



# Press Release

## Super Mario gets social intelligence

**Tübingen computer scientists help the popular jump 'n' run game figures learn to observe, collaborate – and even switch allegiance**

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Tübingen University's Cognitive Modeling group, led by Professor Martin Butz, has developed software to give social skills – based on human thinking and behavior – to favorite video game figures Mario, Luigi, Yoshi and Toad. Even as artificial intelligence plays an ever-greater role in computer games, socially intelligent systems have so far been little used. But the new video shows what socially intelligent game characters may be capable of in the future.

By watching one another and communicating, the figures are able to learn about their environment. This means that Mario can ask Toad how to collect coins and then try it himself. Another new feature is that the characters work together to achieve common goals. For example, Mario and Toad work out that they can stand on one another's heads to reach coins which are high up. The game even enables friends to become enemies who crash into one another intentionally, hurting themselves. The computer scientists gave Mario and his friends the basic ability to start a fight with opponents, and to gradually refine this competitive interaction.

In 2015, the team presented the first video in this series, in which 'Mario' (in a clone of Super Mario Bros) was equipped with artificial intelligence. Mario was introduced as a self-motivated creature who gets to know his environment, learns what he can do in it, and even communicates with the user about his knowledge as well as his current goals. As a result, Mario is no longer simply a reactive character controlled by the user. Rather, he appears to live in his environment and the user can influence his behavior only by giving abstract orders or motivational instructions via speech input. This will make Mario focus on particular aspects of his world – such as collecting coins, clearing the level, or learning as much as possible. When setting goals, Mario will attempt to reach them – possibly asking for help or further information. Now the programming of artificial social intelligence into several characters has made the inhabitants of the Super Mario universe even more human.

“While artificial intelligence has made tremendous progress in the field of computer gaming, artificial social intelligence is frequently no more than a marginal feature in the shadow of theoretical applications,” says doctoral candidate Fabian Schrodt, one of the main developers on the team. One of the researchers’ main goals is to make artificial social intelligence easier to use for teaching in schools and universities - and to bring new ideas not only to the current development of computer games, but also into the field of human-machine interaction and driving assistance.



Getting to know you: Toad says hi to Luigi. Graphic: Mario AI Project

**Video about Super Mario characters’ new skills:** <https://www.youtube.com/watch?v=ItPj3RIN4Nw>

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