VRAT
Virtual Realistic Augmented Training

VRAT provides a synthesized-realistic training environment for first responders working with hazardous materials (HAZMAT) that will enhance scenario recognition and response-based cognitive agility, providing first responders (FRs) with the skills, knowledge, and decision-making ability necessary to navigate hazardous situations effectively.

Our aim is to enhance FRs training by utilizing Virtual Reality (VR) / Augmented Reality (AR) technology and scientific models. VR/AR creates a safe and controlled environment for FRs, to practice and learn without real-world risks. Immersive training scenarios will simulate material properties and the dispersion of radiological materials by incorporating scientific models of dynamic environmental conditions and terrain complexities ensuring realism and immersion, while customization enhances effectiveness. This cost-effective training method prepares FRs for real-world challenges efficiently in single or multi-user modes. Real prior incidents can be modeled for training and validation of models in real-life. Some of the features include:

Environmental Modeling – create weather environmental conditions per model predictions. Our basic configuration provides variable weather conditions (rain, snow, etc.) for instructor configuration selection. The advanced configuration uses cloud-based modeling to generate realist instrument readings of hazardous materials impacted by the environment.

Terrain/Building Modeling - this is the geographical terrain (outside) or the interior of a building. The model is used to assist in the dispersion of the hazard material overtime within the scenario. The basic configuration assumes the planet is flat.

Hazard Material Dispersion – create material dispersion fate and transport as realistically as possible with input from the "Terrain/Building" models and "Environmental" models.

Enhanced Asset Functionality – these are assets (instruments, hand tools, vehicles, etc.) that are designed to appear and function as realistically as possible. The environmental, terrain/building, dispersion models plus any assets (e.g., vehicles) that may be between the instrument and the hazardous material will impact the readings/usage of the instrument (asset). A collection of common "enhanced assets" are included. Custom instrumentation and tools are available.

Artificial Intelligence (AI) Enabled NPC (Non-Player Characters) – typically NPCs are silent bystanders however we will also have AI enabled NPCs. NPCs are shown as avatars (e.g., other people in the training scenario). They will add a "public" dimension associated with the randomness of life. Our AI Enabled NPCs provide reactions to student actions and can have randomized responses to provide a richer learning experience. We provide several types of NPCs, such as, "angry property owner", "pesty journalist", or an imposter. An imposter is when the "instructor" takes the role of the avatar or another student without the knowledge of the actual students.

Single or Multi-Student Training Sessions – student(s) plus an instructor may connect into the training session from any location with adequate bandwidth.

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Scenario Background Configuration - this is the background the training take place within (e.g., the scene for the training scenario). Once a background is selected by the instructor, they can use the "Instructor Configuration Panel" to add and place additional assets. The basic configuration contains two backgrounds (exterior and interior). Additional and/or custom backgrounds are available.

Instructor "Training Session" Configuration Panel– the panel allows the instructor to customize the training session, select the hazardous material, add randomness, and select avatars for students.

The VRAT System architecture serves as the backbone, providing an immersive, collaborative, and dynamic training environment stands apart from existing methods. Key components of this architecture include an Instructor Configuration Panel for session customization, cloud-based models for location. environment, terrain, and hazardous material to ensure realism, scenario variables functioning as a database for run-time characteristics, and live training sessions can begin, once all model calculations are complete. By leveraging advanced technologies like VR/AR, ML (Machine Learning), and AI, the system enhances training realism and effectiveness. New training applications in handling and working with hazardous materials and response to emergencies and uncontrolled hazards are made possible, including complex environment simulations, real-time feedback, and training scenario adaptability to individual learning styles and needs. Unique features of the VRAT system include environmental modeling, terrain/building modeling, hazardous material dispersion, weathering, and incorporation of actual tools and equipment, Training can be set for a single or multiple students. Additional AI-enabled Non-Player Characters (NPCs) can supplement the experience playing divergent roles in support of or in conflict with the students. VRAT offers a paradigm shift in training methods, creating an engaging and effective learning environment significantly improving upon existing methods.

VRAT allows instructors to customize training sessions focused on realistic HazMat incidents. Utilizing scenario variables and cloud-based models. The cloud-based models set up the environment (weather, etc.), terrain, and hazardous material conditions including dispersion. Trainees (local or remote), participating individually or in groups, interact with the scenario and direct team members, who can be AI-enabled NPCs or real players. After the scenario, trainees receive detailed feedback based on performance metrics, helping improve their skills.

For More Information Contact:

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