Cyberbotics and RoboCup: the Robotstadium competition

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Webots™ 6
fast prototyping and simulation software for mobile robots

Spin off from EPFL, Lausanne, Switzerland
Company founded in 1998, now 6 employees
International collaborations (Sony, SRI, EPFL, University of Nevada, ICEA European project)
Over 650 customers worldwide (including universities and corporate research centers)
Webots used both for research and education

€ 1'500
Robotstadium 2009: objectives

- Provide a simulation setup equivalent to the Nao-based Standard Platform League (SPL)
- **Second online competition** (first one was 2008):
  - Remote participation, free of charge
  - Several programming languages: C/C++ (*NaoQi*, *Matlab*), Java, *Python*, URBI
  - Running matches and publishing movies every day
  - Web site: *live cam*, instructions, forum, upload, etc.
  - Attractive prizes (*cash CHF 1,000 + Webots 6 pack*)
Robotstadium match
Kal (Germany) vs UPennalizers (USA)

(4x real time playback)
Robotstadium 2009: Realistic simulation, *NaoV3R*

- 22 servo motors with position and force feedback (control in position, velocity or torque)
- 8 force sensors (4 in each feet)
- 4 foot bumpers
- 2 color cameras (*multiplexed*)
- 4 ultra-sound sensors
- Accelerometer and *gyro*
- Receiver and emitter devices (to communicate with team and referee)
- LEDs (*foot, torso, eyes, ears*)
Robotstadium: automatic referee

- Implemented as a Webots supervisor
- Record match movie
- Implement the RoboCup GameController (game status: SET, READY, PLAY, PENALTY, etc.)
- Monitor the ball, detect goals, display score, make throw-ins
- Reset robots and ball to initial position
- Apply official rules (kick-off shoot, etc.)
- Handle penalty kick shoot-out
- Stop the watch when the match is over
- Improved compliance with RoboCup SPL rules
Robotstadium web site: www.robotstadium.org

- Host official competition
- **Live cam**
- Ranking (14 competitors)
- Rules
- Registration
- Software download
- Controller upload
- Reference to SPL
- Match movies
- Forum, FAQ, shoutbox, etc.
Robotstadium: expected outcome

- Compare the performance of different approaches to this benchmark (e.g., for example traditional control versus bio-inspired approach, different strategies, etc.)
- Encourage further research to outperform the best solutions
- Improve the simulation so that it accurately matches the real setup and allows for transfer to the real world
- Observe the evolution of the performance of the solutions over time (how did the research progressed in this field over the past few years?)
Robotstadium: conclusion & future work

- Complete system benchmark based on RoboCup SPL robot soccer
- Realistic simulation aiming at transfer to real robots.
- Running continuously online, free participation
- Weekly tournaments and ATP-like ranking system
www.robotstadium.org

Thank you!