Robot4Care II

Fontys Lectorate Technology, Team Robot4Care II

Introduction

- **Context:**
The goal of this project is reducing the workload of hospital staff using robots. This is done by improving the robot's speech and animation to make communication more intuitive; creating a framework on which more complex dialogue can be developed.

- **Objectives:**
Make communication feel intuitive using:
  - *Face tracking to look at a user*
  - *Animations as visual aides for interactions*
  - *Using an external dialog engine for better speech*

Context
Stakeholders:
Team Robot4Care II, Fontys Lectorate Technology, Catherina hospital
Related to the Robot4Care I project

Methods

Approach:
- Looked at existing packages
- Divide in 3 objectives
- Lots of testing and adjust

Methods:
- DOT framework
- Scrum

Tools:
- Python, C++
- ROS, NAO-QI-SDK, OpenCV, MoveIt library, Watson AI
- Gazebo, RVIZ

Results, Conclusions and Discussion

- **Face detection and tracking with OpenCV**
Implemented face detection with openCV. Compared its cascade classifier algorithm with its new DNN framework. This detection was then tied to a face-tracking algorithm, that converted the offsets to rotations.
 - ***Found improved robustness and performance.***

- **Animations as visual aides**
Using MoveIt library, a ROS sub-system is setup to facilitate controlling Pepper's servos. The hardware and kinematics are abstracted away from software clients.

