ORKA Robotics TDP

Agnes Biborka and Bernadett Biborka and Daniel Biborka and Balazs Marton

Veres Péter Secondary School, Csobánka tér 7, 1039 Budapest, Hungary

rcj@orkabot.com

Abstract. We would like to introduce our team members their roles in our team. We will share our experience and upgrades connected to this year's RoboCup Soccer Sim, write about our program's structure, and outline a method how we got to the current state. During that we would like to present our future ideas and the program's older version's faults and how we solved them. We will also share the new knowledge that we gained during this year.

1 Introduction

1.1 Team Background

Team Members and History. Our team has four members, Agnes Biborka, Bernadett Biborka, Daniel Biborka, Balazs Marton. Our team's mentor is Robert Laszlo.

All the team members are attending the same school and the same robotics study circle, and we already took part in several competitions together. Three of us are siblings, but we have plenty ways of communicating between team members.

Roles. In our team Balazs and Bernadett are the programmers, while Daniel and Agnes are responsible for the strategy updates, but they can also take the programming roles. The strategists are also able to help if the programmers have any problems in mathematics.

Previous RCJ Experience. In 2017 we entered in the maze category in Budapest. We participated in RoboCup Junior Euro 2019, in the "Soccer 1-1 Standard Kit" league in Hannover where we were got 2nd place. Also in 2019 we won the Best Team Spirit award in Soccer Lightweight category in the World Finals in Sydney. In 2020 we competed in Virtual Rescue Maze. In 2021 we were placed 3rd in the RCJ Soccer Sim Demo.

1.2 Current Year's Highlights

This year we improved our defense a lot, by role changing robots. This way the strikers can become goalie anytime when the goalie is out of the goal (e.g.: lack of progress). We also changed our goalie's position.

2 Robots and Results

2.1 Software

Global History. Leading up to the day of the code submissions, we were working on a global history, which would have stored all the incoming data of all the robots, including the opponents too. It could also predict the ball's next 100 or so movements. Unfortunately, we ran out of time and couldn't submit it.

Coordinate system. Although in the end, due to the lack of time we couldn't use it, we made our own coordinate system, using the centre of our goal as origo. This way it would have been easier to calculate distances and predict movements.

Clean Code. In our last code, we used lots of long variable and function names. We tried to change that on this competition, by using constants, with understandable yet not too long names.

2.2 Results

We were hesitating about having a goalie or not, but in the end, we decided that it's better to have one. For this outcome we made numerous tests against the original program, and against stronger opponents.

During the RCJ Soccer Sim Demo we already had an idea of the role changing robots, because our goalie would often stay inside the penalty area for too long or was put out of the goal because of the lack of progress. In those cases, it took too long for the robot to get back to its normal position, which caused a huge hole in our defense.

In the previous tournament the opponent was able to score many goals, when the ball was spawned to the middle by simply kicking it in, while our goalie was in the corners. So, we made our strikers come back and help in the defense, every time the ball is close enough to our penalty area.

The goal that we had in mind while programming the robots, was to write and use functions covering lots of situations. Like calculating attack power (which defines, which robot has the best position on defense or to attack) or moving to exact coordinates.

3 Conclusions and Future Work

3.1 Conclusion

The greatest investment was to use a lot of constants, which made easier to understand our program. We had many ideas, but we started to focus on the competition too late so, we must work on our time management more.

3.2 Future Work

We plan on putting the newer investments (like global history and the new coordinates system) into use after a few more tests. We wish to improve our attack power, because we are quite satisfied with our defense right now. In the future our strikers should be able to catch a moving ball, based on its future route. We will also make a kickoff function in our goalie, because we noticed that we miss a lot of scoring chances because of the goalie sticks to its defending role.

References

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