Rescue A, B to CoSpace:
Our RoboCupJunior Rescue Experience

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Abstract.
This presentation introduces the learning experience of M&Y, a Japanese rescue team, that accomplished their participation in all of the Junior Rescue league games including Rescue CoSpace in past years both at the national and international levels. The team members emphasize that the learning experience from any Rescue league games will benefit a team that takes a new Rescue challenge by moving onto another sub-league (i.e. from Rescue A to B). The team members believe that programming is the core of autonomous/intelligent robotics.

Keywords: RoboCupJunior, Rescue, Learning Experience

1. Introduction

M&Y started its rescue challenge in 2007. In 2007, we participated in RCJ International, Atlanta, USA, for the first time and won the 2nd place with Rescue SuperTeam. In 2008, we participated in RCJ International, Suzho, China and won the individual 2nd place. In 2010, we challenged Rescue B and participated in RCJ International, Singapore, and placed in the individual 1st place. We kept challenging ourselves and tried out CoSpace Rescue in 2011 at RCJ International, Istanbul and won the SuperTeam 2nd place.

Many Rescue A teams that we have met in various competitions comment that it would be difficult to move to Rescue B and/or CoSpace Rescue. However what is required to compete in either of the games is different, what we learned through Rescue A could help us with our challenges with Rescue B and CoSpace Rescue. We could apply some of what we learned with Rescue A effectively with Rescue B and CoSpace Rescue.

2. Rescue A

M&Y started out with Rescue A. Although the victim with Rescue A is only one and the most difficult part of the game might be more of the engineering challenge of how to make the grabbing mechanism successfully to move the victim to the evacuation zone, it was not the case when M&Y started in xxxx. In the red zone, which is the last room on the second floor of the arena, has no line to use as a guide. We struggled to find better solutions to tackle the problem.

3. Rescue B

M&Y moved to Rescue B in xxxx. Rescue B arena has no line, as Rescue A arena has. A robot has to look for victims emitting human temperature heat. When the robot found a victim, it has to flash a ramp to indicate the "rescue." People might ask if we need to create a program from scratch or make a major revision on the previous program used for Rescue A. Our answer is "no." When we worked on the maze program for Rescue B, we used the strategy that we learned with Rescue A red-zone programming. We have already mastered the code to make a robot make 90-degree turns and move forward for specific distance defined through our experience with Rescue A. Those are the strategies that helped us with Rescue B programming.

4. CoSpace Rescue

Challenging CoSpace Rescue was not different at all. With CoSpace Rescue, the programming strategies that we learned with Rescue A helped. For example. With CoSpace Rescue, there are lines that lead to "special zone" where the points gained doubled. The line following program that we mastered with Rescue A became very handy. Also, the objects that a robot has to find are all laid on the floor, similar to the old Rescue A game of searching victims. We could use the same strategy that we used to find the Rescue A victims.

On the other hand, what we learned with CoSpace Recue helped us with Rescue B. Since CoSpace robot uses ultrasonic sensor to detect obstacles, we learned how to use ultrasonic sensors, which became very helpful with Rescue B.

5. Conclusion

Looking back, for us, moving from Rescue A to B and CoSpace rescue was not hard challenges because we could make connections from what we had learned with a previous challenge to the new challenge. We think our concepts of robotics helped us as well. Our concepts of robotics are 1) small, 2) simple, and 3) software. When we work on a new robot, we try to create a robot as small and simple as possible, and create solutions through programming, not by engineering of the robot itself. This might be because of both the team members are programmers. But also, we try to spend less money on developing robot without expensive and sophisticated parts. Rather, we want to show that robotics can be done by anyone without those expensive and sophisticated parts. Although, at Japan Open, a team that created a robot from scratch was given a special award that may equals to a third place, those special awards are usually given in Dance league. It is important to have a robot that is steady and functional; however, we believe a robot becomes effective because of its advanced program. We should remember that autonomous/intelligent robots move and do tasks that we want because of the programs that we create.