Team 2: Wireless Electroencephalographic Device Incorporation into Gameplay

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Electroencephalographs (EEGs) are input devices available as commercial wireless headsets which are capable of picking up signals associated with facial expressions, emotions, or even focused thoughts. These could be used by physically impaired people (e.g., paraplegics or victims of ALS) to control prostheses or wheelchairs, restore mobility, and increase independence. Alternatively, they can be used by people including the non-disabled to control external devices or software such as video games.

The goal of this project is to create a new paradigm of gaming using EEG input via an Emotiv headset. This makes the game more psychologically involved through the use of mental commands, such as spell-casting, by thinking or concentrating rather than the conventional usage of a keyboard and mouse or console controller. This could make the gaming—or any—experience more intuitive, not requiring the user to click when they want something, but instead just thinking about it. This could also be useful in a psychological sense: it could be used to monitor a person's emotions in a non-intrusive way, and could be used as a therapeutic tool, or simply an interesting way to teach people more about what signals their brains are sending, while providing an entertaining experience in the process.

The game is made in Unity and interacts with the Kinect through RUIS, Reality-based User Interface System. A client-server connection is used to obtain data from the EEG headset which determines the player's actions within the game. Players are able to use their mind with the EEG headset to control certain actions, and move their body in front of a Kinect One to control the character's movements. This provides a more immersive experience where users aren't just pressing buttons to progress through a storyline. EEG gaming is a largely unexplored field of gaming, so much of what this project explores is unprecedented, making it a great problem-solving experience. The main goal is to engineer a more immersive and healthy gaming experience in which the player can interact directly with the environment without the use of traditional inputs.