Remote Interaction with a Nao Humanoid
Elective in AI / HRI Report

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1 Introduction

In the context of RoboCup games, robots are fully autonomous and are not allowed to receive any external help from humans. However, in a world where robots are used in everyday life, they are of course used in collaboration with humans. Moreover, the RoboCup 2050 challenge aims to have a football match between the winning team of the RoboCup and the human winning team of the FIFA World Cup. In this project, we aim to make a very small step in that direction by developing a system that allows a human operator to remotely control and interact with a Nao Humanoid through a graphical interface and a web socket. This pipeline was specifically designed to be used in the RoboCup 2024 SPL challenge, where the goal was to make two teams of robots play against each other, where one robot of each team is controlled by a human operator.

1.1 Objectives

The main objective of the project is to develop that allows the human operator to use the robot as a proxy to interact with the environment, namely the soccer field. To do this, there is of course to need to have some form of bidirectional interaction between the human operator and the controlled robot. The human needs to be completely aware of the robot's surroundings, that is, the human can perceive the robot's surroundings only through the robot's sensors. The robot, on the other hand, has to be able to receive commands from the human operator and execute them in real-time. The robot should also be able to send feedback to the human operator in real-time.

Allungare un po' il brodo

2 Solution

We opted for a solution that prioritizes high-level commands and audio-visual feedback. The main component of the system is the graphical interface. It is

made by a bunch of buttons that allow the human operator to send commands to the robot and a 2D representation of the field that shows the robot's position and some perception information.

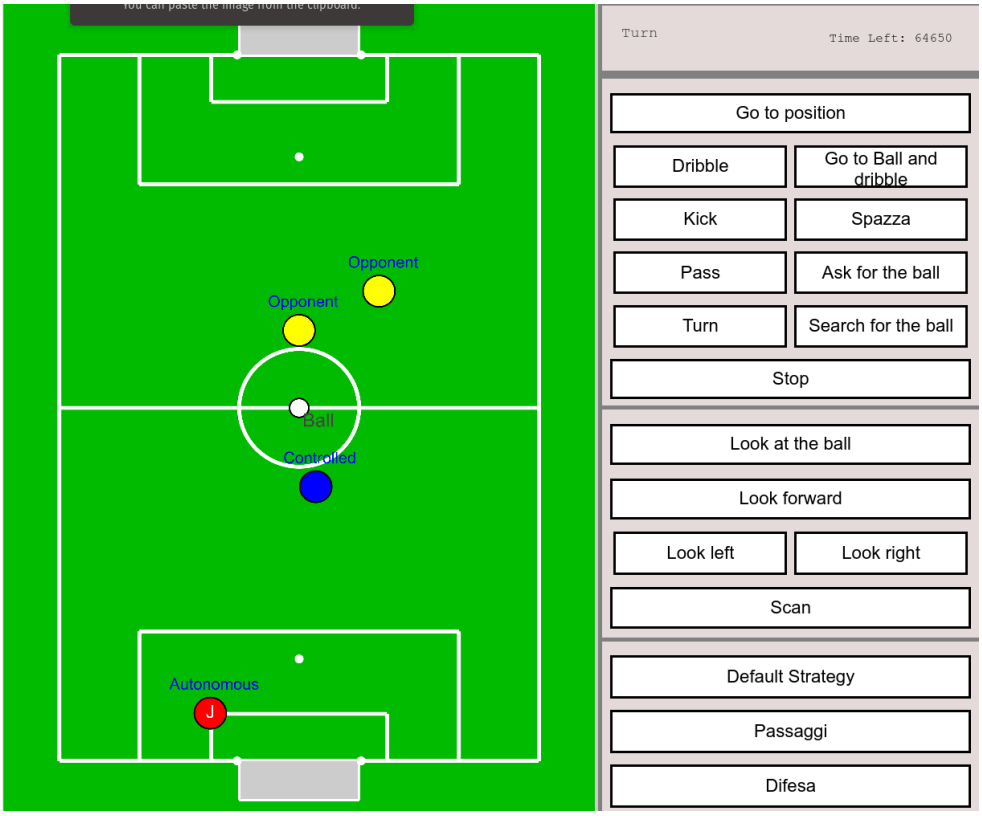

Figure 1: The graphical interface

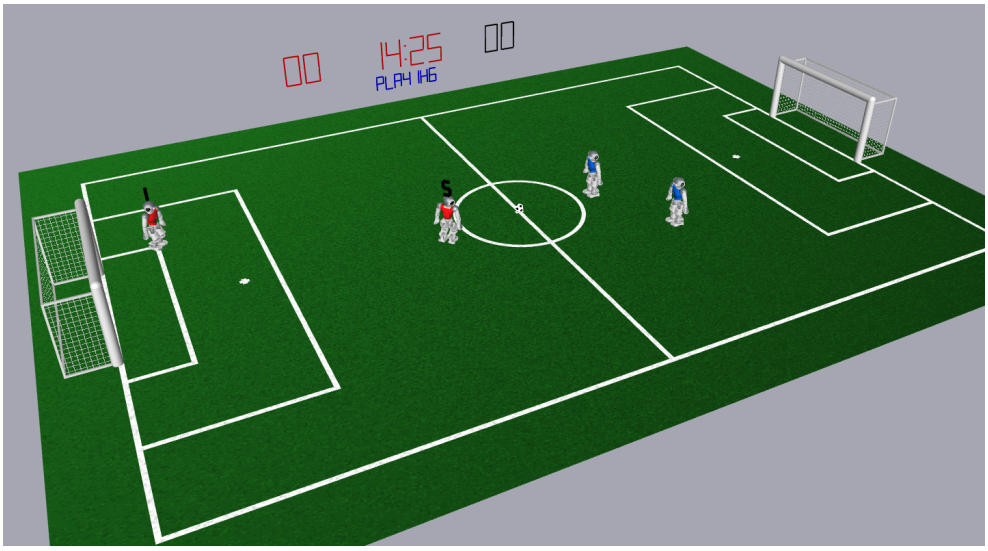

Figure 2: The Corresponding Field Configuration

3 Implementation

Dettagli sul codice

4 Results

Non so che cavolo metterci qui

5 Conclusion

Amen