

USE OF THE PSEUDO-RANDOM URBAN FEATURE ENTITY SERVER (PRUFES) TO EVALUATE URBAN APPLICATIONS

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Abstract

The United States Army is transforming into a force that is lighter, more rapidly deployed, and better suited to the needs of an changing operational setting. This transformation is necessary to maintain the world's most dominant military force in an ever-changing battlefield. Whereas previous wars have been fought in vast open spaces, today's missions require the soldier to fight in urban and suburban areas as well as uninhabited areas. Military Operations in Urban Terrain (MOUT) and Military Operations in Built-up Areas (MOBA) require specific training in the tactics and techniques of such a mission. The most common method of training for urban operations is by practicing in small mock towns; however, these sites are costly to develop, instrument, and maintain. In addition, MOUT sites become predictable to warfighters once they have participated in several training exercises. To combat this problem, the US Army Aviation and Missile Research, Development, and Engineering Center (AMRDEC) has developed a simulation tool that provides an urban/suburban sprawl environment.

In the past, if an urban/suburban sprawl area were required for a simulation, every entity in the defined area had to be created within the large, static "neighborhood." The Pseudo-Random Urban Features Entities Server (PRUFES) allows for real-time generation of a cultural feature set that realistically represents a geo-typical terrain. As the server monitors the movements of a user, it populates an existing terrain with a selected cultural features set within the line of sight of the user. The particular cultural features set used for this PRUFES experiment contains three each of small, medium, and large houses, including the interior of each house that can be generated as needed. Each yard contains various combinations of trees, fences, and cars. The feature entities are repeatable, but variable in combination, placement, and appearance. The population of the terrain is random, but is based on a chosen point of origin. The PRUFES server distributes these features as objects to client machines across High Level Architecture (HLA) or Distributed Interactive Simulation (DIS) interfaces. PRUFES has the capability to create a practically infinite sprawl area without overburdening the client machine.

This paper discusses the three-week PRUFES experiment performed by a Systems Engineering student from the United States Military Academy. The purpose of this experiment was to test the capabilities of the server and provide early soldier feedback into the appropriateness of the server as a training aid and to investigate potential urban warfare applications. The experiment contained a homeland defense scenario that required the user to move through a suburban sprawl area, searching house-to-house for a hidden suitcase that represented a threat such as an explosive device or chemical agent. The collected data and resulting feedback from the experiment will be beneficial for future improvements to PRUFES.

Biographical Sketch

Polly Ann Cayson is a project engineer for the US Army AMRDEC at Redstone Arsenal, Alabama, in the Advanced Prototyping, Engineering and eXperimentation (APEX) Lab. She earned a BS in Industrial Engineering from Mississippi State University and a MS in Management from Florida Institute of Technology. Her current focus areas in the APEX Lab are urban simulation and constructive simulations analysis.

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Bobby Wright is a computer engineer for the US Army AMRDEC at Redstone Arsenal, Alabama, in the Advanced Prototyping, Engineering and eXperimentation Lab. Prior to his current efforts developing cultural feature sets for PRUFES, Mr. Wright worked at the Tank, Automotive, and Armaments Command in Warren, Michigan. He earned a MS degree in Electrical and Computer Engineering from the University of Michigan.