Making a Mark in Robotics

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Whenever we talk about robotics, an advanced field of applied engineering, we think about Japan or the US. That Bangladeshis can make technically advanced robots, made of hundreds of sophisticated sensors is therefore quite a surprising achievement. Undergraduate students of the Department of Mechanical Engineering of Bangladesh University of Engineering and Technology (Buet) are developing such advanced robots and are participating in an international competition to show off their calibre in the field of robotics.

The Bangladeshi team's triumph after beating Saudi Arabia at the ABU Robocon 2009 competition in Tokyo, Japan.

The Buet students have been participating in the annual robotic competition ABU Asia-Pacific Robot Contest since 2005 and have won the prestigious Panasonic Award in the Robocon contest participating for the very first time. The competition has been organised by Asia Pacific Broadcasting Union (ABU) since 2002. The event is widely known as ABU Robocon, which is an international educational event with a fresh and unique concept for university, college, and polytechnic students in the Asia Pacific region.

This year, the Buet team participated with even more advanced robots at the ABU Asia-Pacific Robot Contest 2009, held at the gymnasium of the Metropolitan Komazawa Olympic Park in Tokyo, Japan last August.

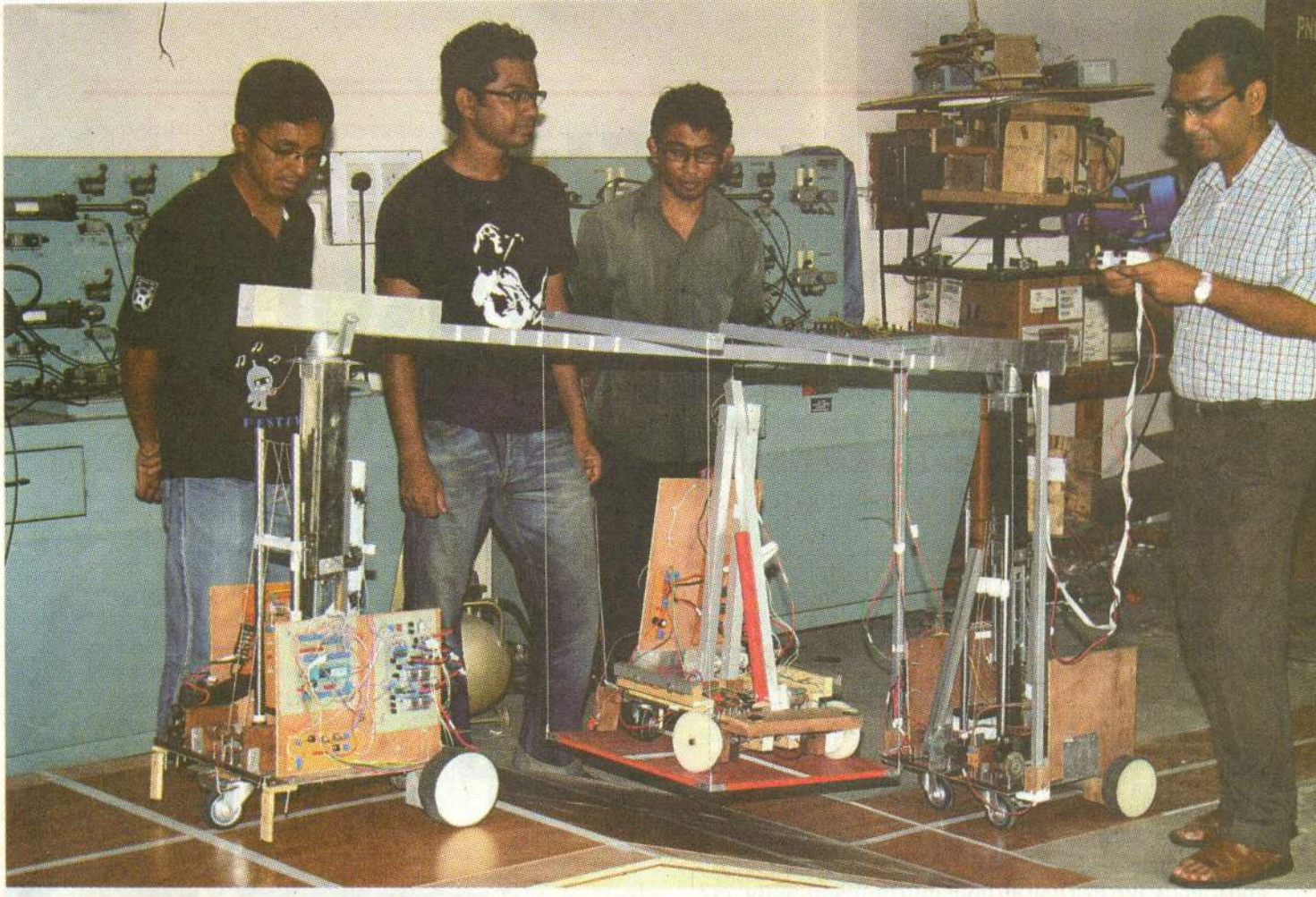
To participate in the competition, the Buet students developed three robots with used motor parts, aluminum sheet, nylon fibre, steel sheet and other materials collected from the city's Dholaikhal and Patuatuli areas, and imported micro-controller chips and hardware from the US. These autonomous robots are capable of moving through steep slopes and sharply winding roads to a certain destination and can take further decisions after reaching the goal. No camera was installed with the robots to reach the target, rather these robots function through a pre-programmed control system. The automatic robots developed for the competition are controlled through high-speed censor-based communication system. The control system receives 1000 commands per second for taking the corrective measures during the game.

