# How Good Should an Artificial Intelligence in an Electronic CATAN Game Be?

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If someone had asked me this question roughly half a year ago, I would have answered: Of course it has to be as good as possible. A computer opponent can never be a substitute for a human player in a CATAN game on a real game board, so it should at least be able to play well.

What's missing in a game against computer opponents are emotions: the complaints when the robber comes, the noisy haggling over resources or the pointed remarks used to make the game partners turn against the alleged leader.

In the first version of CATAN for PC (CATAN – The First Island), initially published by Ravensburger Interactive in 1999 and later by USM, an attempt was made to provide the computer opponents with human characteristics. The AIs were nicely animated and contributed their wisecracks in a variety of situations.
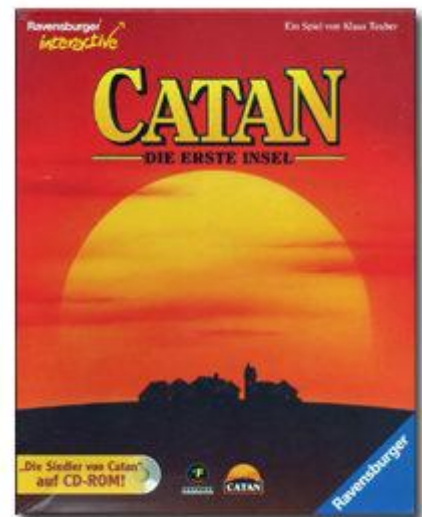
They sounded funny in the first few games, but with time they became rather monotonous because the computer opponents' repertoire was, of course, limited.

Back then, many players complained that the wisecracks were bugging them, and that they were switching off the sound when playing.

To make up for its flawed "human touch," an artificial intelligence should at least be able to play a clever game in terms of strategy and tactics and thus be a challenging opponent for the human player.

In the PC game "CATAN – Cities & Knights," published in December of 2008, we thus focused on developing a good AI. We refrained from including spoken comments made by the computer opponents – the criticism of "CATAN – The First Island" was still very fresh in our memory.
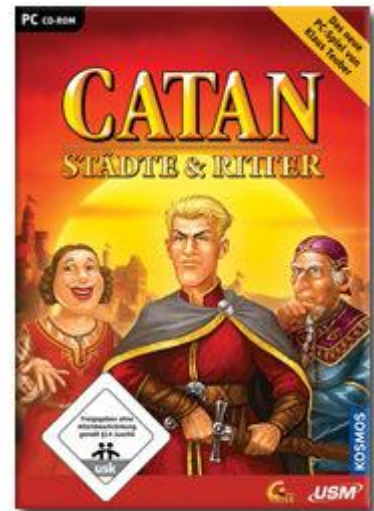
I for one put over six months of work into the concept of the AI, the fine tuning of the AI together with programmer Sebastian Mellin, and into countless tests. We published the program with an "easy" mode and a "normal" mode, and we wanted to provide an add-on with a "difficult" mode later. The "normal" mode was designed in such a way that an experienced player should have no problem playing the games. Testing and refining of the "normal" mode continued until the point where we at CATAN GmbH lost some Campaign games too; then we were satisfied and also a little proud of our work.

What made us proud as well was the fact that our artificial intelligence worked completely without tricks. There was no manipulation of the dice roll sequences, and the computer opponents were not targeting the human player. When placing the robber or trading, the AIs only saw opponents and made no distinction between the human player and other AIs.

So we were looking forward to feedback from the gamer community regarding our strong AI. The feedback came, but it mostly wasn't what we had hoped for. Sure, we also received praise, but unfortunately, many players had problems with the strength of our AI. Some of them purportedly needed more than 10 attempts to win the first game of the Campaign. It seemed that many players skipped training in "easy" mode and immediately hurled themselves into the Campaign adventure in "normal" mode.

The following mail is representative for some letters we received:

"The alleged random dice roll in the CATAN PC game is anything but random. I'm really asking myself what induces someone to be so – please excuse the expression – antisocial that he writes a program in a way that you simply cannot win."

In my answer I assured him that I usually do not behave in an antisocial fashion and gave him my word that the dice are not manipulated and the computer opponents don't gang up against the human player either, and that the computer opponents were just playing well.

The reply was short:

"Do you actually believe the crap you are writing me?"

Also, people often mentioned the predecessor "CATAN – The First Island" as the better alternative, although the computer opponents of this original version are very weak. It would appear that players who are repeatedly defeated by a computer doubt the program's trustworthiness more than their own playing skills. And if someone thinks that the program is "cheating," he or she feels betrayed and doesn't like the game. That's something I can understand.

So, if someone would ask me today how good a "normal" artificial intelligence in a CATAN game should be, I would answer: As good as required for an occasional CATAN player to win against a computer opponent.

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