

TAMKANG DEVELOPS TAIWAN' S FIRST WALKING ROBOT

Taiwan' s first “walking” robot created by the Department of Electrical Engineering participated in the FIRA Robot Soccer World Cup contest from October 25 through the beginning of November. These walking robots, a result of tremendous efforts of students and professors in Electrical Engineering Departments at Tamkang, competed with those from countries that included Singapore, Canada, Germany, Mainland China, Japan and Austria and won the second place in the RoboSot medium-size group, the forth place in both the MireSot small-size and HuroSot human-figure groups after several hours of the harsh competition.

Four teams named “TKU” were led by Professor Ching-Chang Wong of the Department of Electrical Engineering at Tamkang. They wore Tamkang commemorative uniforms and carried 20 various sizes of robots to Busan, South Korea on the day right after the typhoon attacked Taiwan. They participated in the World Cup Soccer Tournament for the medium-size, small-size, human-figure, and simulation groups, among others. Particularly, the small-size and human-figure robots were designed and created by the students in the Department of Electrical Engineering for the first time, and their debut in FIRA Robot Soccer World Cup has won praise by professors from Singapore and the Chairman of FIRA who were so impressed by the outstanding works and expressed their admiration: “Good Job! Well done!” Tamkang has established its reputation of excellence in this FIRA Robot Soccer World Cup.

Mr. Shi-An Lee, a doctoral student in the Department of Electrical Engineering and leader of medium-sized group “TKU RoboSot” remarked that this year' s medium-sized robot soccer players not only maintained last year' s advantage with image-catcher similar to human eyes catching images and infrared ray device detecting barriers, but they also featured a newly

invented PK “secret skills. TKU robots won the championship last year with the flexible design of chasing, dribbling and shooting skills. This year, the robots were upgraded with aluminum board to strengthen the body, plus a more stable motherboard and reinforced shooting power. Unfortunately, the Polytechnical University team from Harbin, China, with their robots processing newly invented efficient passing skills, and due to the dark light in the field impeding the reaction of TKU’ s light-sensitive robots, took the Championship away from Tamakng, which consequently received the second place.

Mr. Shih-an Lee indicated: “we are considering to install a whole computer system into the future robot to strengthen its capability of recognizing images.” As for this year’ s loss of championship, Miss Chia-ling Hsu, a senior student in the Department of Electrical Engineering, announced: “We will clinch the victory next time!”

Participation in the process of making, designing, researching and inventing, Mr. Wei-wen Wang, a second year master student at TKU and leader of “TKU MireSot,” remarked that the small-size robot soccer tournament had always been the most popular contest over the years because small-size robots were smaller and easier to design than medium-sized robots. Based on their experiences and efforts, thirteen small-sized soccer robots were created. Mr. Wang smiled and said: “we did make all of these thirteen robots with our own hands. Not like some other countries that needed to purchase some parts of the materials to make one robot due to various reasons, we made as many as robots as we needed, because we were capable of making every small parts.”

Small-size robots process images-catching, tactics, and hardware terminals; they are like human eyes, brain, hands and feet, respectively.

With two motors and a battery, these small-size robots were capable of running programs of tactics to determine whether to offend or to defend in the field. And the detachable motherboard was another unique design. Although they participated in an international competition for the first time, “TKU MireSot” robots won the forth place out of ten teams from six countries. Mr. Wei-wen Wang expressed: “That was a very valuable experience that I not only learned and realized each country’ s strength of design and research but also shared information with participants from various counties around the world through the competition.”

The human-figure soccer robot, “TKU HuroSot,” was the first robot capable of walking in Taiwan. This human-figure robot was a modified version of the “Creeping Sniper” robot model completed in May this year, which was a result of continuing efforts of researching, testing, and modifying. Finally, the robot was capable of completing a sequence of moving actions by the end of August and walking independently in the beginning of October, 2004. The World Cup tournament featured four types of events, including “Straight Line Speeding Competition,” “One-on-one PK Competition,” “Obstacle-Avoiding Competition,” and “Loading Competition,” and the final score was calculated by the sum of scores in the four events. TKU HuroSot robots fell down in the last step of Straight Line Speeding Competition and scored zero in this event. The Loading Competition event was really an interesting one. All the robots were required to carry batteries by their hands, shoulders, breasts, among other pats of their bodies, which indeed created may funny scenes. In this event, TKU HuroSot robots carried the battery on their shoulders and arrived at the end successfully; it consequently won the forth place overall.

The team leader, Mr. Han-chen Wu smiled and said: “although our score was not as good as we expected, we had done our best in the contest. Most importantly, we are so proud that we developed Taiwan’ s first walking

robot.”

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Five participants of Tamkang students and Professor Ching-Chang Wong (first on the left), The director of Canadian team (second on the right), and the student representative from Canadian team (second on the left), the group picture in the competition setting. (Photo provided by the Department of Electrical Engineering)