



iDISPLA University Adversarial Artificial Intelligence (AI)/ Machine Learning (ML) Challenge

On behalf of iDISPLA (Innovative Discovery Science Platform), Army Night Vision and Electronic Sensor Directorate-NVESD (Army Night Vision Labs) and The Greer Institute for Leadership and Innovation (Greer Institute), you and your students are cordially invited to participate in the ***iDISPLA University Adversarial Artificial Intelligence (AI)/ Machine Learning (ML) Challenge***. This challenge is centered around digital imaging technology and preventing/uncovering the manipulation of such. The Greer Institute is leading this initiative in support of Dr. Nibir Dhar, Chief Scientist for Army's Night Vision Labs.

Background:

Imaging technology (digital cameras, mobile phones, etc.) has become ubiquitous, allowing people to take and share images and video instantaneously. The rise in digital imagery comes with the ability for even relatively unskilled users to manipulate and distort the message of the digital media. This kind of digital manipulation is often used for adversarial purposes, such as propaganda or misinformation campaigns.

This manipulation of digital media is enabled by the wide scale availability of adversarial machine learning algorithms or generative adversarial networks (GANS) that permit editing in ways that are very difficult to detect either visually or with current image analysis and visual media forensics tools. In addition to specific U.S. Army imaging/video concerns, there are a wide variety of misinformation/disinformation use cases that can also be directly relevant to COVID-19 campaigns designed to mislead and endanger U.S. Citizens.

The Challenge:

This challenge is focused on leveling the digital imagery playing field, which currently favors the manipulator, by developing technologies for the automated assessment of the integrity of an image or video and integrating these in an end-to-end media forensics platform. The goals of this challenge are to:

- Automatically detect manipulations associated with the use of GANS and adversarial machine learning
- Provide detailed information about how these manipulations were performed using GANS
- Describe how to reduce the risk associated with the use of any questionable image or video in decision making: This could include how to "harden" the algorithm/data, against "known" GANS and with respect to the vulnerability of interest (e.g. misinterpreting road sign as speed limit, or valve open as valve closed)

This challenge is designed for release to a specific number of academic institutions with the following objectives:

- Selected university partners will each submit a research study paper of their proposed solution

- The top 3 proposed solutions will be selected by a panel of Subject Matter Experts from Army Night Vision Labs, other Government experts and Industry leaders. The following challenge prize awards will be provided by the Greer Institute to the top 3 university solution winners to assist with advancing further research on the topic areas:
 - 1st Place: \$6,000 University Dept. team submission
 - 2nd Place \$3,000 University Dept. team submission
 - 3rd Place \$2,500 University Dept. team submission
 - Best university student individual submission: \$1,000
- Each finalist university will have the opportunity to hold a virtual lunch and learn briefing of their solution to Dr. Nibir Dhar, the Chief Scientist of Army's Night Vision Lab; Melvin Greer, founder of the Greer Institute nonprofit and head of AI for Intel Corporation; and other AI challenge judge panel members.
- Technology Landscaping features in iDISPLA (details attached) will be used to discover current work in this area and the corresponding global locations of where it is occurring around the world. Winning solution concepts will be correlated against other state of practice capabilities across the world.

What's next?

- Please share this information with your colleagues and students interested in AI/ML initiatives.
- Join Dr. Nibir Dhar, Mr. Melvin Greer and other iDISPLA partners for one of two **University Adversarial AI/Machine Learning Challenge Kick-Off Sessions** (complete details forthcoming):
 - **Tuesday, January 12th @ 12:00 pm EST**
 - **Friday, January 15th @ 12:00 pm EST**
- Questions will be answered during these kick-off sessions ONLY
- Challenge will run from January 19th - February 1st, 2021
- All submissions must be received by 9:00 pm EST, February 1st, 2021

Current Challenge panel members include (more will be added):

- Dr. Nibir Dhar, Chief Scientist of Army Night Vision Labs
- Melvin Greer, founder of the Greer Institute nonprofit and Chief Data Scientist for Intel Corporation
- Carlos Rivero, Chief Data Officer for the Commonwealth of Virginia
- Dave Ihrle, Chief Technology Officer for the Center for Innovative Technology
- Dr. David Bray, Director of the GeoTech Center, Atlantic Council and former Chief Information Officer of the Federal Communications Commission