Physical Research Laboratory, Ahmedabad

COLLOQUIUM - 13 – 09

Speaker: Prof. Himanshu S. Mazumdar
E.C. and Head R&D Center, D.D. University, Nadiad

Title: Challenges in Autonomous Robotics Research and its Applications

Abstract

Androids and autonomous robots in popular films and fictions are far too smarter than the ones being developed in most advanced research labs. Most of us grew up watching "C3Po" and "R2D2" robots of "Star Wars". General expectation from robot poses greatest challenge for researchers. Robotics research is evolving as one of the key science discipline of the 21st century. Complex robotic hardware is rapidly evolving with the availability of greater computational power, variety of integrated monolithic smart sensors and actuators. These advances in hardware, however, do not fulfill the expectation of desired intelligent performance without the matching advances in software like computer vision, natural language processing and computational intelligence. Disciplines like artificial life, cognitive science, neural networks, rule-based systems, behavior based control, genetic algorithms and other forms of evolutionary computation are being applied to evolutionary robotics to bridge the gap between hardware and software. The integration of mechatronics with computational power and artificial intelligence has created human-like androids, autonomous vehicles and planetary rovers. The techniques of mechatronics and robotics are being applied to other areas of engineering, sciences and medical applications, creating vast opportunities of new products. In recent past we have witnessed the real-life application of such devices like *Da Vinci* the surgical-robot in Britain, drones in Afghanistan, war-robots used in Iraq war. NASA's Robotic Refueling Mission (RRM) is coming up with the capabilities of repairing and refueling dead satellites in space. Multi legged robots are being designed to explore terrains and hostile landscapes. Robotics is most popular among university students and hobbyists. It is one of the best sources of learning many technologies like mechanics, electronics, mathematics, control, software, computer vision and artificial intelligence. This colloquium will give an overview of the historical development of robotics highlighting few case studies and results.

The Speaker

Prof. Himanshu S. Mazumdar acquired his Bachelor's degree in Electronics Engineering from Jadavpur University in the year 1968 and PhD in Computer Engineering from DDU, Nadiad, in the year 2004. He has over 30 years of extensive experience in Airborne and Ground based instrumentation in Rocket, Satellite, Space Shuttle, Radio Telescope, Infrared Telescope, Industrial Automation, Process Control, Robotics, Communication, Signal and Image processing projects. He has long design experience of Analog, Digital, Embedded Controller, VC++, Power Electronics and PC based Systems. His current research interests include Artificial Intelligence, Computational Biology and Space Instrumentation. He has worked in important space missions in University College London, NASA's Space Shuttle and Indian Space Research Organization. He has worked with Physical Research Laboratory, Ahmedabad, India in the capacity of the Head, Electronics Division and Computer Science Laboratory during 1968 – 2004. He has worked as Director, Research and Development, Defense Training & Technologies Champaign, IL, USA. He is recipient of Hari Om Ashram Prerit Vikram Sarabhai Award in the year 1991.

Wednesday: 27 February, 2013, 16:00 hrs.

K.R. Ramanathan Auditorium, PRL

Tea at 15:30 hrs

ALL ARE WELCOME

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A YEAR OF NEW SCIENCE, NEW DISCOVERIES and DEEPER SOCIETAL COMMITMENT