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Using Living Cells to Create Biotic Video Games

<http://www.physorg.com/news/2011-01-stanford-cells-biotic-video-games.html>

Stanford physicist Ingmar Riedal-Kruse has developed a "biotic videogame" that involves paramecia and other living organisms. These games are played in a controlled environment, in which a group of paramecia are enclosed in a fluid chamber. Above the fluid chamber, there is a camera that transmits back to the computer images of the paramecia swimming around in the fluid. A controller, much like current day video game console controllers, is hooked up to the computer. When the user presses a certain direction on this controller, the electrical field around the fluid chamber is changed, which in turn provokes the paramecia to swim in that given direction. Scientists can then take the video from that camera and develop video game software that uses the video to interact with the game, such as the paramecia becoming the paddles in the classic game pong.

This article relates to our study of small, single-celled organisms. Paramecia, the organisms used in this study, are single-celled organisms themselves.

The backbone of this entire study is the paramecia, the single-celled organisms that are being video recorded and used to interact with the video game interface. This strongly relates to our studies in this class, because eventually we will be talking about organisms, which the paramecia are part of. Instead of playing a video game by controlling variables in the memory of a computer, people can now play a game by trying to control these single-celled organisms. As Riedal-Kruse says, "the goal is for players to have fun interacting with biological processes, without dealing with the rigor of conducting a formal experiment". Through our studies in this course, we will eventually find out what is happening in these paramecia to have them react the way they do, which is the whole basis of control in this video game. This study relates to bioengineering specifically, in that students could play these games to see how the organisms interact, rather than setting up a time consuming formal experiment. The students would also have more fun learning about these organisms when given a game-like setting such as this one. More interestingly, this also relates to computer science to a degree. Controlling paramecia instead of reading signals from a game controller are completely different things, and each present unique challenges in software. For these games, the only input as far as the computer is concerned is the video from the paramecia swimming around. This means that the control for the video game is not purely digital, because the paramecia are biological and living. Using the paramecia as controls means that the user won't always have complete control over what is going on. The paramecia might act strangely if something in the environment changes, which could completely change the video game.

This article is significant because it marks a location in which a new possible type of computer interface is being researched. Right now we can use the paramecia to control video games, but in the future we might see that these paramecia can be used for other purposes in a computer. This goes along with the idea of biological computers, which could have significant advantages over current computers because of the way they could store data. I think right now people should care about the educational aspect of this, as Riedal-Kruse states, "we hope that by playing games involving biology of a scale too small to see with the naked eye, people will realize how amazing these processes are and they'll get curious and want to know more". If nothing else, this project can be used in an educational environment, but of course there are always other possibilities for different applications in the future. This can also impact computer science if there is a significant breakthrough in biological computing from this study.