

RoboCupJunior Soccer 2021 Team Description

Paper i-bots 6

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Abstract. In this team description, we first introduce each team member and we show our successes in RoboCup Junior competition and our highlights from the current year. Furthermore, we explain our responsibilities in the team. Then we describe our strategies for the three robots and what each roboter does. In order to make our tactics more understandable, we have also included pictures. We coded in Python a striker, a goalkeeper and a victim robot, which blocks the goalkeeper of the opponents. In the process, some problems have come up and to solve them we have developed different tactics. For instance, two robots switch their codes depending on the position of the robots. The advancement of our code and our personal development can also be observed. At the end, we summarize our experiences from the competition and our plans for the future. We thereby also address the current situation regarding the pandemic.

Keywords: RoboCup Junior · Soccer Simulation Challenge · i-bots

1 Introduction

We Alexandra Bank (15), Lara Trapmann (16) and Melissa Katolnik (15) are the i-bots 6 from the Roberta RegioZentrum Hannover. The i-bots are a big group of robotics enthusiasts which meets every Saturday at the Leibniz Universität Hannover to program. We all have participated many times in different teams at the RoboCup Junior Competition. Alexandra Bank competed for the first time in 2018 at the RoboCup Junior Competition in the category Rescue Line. In 2019, Alexandra entered the Rescue Line Competition for the second time and she even made it to the German Championship. In 2020, Alexandra competed in the RoboCup Junior Rescue Maze competition. Through the experience she gained from the competitions, she has knowledge of the software C (Arduino) and Open Roberta. Lara Trapmann participated Rescue Maze Entry regional for the first time in 2019 and she has made it directly to the German Championship and then even to the European Championship. In 2020, Lara and Alexandra entered the RoboCup Junior Rescue Maze as a team. Like Alexandra, Lara has knowledge of C (Arduino) software. Melissa Katolnik competed in the

Junior Rescue Line Entry competition in 2018. Then in 2019, Melissa entered the German Championship in the Maze Entry category. In 2020, Melissa again participated in the Rescue Maze Entry category. Melissa has knowledge in the software of EV3 and mBlock. For this qualification, Alexandra is responsible for the goalkeeper and the sacrifice robot, while Melissa has programmed the striker and Lara worked on the strategy.



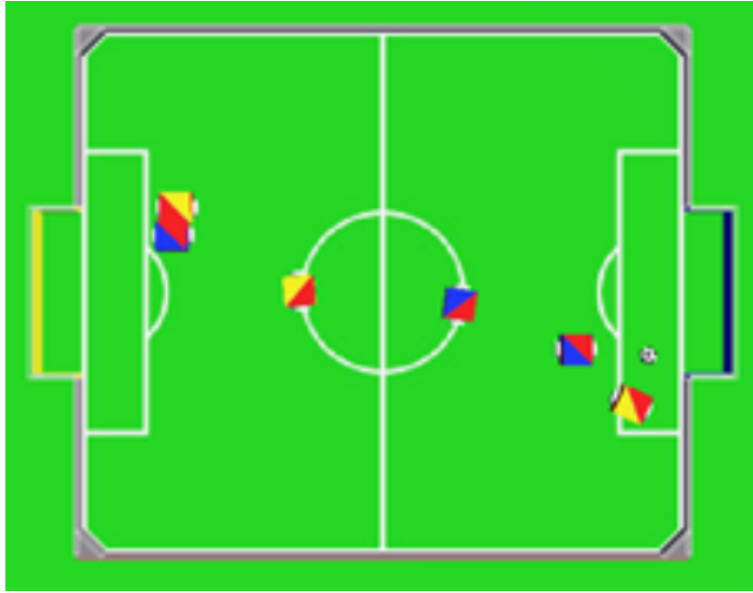
2 Aim and Strategy

2.1 Software

As this competition is held online, our focus was on the software. All our programs are written in Python.

2.2 Goalkeeper

First, we coded the goalkeeper to drive along the y axis in front of the penalty arena. We quickly noticed the problem with this simple program. The robot had no chance to defend the ball when the ball came behind the robot.



