

## **Team Discription Paper**

### **What's SIOR?**

Our team SIOR is named after an institute of robot called SIOR which is an abbreviation of 'SungKyunKwan Univ. Institute **Of** Robot'. This institute was created in 1985 to foster future engineers who deeply understand filed of electronic engineering both theoretically and practically It is consists only of undergraduate students of Sunkyunkwan Univ. and so is our team, SIOR in RoboCup.

This is the first year of RoboCup to SIOR and by participating in this amazing competition, we intend to open a new filed of dream for our next generation and show the engineers from the world that we are with them. We deeply shares the goal with RoboCup organization, that building robot soccer team which is effective against Human World Soccer Champion team and by our efforts, we believe RoboCup can realize this dream sooner than 2050.

Although we are new to RoboCup, we have various experiences of building robot soccer team and have participated in few competitions. The sizes and structure of robot were different and controlling teen size (which is approximately 95cm high) robot was a significantly challenging work but we made it and now are ready to let our robots play games against wonderful engineers form different countries. So here we ask the RoboCup a permission to join the league.

### **Pledge**

All members of team SIOR pledge that we will play each and every game in accordance with the rule of 'RoboCup 2013' and protect the spirit of fair play.

All members of team SIOR guarantee that we will be well aware of all rules of 'RoboCup 2013' that is necessary to perform fair play and understands that some of our team members may have to carry out duties as a referee.

### **Our Work on Humanoid**

We have built various types of robots that best serve humans and our team believes the humanoid will be the prima donna of the future generation of robots and wildly used throughout human residences.

When it comes to designing robots, we spend significant time and efforts to build effective body structure which suits the environment best and interesting part here is that the answer always comes from the original residents of the environment. It's probably because their body itself is the answer they have found from thousands years of natural selection and rule of survival of fittest. Likewise, the robots that will be operated in the places built for humans are recommended to have a human-like shape. This is our belief regarding humanoid and we have been trying to understand human motions and its mechanism to enable robots to do the same. To make robot's movement more like that of humans, we videotaped real humans and used image processing technologies to trace the center of mass, find points of action and evaluate the degree of recoils of related parts. As a result, we found that bipedal walking, the most crucial skill of humanoid is indeed a constant collapse of valance which looks like 'valancing' and we are trying to find perfect algorithms to realize it through our robots.

Our goal is designing robots that behave exactly same as human being and to accomplish this objective, we are continuously working on both hardware and software. Currently, most of bipedal robots locate its source of power (usually motors) inside of each joint, which is very effective way to save space, but it's hard to say it is the most ideal way for robots in the sense that different weight distribution from human body makes the calculation a lot more complicated. So we are trying to build our own robot body that shares similarities with humans more than just its appearance. We also aim to increase robot's AI by developing better image processing algorithms which must be much lighter and more efficient. Necessary procedures may require us more than the level of undergraduate students but we are and will keep moving forward.

#### **Relevant achievements in research and developments**

3 of our members have an experience of participation in a competition held by FIRA. Two of them led a Mirobot-class team and the other was a member of an Androsot-class team. Androsot team has won the 1<sup>st</sup> place in world robot soccer competition held by FIRA in London 2012. Their robot is equivalent to 'kid' size of RoboCup therefore we have capability of controlling humanoid and processing images from web camera.

#### **Previous performance in RoboCup competitions**

Unfortunately, none of our team members have an experience of RoboCup. But with experience of kid size humanoid and advanced technologies we expect to

perform better.

**Any software from other teams is used ?**

Our robots are not sharing any software with other competitors.

**Team Data**

Team Name: SIOR

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Competition Class: Teen Size

**Qualification Video**

Video that proves Team SIOR is capable of participating in RoboCup can be found from [www.youtube.com/watch?v=MgFloihcklY](http://www.youtube.com/watch?v=MgFloihcklY) or by inserting keyword 'sior robocup' in youtube search box.