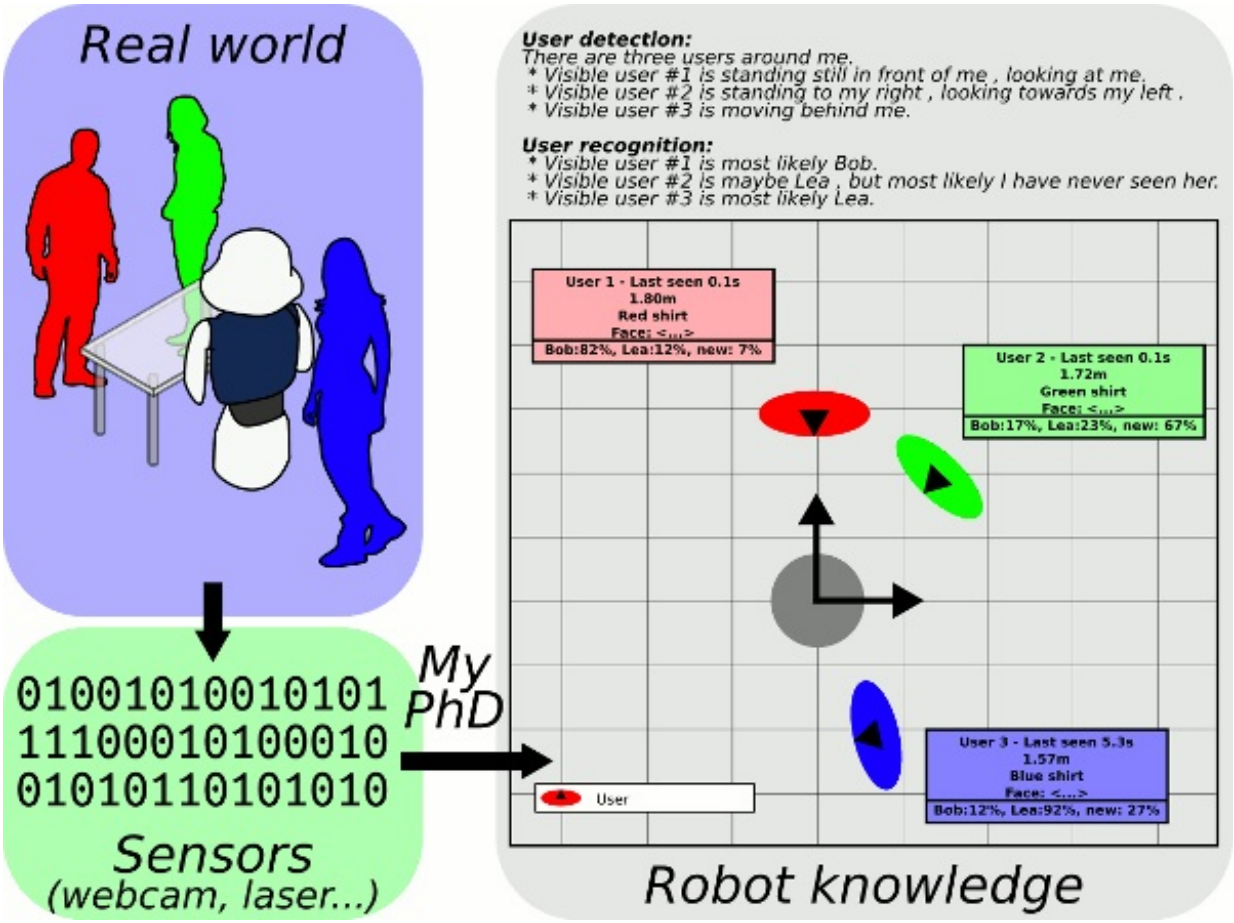
people_detection_vision



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

1. Dependencies from sources

Dependencies handling is based on the wstool tool. Run the following instructions:

```
$ sudo apt-get install python-wstool
$ sudo wstool init
$ wstool merge `rospack find people_detection_vision`/dependencies.rosinstall
```

```
$ roscd ; cd src
$ wstool update
```

2. Dependencies included in the Ubuntu packages

Please run the rosdep utility:

```
$ sudo apt-get install python-rosdep
$ sudo rosdep init
$ rosdep install people_detection_vision --ignore-src
```

3. Compile

Use catkin_make:

```
$ roscd
$ catkin_make
```

How to cite this work

Use the following BiB entry

```
@phdthesis{
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 type = {phdthesis},
 year = {2015},
 pages = {274},
 websites = {https://sites.google.com/site/rameyarnaud/research/phd},
 institution = {Robotics Lab, Universidad Carlos III, Madrid, Spain},
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eness},
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 bibtype = {phdthesis},
 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.
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- [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