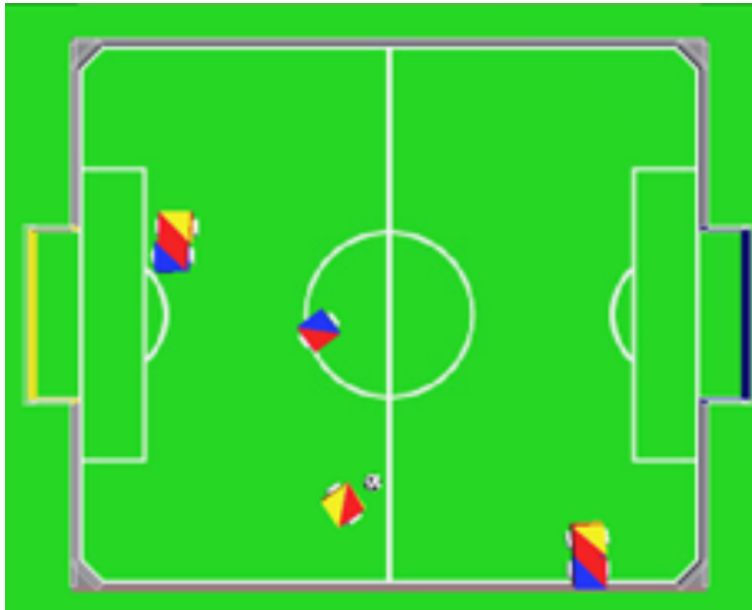
As a solution, we let the robot also drive on the x-axis when the ball is behind the robot. Therefore, the goalkeeper drove as expected and we had not made any major strategic changes.

2.3 Striker

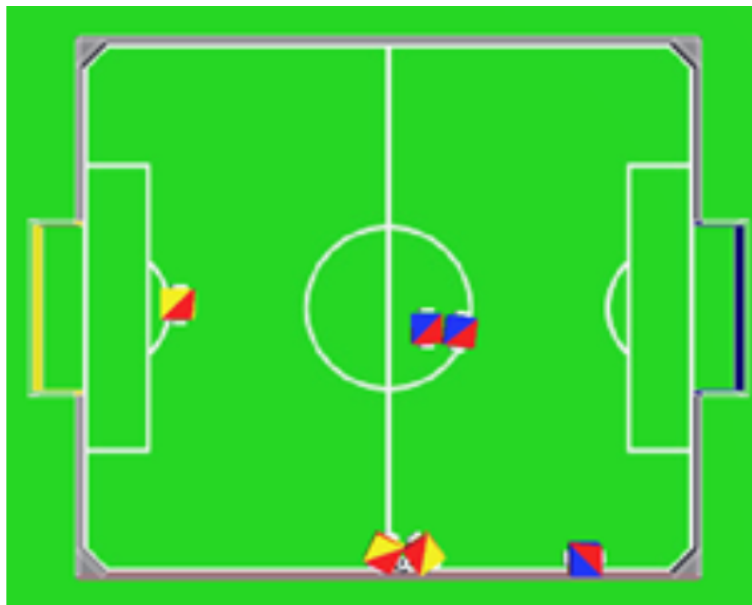
For the striker we first made a different and much faster drive-to function than from the demo program. We have implemented this by having the robot turn on the spot until it reaches the target angle to drive directly to its destination point. This simple function enables the robot to score goals very quickly when the ball is near the striker. Additionally, we coded that our robot shoots in the middle of the goal to prevent the ball from missing the goal.

2.4 Victim Robot

At first, we could not assign a specific role for the third robot. Later on, we decided to create a second striker. However, we encountered the problem that both strikers blocked each other. For this reason, after much deliberation, we came up with the great solution of writing a victim robot, which blocks the goalkeeper of the opponents.



One problem we had in certain cases was that the victim robot and the striker robot blocked each other. As a solution, we decided to swap the code of the robots depending on their position.



We experienced that this worked very well and we decided not to change anything else in the programs.

3 Conclusions and Future Work

Through this competition and during the pandemic we gained a lot of new experience and knowledge. We particularly learned about cohesion and teamwork. Moreover, we realized how important it was to see someone face to face, therefore we often met on different platforms like Discord. The change from hardware to mostly software was a big challenge, but it was more manageable than we anticipated. We all worked with Python software for the first time. Melissa even transitioned from block-based programming to text-based programming. Additionally, we learned new tactics and structures such as our first drive-to function. In the future, we plan to work with different software and simulation platforms like ROS Robot Operation System. In our program, we would also like to include more control of the ball like a ball handling mechanism. Furthermore, we would like to implement more tactics and detect them, such as being able to determine whether the opponent has a victim robot.

References

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