Title (tentative): Recognition of Activities of Daily Living by using RGB-D sensors

Thesis advisor(s): Solari Fabio, Manuela Chessa

E-mail: Fabio.Solari@unige.it

Address: Via Dodecaneso, 35 - 16146 Genova 303

Phone: (+39) 010353 - 6756

Description

Motivation and application domain

In the context of the recognition of Activities of Daily Living there are scientific challenges in people detection when dealing with real word scenes with apathetic patients: cluttered scenes handling static and dynamic occlusions, low contrasted objects. Here, we propose to use the Kinect sensor to improve the recognition of ADL. The SUP library (developed by STARS team) is able to recognize some activities, however the task remains a challenge.

General objectives and main activities

This internship consists in the improvement of the recognition of Activities of Daily Living process using RGB-D sensors to improve monitoring systems for older adults. Many techniques have already been proposed for detecting people in specific environment by using the cooperation of several sensors (e.g. camera network, markers, accelerometers). Despite these studies, activity recognition is still brittle with conventional cameras and often depends on the scene conditions (e.g. number of people, occlusion, and people interactions). This work aims at reducing these hypotheses to conceive a general algorithm enabling the detection of several individuals (and their posture) living in an unconstrained environment and observed through a limited number of cameras including RGB-D sensors. To validate the internship we will assess the proposed approach on homecare videos from Nice Hospital to evaluate technologies to keep older adults functioning at higher levels and living independently.

Training Objectives (technical/analytical tools, experimental methodologies)

1st and 2nd months: Study the limitations of existing solutions.
3rd and 4th months: Propose an original algorithm or event models for activity recognition.
5th month: Evaluate and optimize proposed algorithm.
6th month: Writing report.

Place(s) where the thesis work will be carried out: Inria Stars team (http://www.inria.fr/en/centre/sophia) co-advisor Francois Bremond, and DIBRIS.

Additional information

Pre-requisite abilities/skills: Computer Vision, C++ programming, Linux, artificial intelligence, cognitive vision, 3D geometry and Machine Learning.

Maximum number of students: 2