Foul play won the day in the RoboCup
Foul play won the day in the RoboCup

Charles Seife

**IT PAYS TO FIELD HEAVIES** and rough up your opponents a bit, even if it costs you a few yellow cards. At least, that's partly how a team from Cornell University in New York beat 18 other teams to win the Robot Soccer World Championships in Stockholm last week.

Robots tend not to play football very well, because they have trouble dealing with unpredictable events. "When a robot bumps the ball or kicks the ball, it can go in any direction," says Bart Selman, a computer scientist at Cornell who helped students design their robotic stars. Not only must the robots process pictures of the playing field, search for the ball within the picture and extract its location and heading, they must also decide how they are going to move to intercept the ball and execute that decision, all in a matter of milliseconds. That's quite a task. And if the ball's trajectory deviates from the expected position, the calculations have to start from scratch again.

Cornell's soccerbots--each rectangular, 18 centimetres high and weighing about 2 kilograms--concentrated on defence rather than attack and the strategy worked. "The Singapore team constantly attacked, with lots of shots on goal, but being aggressive can get you into trouble," says Selman. "You are at risk of not knowing where you are or of losing the ball." Cornell beat Singapore 6-2 and went on to beat the Free University of Berlin 15-0 in the final. The German strategy--hoofing balls straight at the goal at 6 metres per second--was stymied by the Cornell team's ability to learn and adapt to different styles of play.

But several of the Cornell machines received yellow cards for bullying their opponents. "We had to take out one of the more aggressive robots to prevent a red card," admits Selman.

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