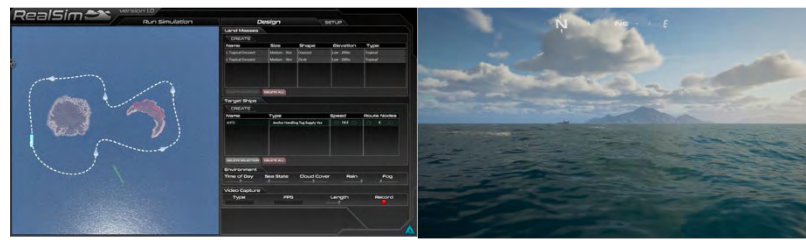


N20A-T014 Machine Learning for Simulation Environments



Areté
Tucson, AZ
www.arete.com

RealSim: Enhanced Realism for Simulations



Scenario Design Tool (Drag & Drop)

Running Simulation: Ocean Tug with Landscapes

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Topic Number: N20A-T014

SYSCOM: Naval Sea Systems Command (NAVSEA)

Program Sponsor: PEO IWS 5.0

Other Potential Programs:

Any Periscope Simulation (PSIM) sub-system, any Training Simulation requiring enhanced realism for increased immersion, any ATR or ML program that lacks training data for algorithms development.

Current TRL: 6

Projected TRL: 7 / Q4 2024

Keywords:

Simulations, training system, synthetic data generation, generative adversarial network, machine learning, enhanced realism

SBIR Innovation Center



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THE CHALLENGE

It is imperative that training systems and simulators be as realistic as possible, enabling experiences like what may be experienced while deployed.

THE INNOVATION

Areté's solution is to create a set of realism-enhancing modules demonstrated within an interactive scenario development tool. These modules incorporate the latest advances in generative adversarial networks (GANs), ocean modeling, and Arété's experience in periscope technologies. The versatility of this technology allows seamless integration into any simulation subsystem within the Periscope Simulation (PSIM) environment. Additionally, our application enables the creation of datasets required for training deep neural network algorithms, further widening the scope of Arété's customer base and the impact of our innovative solution.

THE NAVY BENEFIT

The Navy utilizes many simulators to train operators and conduct experiments. Increasing the realism of these simulations will increase the capabilities and fidelity of these simulators. Providing realistic synthetic environments will improve operator responses, reduce operator uncertainty under stress, and improve decision-making.

THE FUTURE

Our present initiatives can be summarized under three distinct, yet interconnected areas. First, Arété is currently collaborating with stakeholders of the transition program to assess the suitability of our technology in enhancing existing simulation systems. Second, Arété is actively engaging with the Department of Defense (DoD) community, showcasing the capabilities of our solution. The primary objective is to illustrate how our technology can generate synthetic data for Deep Neural Network (DNN) architectures and how these architectures can then effectively be utilized on real-world data. Last, as the technology is near achieving the TRL 7, Arété is directing its efforts toward maturing our solution. Concurrently, we are looking to expand into the realm of commercial game engine plug-in sales.

With respect to potential opportunities, Arété has identified two customer segments with diverse requirements. The first consists of customers already using training simulations who are seeking to enhance the level of realism, thereby providing their trainees with a more immersive experience. The second is composed of advanced algorithm groups often hampered by the lack of operationally relevant data, which is crucial for the development and training of their deep learning architectures.