CMC MICROSYSTEMS IMPACT

Advancing the Mobility and Vision of Humanoid Robots

A University of Manitoba researcher will use tools and technologies provided by CMC Microsystems to improve the mobility and vision capability of his robot when it competes at the international RoboCup competition next year in Germany... in the future, humanoid robots could help to care for the elderly, perform household chores, and locate survivors in a collapsed building

"The technology provided by CMC significantly increases the productivity of researchers in Canada. I am a former senior lecturer at the University of Auckland. In New Zealand, a company would provide an equipment grant, but then the researcher would have to acquire the correct software and manage all of the licensing. CMC provides a comprehensive solution for the researcher—it is a much better support system for the whole package."

Dr. Jacky Baltes
Associate Professor
Computer Science
University of Manitoba

Dr. Jacky Baltes displays humanoid robots developed in his lab using tools and technologies provided by CMC Microsystems. In the future, humanoid robots could help to care for the elderly, perform household chores, and locate survivors in a collapsed building.

A research team at the University of Manitoba is working with CMC Microsystems to give their soccer-playing humanoid robot a competitive edge at RoboCup 2006—the world's largest and most prestigious research competition in robotics and artificial intelligence.

Humanoid robots compete at RoboCup 2005 in Osaka, Japan. A CMC-enabled robot could be among the contenders at next year's competition in Germany.
PHOTO: Terry Liu

The first design equipment has already arrived in the computer sciences lab of Dr. Jacky Baltes—an FPGA (field-programmable gate array) platform and an associated workstation. The technology provided by CMC will make it possible for the researchers to simultaneously control up to 27 motors, instead of the usual two or three motors in most robots. Intelligent control of a humanoid robot requires computation of motion plans, joint trajectories, actuator positions and velocities in real time, all the while incorporating feedback about the pose of the robot from gyroscopes, accelerometers, force sensors, and/or vision input.

Dr. Baltes explains: "With 27 motors, real-time control becomes a real problem. If you use a general CPU, the robot would shake uncontrollably due to jitter in the timing of the actuators. By using FPGAs in the design, we can significantly improve the mobility of the robot, specifically the way it walks."

He also hopes to use additional FPGA tools provided by CMC to increase the robot's processing power and vision system.

This internationally-competitive research is helping to advance the capability of humanoid robots and the many ways they could help us in our daily lives in the future. *cmc*