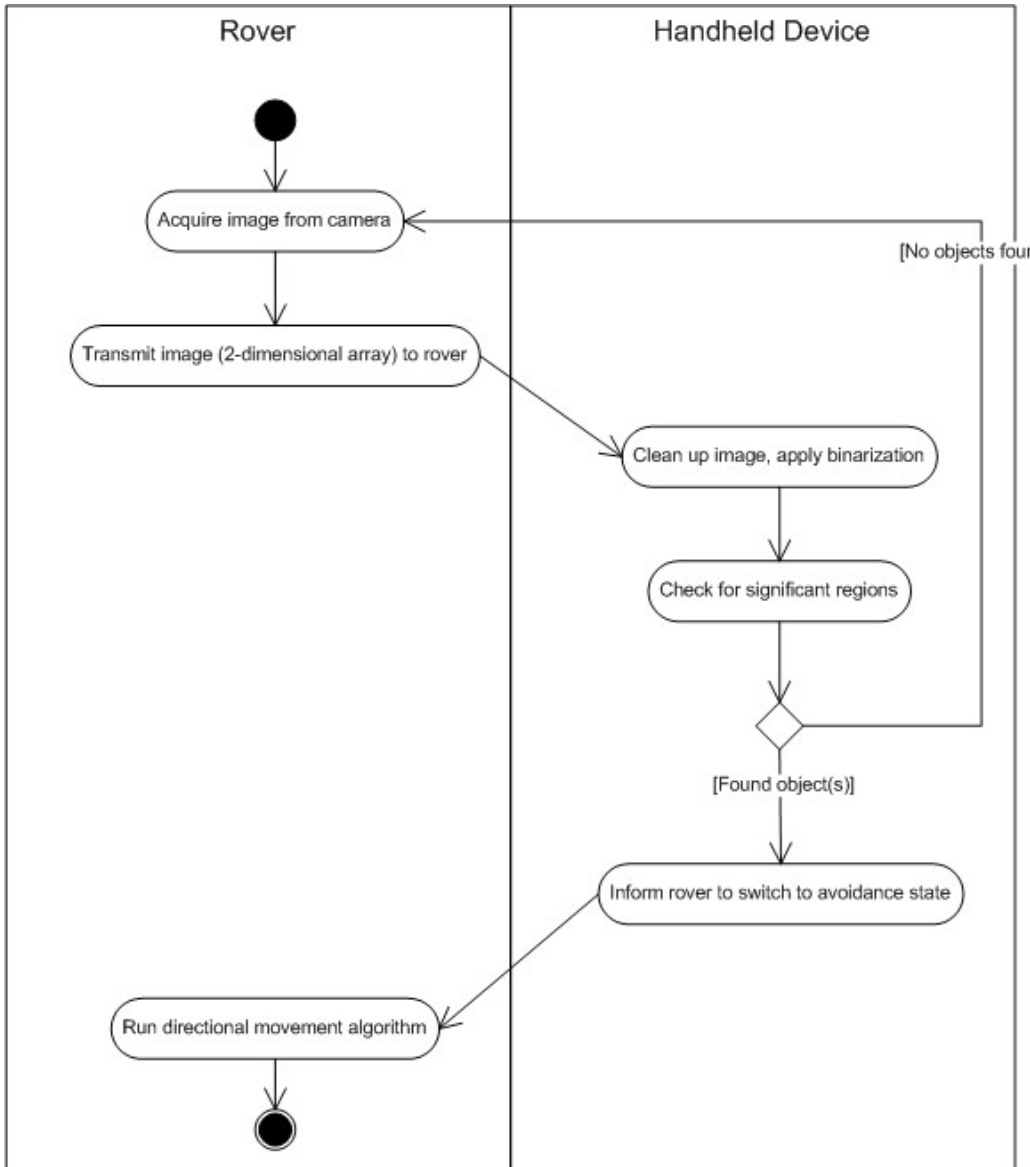
Proposed Design

- Rover Movement State Diagram
- Handheld Device-to-Rover Interaction Activity
- Rover Input Capture and Movement Algorithm
- Rover Directional Movement Algorithm

