

Use of a virtual environment to solve real world problems

The research involves a project for homeland security within the Modeling and Simulation Group, Computational Sciences and Engineering Division at the Oak Ridge National Laboratory. Using the Unreal Engine, nuclear facilities and other real-world plants are developed in a virtual environment. The purpose of this project is to enable the military to create real-life scenarios in a safe (virtual) environment to protect our country's power facilities from terrorist attacks.

The Unreal Engine is a programming environment that is based on an open source, object-oriented language similar to C++ and Java. To enable the military to use this virtual environment to calculate real world scenarios, programmers from the U.K. were called in to create a modification to the Unreal Engine to create life-like soldiers, terrorists, and environments. Within these "real world" environments, the Modeling and Simulation Group has worked diligently to duplicate virtual nuclear facilities and power plants across the country into the Unreal Engine's virtual environment to create a place for the soldiers and terrorists to work and move.

My role in this project is to develop a program in which a colored bar appears on the upper left corner of the screen that measures the amount of damage a power plant has sustained when certain components are attacked by terrorists. Certain components of a nuclear facility or power plant have different levels of importance. Some components, like a tank or a generator, are more important than others, like a computer console. When a terrorist attacks and destroys a power plant's component, a section of the bar depletes depending on its importance. When the bar is completely depleted, the terrorists, known as "Op Force," automatically wins. By using this virtual environment, the government can simulate dangerous situations like these without the need to use live ammunition, or worry about losing human lives in training exercises. Also, it is more cost effective, and more precise in calculating the different outcomes that can happen within a given situation.

In conclusion, using a virtual environment has many benefits from simulating scenarios using real people and elements. In the future, where more advanced technology will become available, using virtual environments will be more common place. The main point is that by using virtual environments to calculate terrorists attacks, homeland security can help make America safer.

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