

Student researchers build table-football robot

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Is in table football. The next step will be to program the robot with some strategy and organise a competition among robots.

Do you think you could win a game of table football against a [robot](#) developed by EPFL students? Some people have tried, and it was harder than they thought. Even with a very simple strategy, the robot is able to beat players with an average skill level. What's its secret? Speed and shooting power.

The robot, which was designed as a [research platform](#) for Bachelor's and Master's students, reached a milestone recently. After several years of development in the Automatic Control Laboratory, it is now faster, more accurate and more powerful than ever before.

Much more efficient industrial motors

The robot was provided with brand new 'arms', which are powerful and agile. They use high dynamic linear motors, the same type found in manufacturing. They can position the player very quickly on the field and then engage a rotational movement with the help of another motor to shoot. These motors are precise to less than a millimetre and can generate 9g in acceleration: the robot moves faster than a human being.

The robot also has excellent eyesight. A high-speed camera located under the game's transparent floor follows the ball's movement. The camera collects 300 images per second, which are then processed by a computer. Léo Sibut, a Master's student, spent six months working on data acquisition and actuator control. "I learned a lot about image processing, which is a field I didn't know very well," he said. His work improved the robot's precision and reliability.

Plenty of brawn but just a little brain

The system is currently able to detect the ball, stop it and then shoot towards the goal. "It's a very basic strategy, but it works surprisingly well," said Christophe Salzmann, the scientist in charge of the project.

Yet he thinks it's too simple. "At this stage, the system is like a bodybuilder with a tiny brain," he jokes. "But in addition to being strong, we want the robot to be able to fake out the opponent, steer clear of the opponent, and predict the ball's path and the opponent's position." The students have started working on these improvements by installing lasers that can detect the position of the opponents' handles. This is what the robot needs to be able to apply a real strategy.

Competing software

In the meantime, Salzmann would like to quickly put together a table football competition between robots. The aim would be for the participants to program some strategy into the software and then have the machines square off.

Provided by Ecole Polytechnique Federale de Lausanne

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