

Project Title: Autonomous Robot Navigation with Human Interaction

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Program an indoor robot to travel from one position to another using existing indoor localization technology. The robot must avoid running into objects on its path. To identify routing path (or strategy), the robot needs to process camera images and sensor readings in its controller to calculate the current position and status in real time. It should also recognize human and identify human gestures to follow human instructions.

Learning Objectives:

1. Learn:
 - a. Arduino programming and connection to PC
 - b. Video camera and image processing based on OpenCV library.
 - c. Picture-based indoor localization
 - d. Robot navigation and control
2. Analysis:
 - a. Obstacle avoidance
 - b. Optimal route planning
 - c. Hand gesture recognition using deep learning algorithms
3. Implementation:
 - a. Robot movement controller
 - b. Robot navigation in an indoor environment
 - c. Robot specific action controlled by hand gesture

Technology and Tools:

- Python
- C and C++
- OpenCV 3.x
- Deep learning framework (Caffe, Tensorflow)
- Raspberry Pi 3+
- Intel® Movidius™ Myriad™ 2 VPU
- Intel® RealSense 3D Camera

Project Illustration:

Wheel Robot

