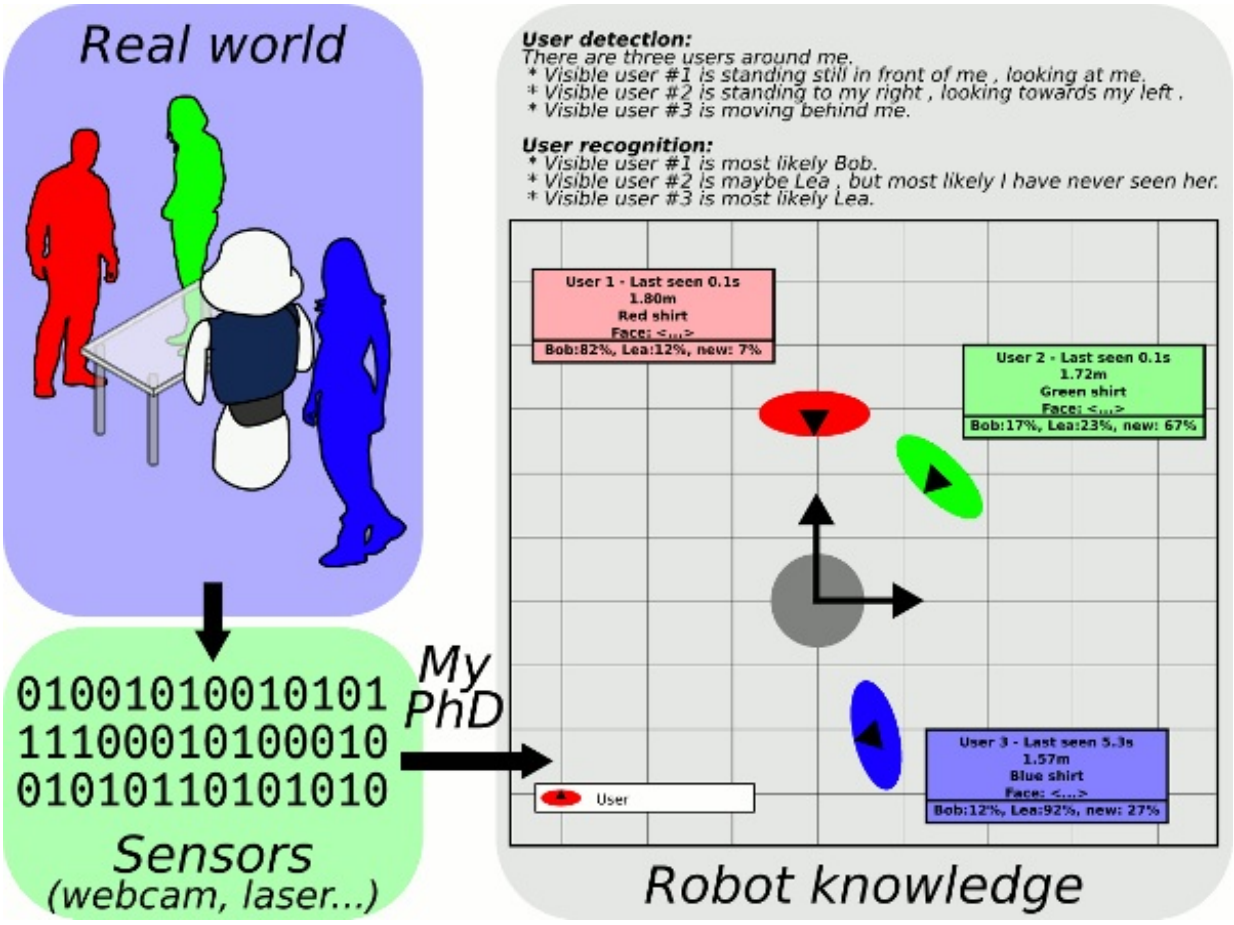
people_detection_vision



User detection, recognition and tracking is at the heart of Human Robot Interaction, and yet, to date, no universal robust method exists for being aware of the people in a robot surroundings. The presented work aims at importing into existing social robotics platforms different techniques, some of them classical, and other novel, for detecting, recognizing and tracking human users. These algorithms are based on a variety of sensors, mainly cameras and depth imaging devices, but also lasers and microphones. The results of these parallel algorithms are then merged so as to obtain a modular, expandable and fast architecture. This results in a local user mapping thanks to multi-modal fusion.

This package gathers all the different people detection algorithms that were integrated:

- a 3D improvement of the **Viola-Jones face detection** [Viola and Jones, 2001]
- a 3D improvement of the **Histogram of Oriented Gradients (HOG)** [Dalal and Triggs, 2005]
- the **Polar-Perspective Map (PPM)**, [Howard and Matthies, 2007]. used in autonomous driving for pedestrian detection It uses a polar transformation and an accumulation process on the ground plane.
- the **NiTE** algorithm, the Kinect middleware [Berliner and Hendel, 2007]
- the **tabletop** algorithm : [Blodow and Rusu, 2009] uses point cloud manipulation techniques, detecting users as it would for objects on a table.

For more information, check out Arnaud Ramey's PhD.

How to install

Dependencies: please run the `rosdep.sh` script:

```
$ roscd people_detection_vision
$ sudo sh rosdep.sh
```

How to cite this work

Use the following BiB entry

```
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 pages = {274},
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 author = {Ramey, Arnaud}
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References

- [Berliner and Hendel, 2007] Berliner, T. and Hendel, Z. (2007). Modeling Of Humanoid Forms From Depth Maps. United States Patent Application 20100034457.
- [Blodow and Rusu, 2009] Blodow, N. and Rusu, R. (2009). Partial view modeling and validation in 3D laser scans for grasping. Humanoid Robots, 2009.
- [Dalal and Triggs, 2005] Dalal, N. and Triggs, B. (2005). Histograms of oriented gradients for human detection. Computer Vision and Pattern Recognition, 2005. CVPR 2005. IEEE Computer Society Conference on (Volume:1).
- [Howard and Matthies, 2007]. Howard, A. and Matthies, L. (2007). Detect- ing pedestrians with stereo vision: safe operation of autonomous ground vehicles in dynamic environments. In Kaneko, Makoto; Nakamura, Y., editor, Proceedings of the 13th Int. Symp. of Robotics Research, Hiroshima, Japan.
- [Viola and Jones, 2001] Viola, P. and Jones, M. (2001). Rapid object detection using a boosted cascade of simple features. In Computer Vision and Pattern Recognition, IEEE Computer Society Conference on