It was not just about participating in a challenging competition where everything had to be done by the robots without any assistance from the participants. The Bangladeshi students beat the Saudi Arabia Team at the group match although it lost to China, which became champion in the competition. "And it is really something to be proud of that the Bangladeshi team is ranked as a mid level team in the competition", says Professor M Zahurul Haq. Of the South Asian countries, only Bangladeshi and Nepalese teams have won matches in the competition, while India, Pakistan and Sri Lanka has no victory record so far.

"Cooperation between people and robots was the theme of this year's contest", adds Professor M Zahurul Haq, under whose guidance three students-- M Saifur Rahman, Mezba-Ur Rahman and Omar Bin Yousuf--participated in the competition.

"This year's competition was really challenging because some conditions of the game such as the carrier robots will not be allowed to touch the surface except the zigzag path through slopes and they must adjust the seat of the Traveller Robot so that it does not slide or fall even if the seat is inclined by 20 degrees in either the longitudinal or the transverse direction during the travel," he adds.

Dr. Haq further informs that technical requirements of this year's contest is more advanced than the previous years' arrangement, since the organisers have conceived of this year as a step towards the goal of close cooperation between manual (or directly human-controlled) and automatic robots. "The core item of this year's contest was Kago, the traditional Japanese palanquin of the pre-modern era, which had been used



Undergraduate students of the Department of Mechanical Engineering tuning the robots under the guidance of their teacher at the department laboratory.

to carry the traditional Samurais by two men, one in front and the other behind, to distant places. Following the tradition, three robots from each participating team will travel a distance in the competition. Like the Kago carriers of the ancient time, an Automatic Carrier Robot will lead a Manual Carrier Robot to carry a Traveller Robot, which is also an Automatic Robot, on a replica of a Kago to a distance of about 80 metres through replicas of mountains, steep slopes, and sharply winding roads. At the end the robots will reach a bell and the traveller robot will have to ring the bell," he adds.

But Dr Haq believes that the Buet team could have done better this year despite the victory over the Saudi team. "Misfortune had been hounding us from the very beginning", says Dr. Haq, As per the rules of Buet, students cannot do any other activities one month before the examinations. As a result they did not get any chance for proper tuning of the robots, though those were ready for shipment last June. Most unfortunately, their examinations and the robocon competition began simultaneously. Taking special permission from the academic council that the three participants would sit in the examinations after the competition, we left for Japan."

"Even going there we faced some other problems. On the testing period, just before the date of the competition on August 22, the Japanese officials created an embargo claiming the batteries used in our robots were acid-lead batteries, a banned item in Japan. However, there is no such obligation in the rules of Robocon competitions. After the intervention of the Robocon Competition organisers, we were allowed to participate in the competition although in this competition we would not be allowed to go in the final. Meanwhile, time for testing the robots on the special track was over. As a result, we got just five minutes for our final preparation."

However, Dr. M Zahurul Haq is optimistic and determined do better in the future. He says, "We will purchase some modern equipment to develop our next robot project. We will start preparation for the upcoming Robocon contest, which will take place in Egypt next year."

According to Dr. M Zahurul Haq there is huge scope for industrial applications of robots in delicate and repetitive works in Bangladesh. Moreover, robots can be used to develop the defence system of the country such as for mine detection. For sustainable development of robotics in the country, Dr Haq suggests that the industry be developed gradually in different phases. ■