Department of the Navy SBIR/STTR Transition Program

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Topic # N193-A01

Validation of Artificial Intelligence Technologies (VAIT)

R-DEX Systems, Inc.

WHO

SYSCOM: NAVAIR

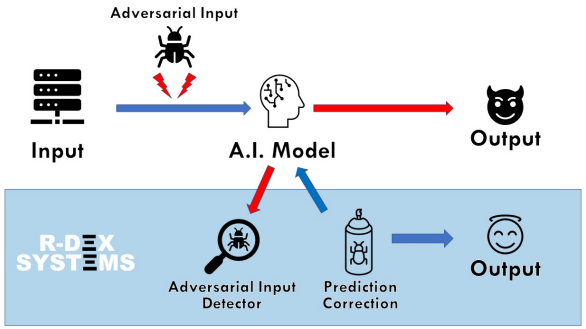
Sponsoring Program: unknown

Transition Target: unknown

TPOC:
(732)323-4601

Other transition opportunities: Joint Artificial Intelligence Center (JAIC), NRO, NGA

Notes: R-DEX Systems has developed a suite of technologies to detect, classify, and adapt to adversarial attacks in both the imagery and signals domains, thereby leading to resilient Artificial Intelligence systems that can be trusted, validated, and on par with human-like performance.



WHAT

Operational Need and Improvement: Artificial Intelligence (AI) is becoming ubiquitous for critical decision-making for a wide range of applications in the military and commercial sectors. Adversarial attacks are defined as changes to the inputs of AI models that fool AI systems into making incorrect predictions. Both man-made and natural sources of adversarial attacks exist. Adversarial attacks are becoming weaponized by our adversaries. The Navy and other DoD agencies need innovative approaches to counter adversarial attacks in order to increase trust in AI-based decisions.

Specifications Required: unknown

Technology Developed: R-DEX developed a family of proprietary Adversarial Input Detector (AID) models for detection and classification of adversarial inputs as well as methods for prediction correction. The underlying approach holds for a variety of deception techniques and also data products from multiple sensor modalities, including both imagery and signal data. R-DEX's AID models detect and classify adversarial attacks based on how the attack disrupts the AI classification model.

Warfighter Value: R-DEX's suite of AI-based countermeasure defeat technologies lead to improved performance of AI systems, thereby increasing trust in AI systems. Applications include: 1) Autonomously recognize when military waveforms experience EW attack and adapt to counter the attack in real time, 2) Improved AI-based signal classifiers against spoofing/jamming and adapt to respond in real time, 3) Improved missile seeker classifiers for identifying targets employing adversarial countermeasures, 4) Improved bird/drone discrimination and classification, 5) Improved target classification for targets with limited training data.

WHEN

Contract Number: N68335-20-F-0547 **Ending on:** October 29, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Flight tests using real-time embedded processing	Med	Standard AI/ML performance metrics	6	October 2021
Integration with GOTS HYDRA	Low	Standard AI/ML performance metrics	6	October 2021
Integration with Mercury Rappid Spectrum Processing Platform	Med	Standard AI/ML performance metrics	6	December 2022

HOW

Projected Business Model: R-DEX's long term goal is to grow a predictable and scalable subscription business through the R-DEX software platform for both military and commercial applications. To achieve this, R-DEX will begin with bespoke solutions and grow its product and customer base by identifying clients and applications that will enable R-DEX to sell products will minimal additional effort. This will decrease the cost per user and expand the user base. R-DEX will consider direct sales as well as distribution partners. R-DEX will minimize the need for outside investment by continuing development on SBIRs while also leveraging R-DEX IRAD budgets. In addition, R-DEX plans to work with its strategic partners to build commercial revenue streams in the satellite/airborne information space.

Company Objectives: Our goal is to integrate and transition this technology into government and prime contractor systems for improving trust in AI/ML systems.

Potential Commercial Applications: Information products that leverage satellite and airborne data for customers that have a critical need to monitor human activity throughout the world. Customers include financial service providers, physical and financial traders, and policy makers/analysts.

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