Introduction

Developing robotic solutions for the welfare and the agricultural fields is a challenging task due to the high level of robustness required, in order to ensure human safety. The robotic behavior is constructed upon the received visual data (e.g. tracking of a person or manipulating an object). This means that getting accurate and high resolution visual information is of crucial importance.

Correct and robust tracking of the human user and of the objects/obstacles in the environment allows for a safe interaction between the robotic platform and its medium. Detection can be performed by estimating the pose of the interesting object (living or not), while the human user can be identified with the help of the 3D sensor.

By fusing two different visual sensors (e.g. Stereo Camera and LiDAR or Stereo Camera and Kinect) we are combining the high resolution stereo data with the reliable data from a Kinect or a LiDAR, which means that we can obtain a dense disparity map at a high resolution. This leads to improved point clouds which can be used as input for different incremental control strategies.

Simulation and testing of tasks

Having identified the human user and/or the interesting object, a visual servoing strategy can be applied in order to carry out different sets of tasks, such as:

- Pick and place
- Obstacle avoidance
- Smart positioning
- Human following and object carrying