4580 WEEKLY REPORT

by Fei

First we made a plan for the whole group, the task for me was to setup the robot as well as do a background research on face detect algorithms.

Turtlebot Setup

Louae and me successfully setup the Turtlebot and configured the ROS system on Wednesday afternoon. The softwares including ROS and turtlebot-specific packages are already installed. We connected the computer to GTwifi and configured the ssh. So all of our group members can access the machine and program on it by using ssh. The ip address is 128.61.73.130.

We performed some basic ROS commands like roscore, rosnode, rostopic, rosrun, roslaunch and etc. Everything works perfectly.

Finally we launched the turtlebot software by running roslaunch turtlebot_bringup minimal.launch. After that, we launched the dashboard of that robot by running: roslaunch turtlebot_dashboard turtlebot dashboard.launch

We found that everything is working fine except for the Power System gives a warning. So the base cannot move and thus we cannot perform keyboard control. But I think we have already got a general idea about how to use this robot.

Face Detection Algorithms

As our project involves face recognition, face detection is the first step.

Face detection algorithms can be sorted into several main categories, the first is by using colors. Usually the skin has colors different from the surroundings. In light of this intuition, algorithms can be implemented. However, this algorithm is not so robust because other naked skin could have the same color as the face. And it is not very robust under varying lighting conditions.

The second way is to using motion, for a real time video, we can use the fact that a face is almost always moving in reality. However, this kind of algorithm will not work for us because our camera is on the top of a mobile robot so the background is always moving as well.

There are also some Neural Network based algorithms. This part of algorithms are based on deep learning. They will need a huge amount of data to perform back propagation to train the network.

The breakthrough of face detection is achieved by Viola and Jones, who invented to use a cascade of weak-classifiers using simple Haar features. The algorithm is called AdaBoost and it is commonly used in face recognition. We found it suitable for our project and will choose to use it.