

INNOVATION

ROBO RONALDOS

Our scouting report for the 11th annual World Cup for robots

THIS MONTH, robotics geeks and soccer fans will cheer side by side on the Georgia Tech campus in Atlanta during 10 days of mechanical soccer action at RoboCup 2007, an international robotics competition expected to draw 358 teams from more than 20 countries. Aside from watching androids dribble and shoot, the tournament's purpose is to drive innovation in robotics, with the ultimate goal of spawning a team of über-'bots good enough to beat the human World Cup soccer champions by 2050. For now, though, just staying vertical and ambulatory is hard enough.

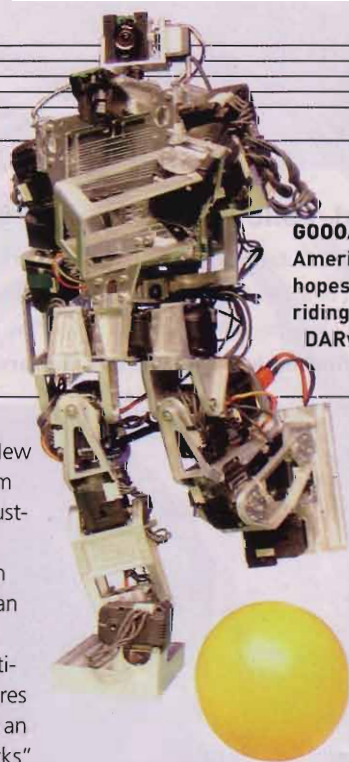
Karl Muecke, a graduate student at Virginia Tech University working on a humanoid RoboCup entry, thinks the 2050 goal is doable—but the hardware and the funding has to catch up to the designers' ideas. "Currently, motor-power-to-weight ratios and battery life are the limiting factors," he says, "not the intelligence or abilities of the competitors."

As in years past, the RoboCup features two-on-two matches between humanoid 'bots of all sizes as well as games between

teams of reprogrammed Sony Aibo robotic dogs. New to the mix is the Nanogram league—a collection of dust-speck-size 'bots designed to show off recent gains in nanotechnology. More than a billion times as small as last year's smallest competitors, each nanobot measures roughly one hundredth of an inch on each side and "kicks" a ball just three thousandths of an inch across—about the size of 10 red blood cells. (Spectators watch the action on a microscope-mounted video camera.)

There's no fantasy league yet, but if there were, we'd draft these four players first.—ERIC MIKA

GOOOAL!
America's
hopes are
riding on
DARwin.



ROBOT

BIO

STRENGTH

WEAKNESS

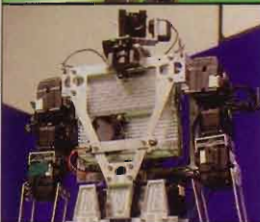


Bruno
Darmstadt Dribblers,
Technical Institute of
Darmstadt
Germany

Bruno was a crowd favorite in 2006, scoring on a backheel kick, a RoboCup first. This is the Dribblers' fourth season of competition.

Fastest feet. Advanced kinematics software helps Bruno trot 16 inches per second (nearly one mile per hour)—faster than any other humanoid 'bot.

Choke artist. For all its acrobatic moves, Bruno fell down several times in the final rounds of RoboCup 2006, allowing other 'bots to score with ease.

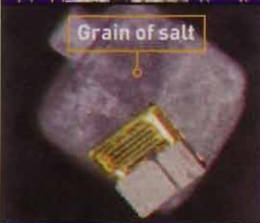


DARwin IIb
Team SPRInt
Virginia Tech University
United States

The first-ever American entry to the Humanoid league, DARwin was originally used to study robot locomotion.

Biggest brain. Loaded with one gigabyte of memory, DARwin also has the fastest processor of any 'bot in its league.

Rookie status. DARwin has only a few months of soccer experience, making it the underdog of this year's RoboCup.



Grain of salt

2rez
Nanogram league,
ETH Zurich, Swiss Federal
Institute of Technology
Switzerland

2rez measures a mere hundredth of an inch wide. A remote PC guides it through challenges that test its goal-scoring skills.

Most agile. The Zurich team uses a magnetic field for quicker steering. Competitors use a slower electrical grid.

Uncooperative. Working with the 'bot is difficult: It's hard to see and often clings to tweezers and refuses to let go.



Robo-Erectus Junior
Singapore Polytechnic
Singapore

The wily veteran of the field, Robo-Erectus has competed at RoboCup since 2002 and took silver in the 2004 penalty-kick competition.

Smoothest gait. With three processors running two gait algorithms, Robo-Erectus plans its next step more efficiently and precisely than its competitors.

Too klutzy. Junior is good at walking and at kicking but struggles to do both at the same time.