RESEARCH SUMMARY

2024 Applying Data Analytics Forum

The Institute for Defense Analyses (IDA) hosts the Applying Data Analytics Forum to foster collaboration by providing representatives of government, industry and academia opportunities to share ideas. The 2024 event in the series focused on the needs, uses, opportunities and limitations of computer vision.

IDA hosted the fourth forum at its Potomac Yard research facility in Alexandria, Virginia, on April 22, 2024. Speakers and panelists presented their perspectives on the forum's theme of computer vision, a burgeoning field of artificial intelligence (AI) that uses deep machine learning models to analyze digital imagery. Applications include facial recognition, medical image analysis, autonomous vehicle technology and more. Topics of discussion ranged from locating long-buried bodies to challenges from model drift — when model performance degrades from being applied to data that are different than the data used to develop the model.

Robert Pless, the Patrick and Donna Martin Professor of Computer Science at George Washington University's Department of Computer Science, presented on the academic perspective. He spoke about an AI application being employed at the National Center for Missing and Exploited Children to identify locations of suspected sex trafficking victims from online images. Research into the new model's success is revealing the importance of super clean datasets, principal component analysis and computer vision and pattern recognition. Given the sheer

IDA

volume of data being analyzed, computer power remains a challenge in the field.

Industry panelists were **Paul M. Kodzwa Jr.**, Associate Director of Business Development for Department of Defense Programs, RTX Technology Research Center, and **Shelley Cazares**, AI Technical Consultant, Google Public Sector. Paul presented on the challenges and opportunities computer vision offers, including

RTX research into applications for both industry and government. Shelley noted the monumental shift since 2012 with the advent of ImageNet, a database of imagery organized hierarchically around nodes of hundreds of thousands of images. Ten years later, another shift came with already trained foundational models that allow infrastructure to be built around them. She said that computer vision can be most helpful when it detects objects, not just classifies them.

Gretchen Stewart, Principal Engineer of the AI Solution Architect Team at SMG Americas at Intel, presented on topics ranging from hallucinations to robotics. She noted that AI is evolving so rapidly that it's disrupting industry in a way that rivals the disruption experienced with the advent of the internet in the 1980s. Intel uses computer vision internally for its fabrication processes to monitor whether employees are using hard hats, bunny suits and other required gear. Models are updated every month to accommodate for assumed model drift.

The first government panelists were **Ashwini Deshpande**, a program manager at the Intelligence Advanced Research Projects Activity, and **Sushant Patkar**, Research Fellow in the Molecular Imaging Branch of the National Cancer Institute. Their discussion included topics such as uncertainty, model drift and bridging the chasm between academia and practice.

A second government panel featured **Bharat Patel** (right in front-page image), product lead for the U.S. Army's Project Linchpin program for sustainably integrating use of artificial intelligence into weapon programs, and **William Streilein** (middle in front-page image), Chief Technology Officer in the Defense Department's Chief Digital and Artificial Intelligence Office. Their conversation covered topics at the intersection of government and industry from synthetic data and enhanced force protection systems to advancing digital literacy.

Emily Fedele (efedele@ida.org), Kristen Guerrera (kguerrer@ida.org) and Brian Rieksts (brieksts@ida.org) are co-leads of the IDA Data Analytics Working Group. Emily is a researcher in the Science, Systems and Sustainment Division of the Systems and Analyses Center at IDA. She has a doctorate in psycholinguistics from University of Southern California. Kristen and Brian are researchers in the Cost Analysis and Research Division. Kristen received a master's degree in operations research and industrial engineering from Pennsylvania State University. Brian holds a doctorate in industrial engineering and operations research from Pennsylvania State University.

RESEARCH SUMMARY