Rover State Diagram

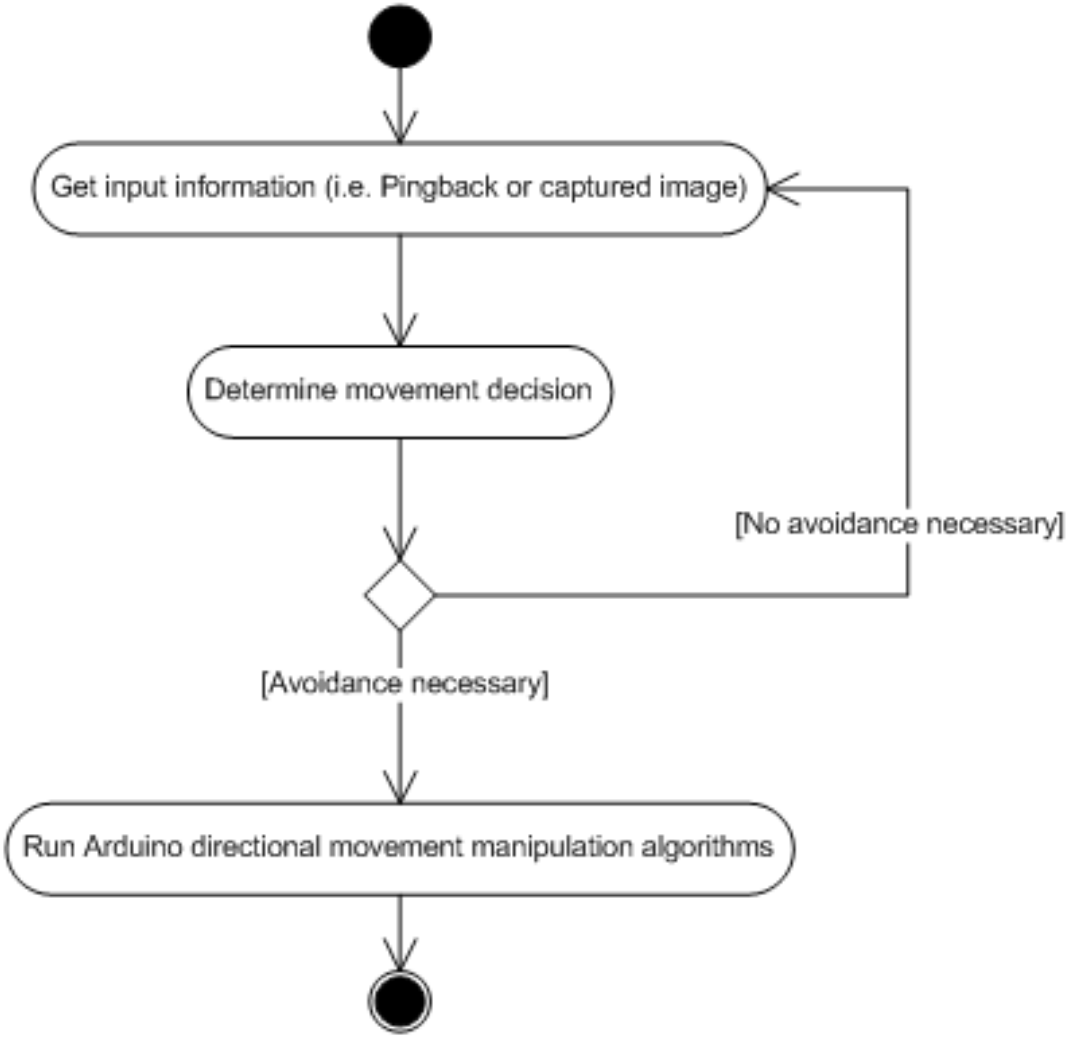


Handheld-Rover Swimlane Diagram



Rover Input Capture and Movement

Input Capture and Avoidance Decision Algorithm



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Directional Movement