In the Spotlight: Prof. Bruno Siciliano

Author Zone interviewed Bruno Siciliano, one of two Editors of The Springer Handbook of Robotics

Bruno Siciliano is a multi-talented scientist and has many different interests. He is a professor at The University of Naples as well as President of the IEEE Robotics and Automation Society and coordinator of the European research project DEXMART. He is also one of the two editors of The Springer Handbook of Robotics which is a mammoth handbook covering more than 1,600 pages including contributions from 167 researchers. The handbook has won the AAP PROSE Award for "Excellence in Physical Sciences & Mathematics" and "Engineering & Technology."

Why did you start researching on robotics? Please tell us about your background.

Recalling my teenage years, I read books by Asimov when I was around ten. I guess these novels and science fiction movies booming at the time were my primordial reason to become interested to cybernetics first and to robotics later. In 1977, and this was before the emergence of the computer age, electronic engineering was very popular because you were guaranteed to have a job if you were an electronic engineer, so I chose electronic engineering as my major. In 1983, I started to take a Ph.D. course, and actually I was one of the first students to take the Ph.D. course in Italy, since back then Italy only offered the master course at the top of the education system. After finishing the course, I approached robotics from the field of automatic control systems. By that time, robotics was one of the hottest subjects in science technology, so I started working in this field. I liked the fact that robotics is simply challenging. As I began researching, I found out robotics is such an interdisciplinary field. I soon realized I had to study a lot more fields like mechanics, sensor systems, computer technology and a control system from an intelligent point of view. This implies not only the physical level of controlling but also the cognitive interaction.

Please tell us briefly about the history of robotics.

Robotics was popular in the 70's and 80's, but in the early 90's, robotics in the industry had already become a well-assessed mature technology. Now the question was whether a robot could do any field applications outside the factory. Robots in the industrial field always have a rigid sequence to execute, in which we can state them as relatively stupid, for they are only performing repetitive actions. Therefore, to advance, in the late 80's the robots were used for outdoor applications in hostile environment such as space applications, subsea conditions, and in a field of land mines. Then, there were teleoperated robots and partially autonomous robots. In a teleoperated system, humans are the ones to decide. But an autonomous robot assesses its environment and learns to take decisions locally.

The new challenge at the end of the century was to create a totally independent autonomous robot. In 2007, the leader of the PC revolution, Bill Gates, predicted that the there would be an upcoming breakthrough in the field of robotics. In other words, we are just at the beginning of the robot age.

In the near future, what will be the most radical and exciting change in this field?

Service robotics has been developing very rapidly. PARO, a seal robot, is very popular. It accompanies elderly people by talking, relieving their feelings of solitariness. Actually, some people liked PARO more than a real animal pet because it is more sociable compared to a live seal. I mean if you have any chances of getting in touch with one.

Another field that is growing is personal robotics. Will each of us have personal robots in our daily life? And should they be humanoids? We do not have an answer to these questions yet. In the future scenario, robots will be integrated into our environments the same way as computers and cell phones have been integrated. This suggests that all IT will be integrated at the same time. I would say there is a high possibility of robots becoming so pervasive that several decades from now, robots will be in every home.

When compared with a human being, what kind of similar abilities does a robot possess?

Among my recent edited work, there is the The Springer Handbook of Robotics. In this handbook, Dr. Rodney Brooks provides a very curious answer to your question, so let me quote.

“As you study this volume and look for places to contribute to research through your own talents and hard work I want to alert you to capabilities or aspirations that I believe will make robots even more useful, more productive, and more accepted. I describe these capabilities in terms of

the age at which a child has equivalent capabilities:

- the object-recognition capabilities of a 2-year-old child
- the language capabilities of a 4-year-old child
- the manual dexterity of a 6-year-old child
- the social understanding of an 8-year-old child

A social understanding can be referred to as an emotion of sorts. This means that a robot can learn from its experience to form its emotions. If I treat a robot with malicious intentions, it will behave with a corresponding reaction, just like a human."

Can a robot understand the emotions of human beings?

Yes, certainly. You may wonder why. If you are sad, maybe you talk less. If you are angry, you will talk with a different voice or maybe become violent. A dog can learn about its owner and so does a robot.

Again, this means we are still in the infancy of robotics. There is a lot more to do to have the same capabilities as an adult. In this sense, this handbook of robotics plays a significant role in the history of robotics. There was no united publication as a reference source that collected all the contributions by people all over the world with a cooperative spirit. Also, I have recently published a new textbook Robotics - Modelling, Planning and Control, which is one of the three most-used textbooks on the subject in the world. As the president of IEEE RAS, or I should say as a scientist, my goal is to advance science by involving students. We must invest in the students. Students are our future. The handbook and the textbook are part of the results of my goal.

We heard you are interested in Zen?

The philosophy of Zen is my motto. And as an Italian, I must say that art is part of my heritage. My work is very technical, but at the same time my work requires some creativity. For instance, I like cooking, and especially the artistic way of how Japanese food is served inspires me very much. Sometimes, new ideas and theories come into life from aesthetic experiences.

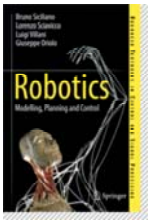
Lastly, I must inform you of some interesting news. I am an organizer of the rock band called RASOR (Robotics and Automation Society Officers Rock). The band consists of some very famous scientists, and already performed at the various parties of the ICRA conference in the last couple of years.

Author Zone thanks Bruno Siciliano for this interview.

Books by Prof. Siciliano

The Springer Handbook of Robotics is available in various formats.

- Print
- eReference
- print+eReference



Robotics provides the basic know-how on the foundations of robotics: modelling, planning and control. The classic text on robot manipulators now covers visual control, motion planning and mobile robots too! ... More