April 2014

B A C H E L O R   T H E S I S / D I P L O M A   T H E S I S / M A S T E R   T H E S I S

Continuous Gesture Recognition using Layered Hidden Markov Models

Problem description:

Human action recognition is a key aspect in many human-robot co-working scenarios. Developing of an accurate and fast action recognition algorithm is still an open problem. Indeed, an action recognition algorithm must be robust to noise, changes in the sensor/user pose, unknown segmentation.

In this Bachelor Thesis work the students has to implement a gesture recognition algorithm to classify gestures continuously performed by different users. Invariant representations of motion [1] will be adopted to cope with the changes in the sensor/user pose. Then, multi-layer, probability-based classification algorithms will be used to classify the performed action [2]

Tasks:

- Literature overview on gesture recognition
- Recognition algorithm implementation in Matlab and C++
- Gesture dataset collection
- Experimental evaluation on self-made and public datasets
- Comparison with state-of-the-art approaches [3]

Bibliography:

[1] M. Saveriano, D. Lee. Invariant Representation for User Independent Motion Recognition. *International Symposium on Robot and Human Interactive Communication (Ro-Man)*, 2013.
[2] N. Oliver, A. Garg and E. Horvitz . Layered representations for learning and inferring office activity from multiple sensory channels. *Computer Vision and Image Understanding*, 2004.
[3] L. Morency, A. Quattoni, and T. Darrell. Latent-Dynamic Discriminative Models for Continuous Gesture Recognition. in *International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2007.

Supervisor:	M.S. Matteo Saveriano
Start:	xx.xx.xxxx
Intermediate Report:	xx.xx.xxxx
Delivery:	xx.xx.xxxx

(D. Lee)
Univ.-Professor