What gamers want: Researchers develop tool to predict player behavior

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Researchers from North Carolina State University have developed a new method that can accurately predict the behavior of players in online role-playing games. The tool could be used by the game industry to develop new game content, or to help steer players to the parts of a game they will enjoy most.

"We are able to predict what a player in a game will do based on his or her previous behavior, with up to 80 percent accuracy," says Brent Harrison, a Ph.D. student at NC State and co-author of a paper describing the research. The research team developed the data-driven predictive method by analyzing the behavior of 14,000 players in the massively multiplayer online role-playing game (MMORPG) World of Warcraft.

"In a game like World of Warcraft, which is constantly developing new content, this could help guide content design decisions," Harrison says.

"A good game stands on its own," says Dr. David L. Roberts, an assistant professor of computer science at NC State and co-author of the paper. "If you want to improve it, you have to make sure players will like any changes you make. This research can help researchers get it right, because if you have a good idea of what players like, you can make informed decisions about the kind of storylines and mechanics those players would like in the future."

"This work could obviously be used for World of Warcraft or other

MMORPGs," says Roberts, "but it also applies to any setting where users are making a series of decisions. That could be other gaming formats, or even online retailing."

Harrison adds that the new methodology could also help game designers guide players to existing content that is suited to their gaming style.

"For example," Roberts says, "you could develop a program to steer players to relevant content. Because it is a data-driven modeling approach, it could be done on a grand scale with minimum input from game designers."

The researchers developed the new method by evaluating the task-based "achievement" badges that players in [World of Warcraft](#) earn. These achievements are awarded whenever a player accomplishes a specific goal or series of goals.

Specifically, the researchers collected data on 14,000 [players](#) and the order in which they earned their achievement badges. The researchers then identified the degree to which each individual achievement was correlated to every other achievement. The researchers used that data to identify groups of achievements – called cliques – that were closely related. Those cliques could then be used to predict future behavior. For example, if a clique consists of seven achievements, and a player has earned four of them, the researchers found that they will probably earn the other three. However, many of the cliques that the researchers identified consist of 80 or more different achievements.

One interesting element of these findings is that the achievements that are highly correlated – or part of the same clique – do not necessarily have any obvious connection. For example, an achievement dealing with a character's prowess in unarmed combat is highly correlated to the achievement badge associated with world travel – even though there is

no clear link between the two badges to the outside observer.

More information: The paper, "Using Sequential Observations to Model and Predict Player Behavior," will be presented at the Foundations of Digital Games Conference in Bordeaux, France, June 29-July 1.

Provided by North Carolina State University