AI based speech and dialogue handling
Thanks to the use of Watson AI resource from IBM cloud, a speech handling has been created allowing the Pepper to communicate with the user's in a "humane" manner.
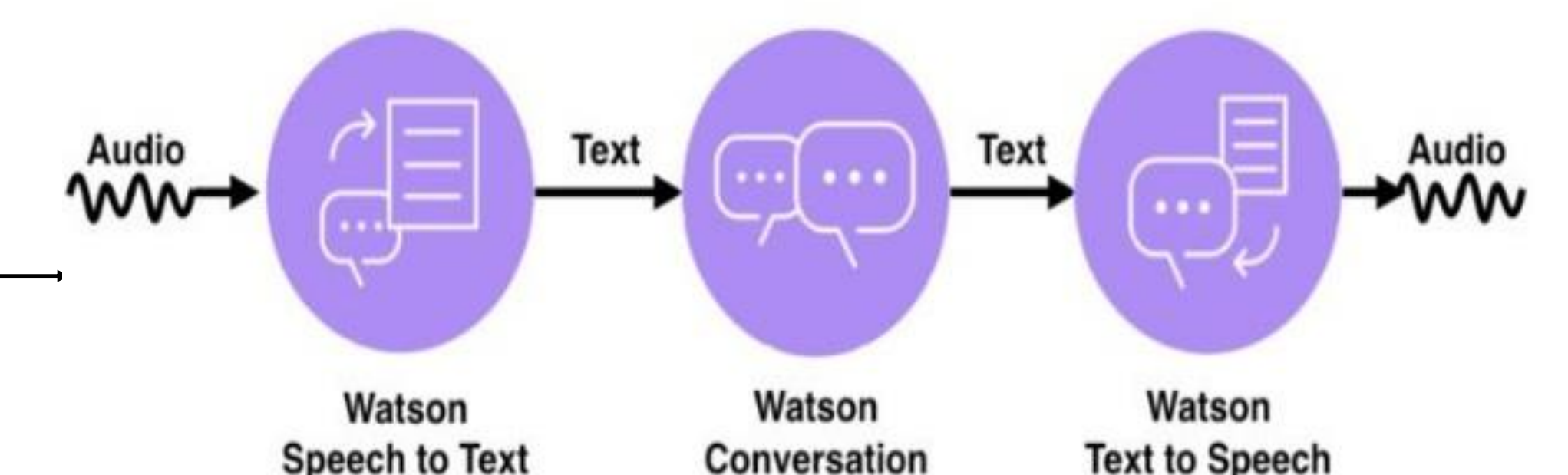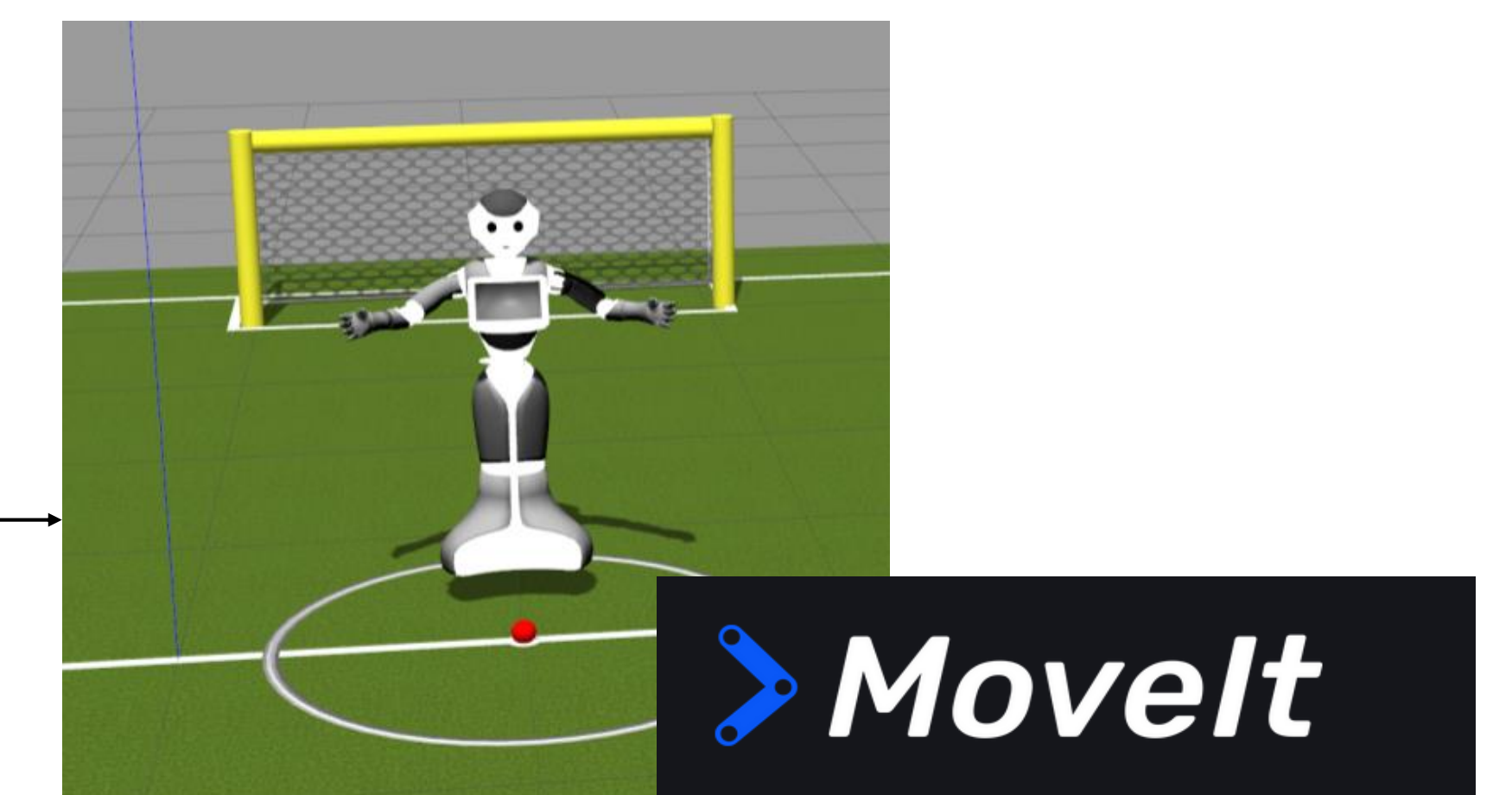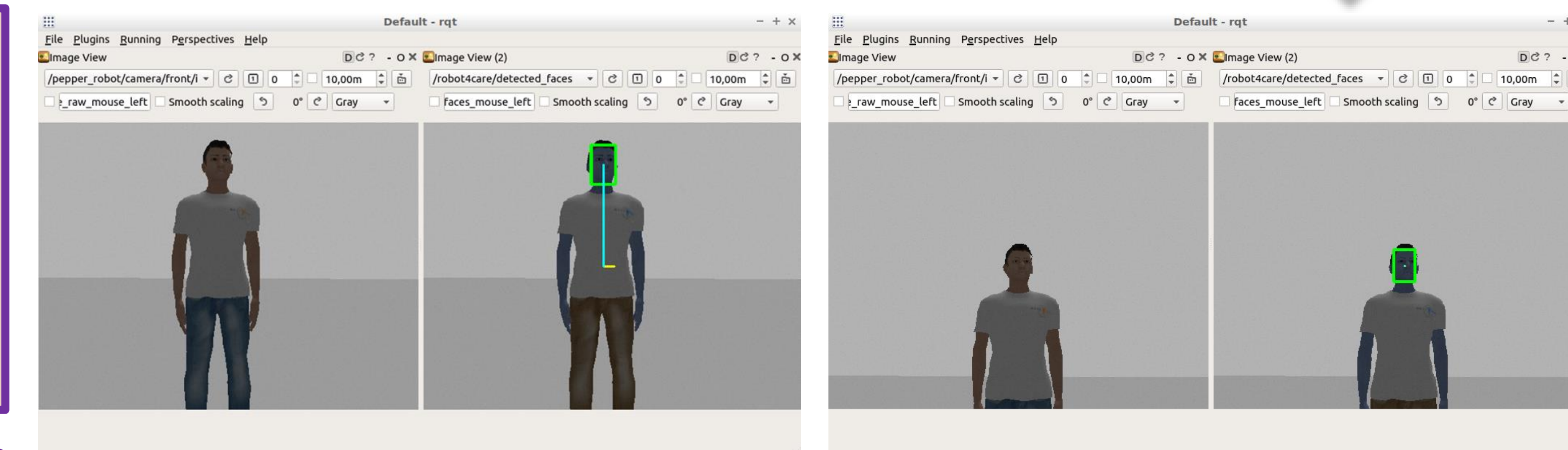
Possible further directions

Test on the real Pepper.
- Animation: Getting more accurate MoveIt feedback
- Vision: Changes in performance and accuracy between simulation and hardware.

More information:

- *References:*
Fontys Gitlab page   Fontys Gitlab Wiki page
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