Most artificial intelligence and machine learning (AI/ML) systems learn their optimal parameter settings from training data and utilize these parameters at inference time. While the approach is fine for learning over big data, in many cases envisioned for Army applications, the training data will be sparse. For sparse training, traditional AI/ML systems can easily be confidently wrong, which can lead to disastrous decision making. This talk will focus on recent advances to achieve uncertainty-aware AI/ML systems that can report confidence in their recommendation based upon the amount training data that is relevant to the current set of input observations. This includes second-order probabilistic Bayesian networks and evidential deep learning that can serve as the basis for an end-to-end uncertainty-aware neuro-symbolic AI/ML system.

Biography

Dr. Lance M. Kaplan received his undergraduate degree at Duke University in 1989 and a PhD degree from the University of Southern California in 1994, all in Electrical Engineering. He held a National Science Foundation Graduate Fellowship and a USC Dean’s Merit Fellowship from 1990–1993. Dr. Kaplan previously worked at the Georgia Tech Research Institute (1987-1990) and the Hughes Aircraft Company (1994-1996). He was a faculty member in the Department of Engineering at Clark Atlanta University from 1996-2004. Currently, he is a team leader in the Context Aware Processing branch of the DEVCOM Army Research Laboratory (ARL). Dr. Kaplan serves as VP Publications for the IEEE Aerospace and Electronic Systems (AES) Society (2021-Present) and as VP Conferences for the International Society of Information Fusion (ISIF) (2014-Present). Previously, he served as Editor-In-Chief for the IEEE Transactions on AES (2012-2017), on the Board of Governors for the IEEE AES Society (2008-2013, 2018-2020) and on the Board of Directors of ISIF (2012-2014). He is a Fellow of IEEE and of ARL. His current research interests include information/data fusion, reasoning under uncertainty, network science, resource management and signal and image processing.