
INTRODUCTION

by

[*Randolph Chung*](#) and [*Lynellen D. S. Perry*](#)

For many science-fiction fans, Issac Asimov's famous *Robots* novel series, as well as his ``Three Laws of Robotics," express a dream of how robots may one day interact with human beings. Asimov's R. Daneel Olivaw, as well as his modern cousin, Lt. Commander Data in *Star Trek: the Next Generation*, was humanoid in form, and was capable of interacting with his environment and learning from it with a positronic brain.

Undoubtedly, the current state of robotics research and application in industrial settings is far less advanced and sophisticated than Asimov's creations. Nonetheless, the field of robotic research has seen much development both in theory and in real-world applications in recent years. Researchers around the world are working to make robots ``smarter" and more useful. Paramount to these goals are technologies which allow robots to sense and react to the world around them. There is also a belief that robots which can acquire knowledge through experience can work more efficiently than those whose ``brains" are hard-wired.

Robotics is an interesting and exciting field in which to conduct research. This is partly because of its integration with other computer science fields, especially those of artificial intelligence, computer architecture, communications and graphics. Developments in each of these areas, for example, in better machine vision systems, will allow robots of the next generation to be more powerful and useful.

Perhaps there is still some time before robots will assume a humanoid form and can interact seamlessly with people. Nonetheless, robots are already proving their usefulness as a tool in scientific exploration and industrial applications today.

HIGHLIGHTS

In this issue, we bring you several interesting articles that survey the current state of robotics research and its various applications.

We start off with Sharon Laubach's article on the Sojourner rover that was recently deployed to Mars to aid in planetary exploration. A number of challenges in mobility, power, navigation and communications for the rover were addressed, as were the technologies still awaiting development for future explorations.

This is followed by a two-article series describing a fascinating tournament, RoboCup, that was held at IJCAI-97 in Nagoya, Japan. Hiroaki Kitano, Minoru Asada, Itsuki Noda, and Hitoshi Matsubara introduce the ideas and goals behind the organization of this tournament, as well as an overview of the details and results of this competition. Manuela Veloso, Peter Stone, Kwun Han, and Sorin Achim from CMU describe the development of their team of small robotic agents, CMUnited, that won the RoboCup-97 small-robot competition.

Last but not least, Todd M. Shrider describes a control system for robots based on artificial intelligence and cognitive science principles.

Also featured in this issue is our Ask Jack column, our Objective Viewpoint column about Java, and a tasty morsel about code obfuscation in Java.