MRSD Project

Tiffany May

Team G / Robographer

Teammates: Sida Wang, Rohit Dashrathi, Gauri

Gandhi, Jimit Gandhi

ILR #4

November 13, 2015

Individual progress

We are trying to detect human faces via webcam, for the need to calibrate pan-tilt unit and the human face detection function as soon as possible, we try to detect human face by Matlab. After the implementation of face tracking, the function of roaming the camera and searching human face before face detection and control the pan-tilt motors according to the position of human face will all be written in Matlab first and working as a whole function before transferred into C++, to test the algorithm and prevent buggy issues.

There's two mode for the function, one is detection mode the other is tracking mode. MATLAB provides webcam package support to deal with live video stream. At the first, we implement the face detection in HOG and locus-kanade. The outcome of HOG is not that satisfying especially when the head pose of faces change slightly, we lose the detection. In order to get the better result we switch to boosted cascade of simple features simply by using vision.CascadeObjectDetector(), a similar function could also be found in OpenCV. For now, you could turn your face between 10-170 degree without losing the tracker. If the interest points < threshold we will a switch back to detection mode. That is, if there's less than ten points being tracked, we will reform a new tracker. For the observation of geometric transformation between points overtime, we use estimateGeometricTransform().

Challenges

1. Once we lose tracking, we cannot form a new tracker correctly, maybe it's because the point tracker we used always find target which is not in the original position.
2. Two out of three times, the function shut down and cannot be started.
3. The size of tracking box change continuously, we will put some limitation to make it work properly.
4. The connection between Arduino and Matlab remains a problem.

Teamwork

Rohit finished CAD for turtlebot.
Jimit and Gauri calibrate turtlebot and able to read the April tag information by Kinect. Gauri is also familiarizing with reading the depth information from Kinect.
Sida distill the interest point from Intraface, which might be used for 3D

reconstruction in the future.

We set up the environment in Kaitia's lab for turtlebot testing.

Future Plan

We will collaborate the pan-tilt unit and tracking function and make the motor moving according to the position of human face.

References

- Viola, Paul A. and Jones, Michael J. "Rapid Object Detection using a Boosted Cascade of Simple Features", IEEE CVPR, 2001.
- Bruce D. Lucas and Takeo Kanade. An Iterative Image Registration Technique with an Application to Stereo Vision. International Joint Conference on Artificial Intelligence, 1981.