Autonomous Agents Lab Exercise 1 Report

Ioannis Zervos **AM: 2017030036**

Introduction:

The first laboratory exercise's purpure was the familiarization with the simulator software of webots by editing a controller to be able to play a basic version of football. The provided controller of the name of nao_team_1 had already some features implemented such as the detection of the ball and aligning the nao robot with the goal.

Implementation:

The first modification involved the **incorporation of a shooting motion** for the Nao robot. This allowed the robot to perform an active kicking movement toward the ball, enabling it to play football more effectively.

During testing, it was observed that the robot occasionally became **stuck in a sidestep loop** when positioned too close to the ball. This behavior was caused by rapid changes in the detected ball direction, which led to the robots built in sidestepping motion being an over correction triggering a form of oscillation. To mitigate this issue, the **constraints were loosened**, resulting in relaxed sidestepping behavior, this does not negatively impact the performance of the robot as its foot is large enough to his the ball in the desired direction.

Finally, the **stand-up motion** was implemented. For this reason the constraint of the getUpWhenNecesary function were again loosenedfrom 3.14 to -2.3. Also since the provided movement set only supported standing up from the front, the **absolute value check on the pitch reading from the gyroscope** was removed. This adjustment allowed the robot to properly detect its state as fallen and perform the stand-up action reliably.

Results:

After the aforementioned changes the robot was able to score a goal when presented with favorable conditions withing the time frame of each round.