MIT Industrial Liaison Program Faculty Knowledgebase Report

AI and Autonomy

November 2, 2021 10:00 am - 12:00 pm

10:00 AM – 10:25 AM	Unitair: A Unified Guidance, Navigation, and Control System for UAVs Jason Nezvadovitz Associate Technical Staff, MIT Lincoln Laboratory Lincoln Laboratory is developing a UAV flight software stack designed to run on a single CPU without the use of a microcontroller. This system will enable UAV research efforts to forgo hobby-grade autopilots which are often a development bottleneck for cutting-edge autonomy. Powerful algorithms such as differential dynamic programming and manifold Kalman filtering have been efficiently implemented to provide unified support for all common UAV types including multirotors, fixed-wings, and VTOLs. With only 5% CPU usage on a typical flight computer, Unitair has achieved a reliable 200 Hz control bandwidth sufficient for aerobatic maneuvering of a fixed-wing UAV indoors. This presentation will cover the motivation, technical design, and performance of Unitair.
10:25 AM – 10:50 AM	Liquid Neural Networks -- video starts at time stamp: 26:13 Ramin Hasani Machine Learning Scientist, MIT Computer Science and Artificial Intelligence Lab In this talk, I will discuss the nuts and bolts of the novel continuous-time neural network models: Liquid Time-Constant (LTC) Networks. Instead of declaring a learning system's dynamics by implicit nonlinearities, LTCs construct networks of linear first-order dynamical systems modulated via nonlinear interlinked gates. LTCs represent dynamical systems with varying (i.e., liquid) time-constants, with outputs being computed by numerical differential equation solvers. These causal neural networks exhibit stable and bounded behavior, yield superior expressivity within the family of neural ordinary differential equations, and give rise to improved performance on time-series prediction tasks compared to advance recurrent network models.
10:50 AM – 11:00 AM	MIT DriverLess, Racing to Win -- video starts at time stamp: 53.16 Jack Bowers Bizops Lead, MIT Driverless Team At MIT DriverLess, it is our mission to be the hub of practical autonomy within the MIT ecosystem. For the last three years, we have been putting cutting edge research to the pavement by competing in autonomous racing series including the Indy Autonomous Challenge, Roborace, and Formula Student Driverless. We would love your support to help our student run team to compete, to learn, and to push the boundaries of high speed autonomous racing.

11:00 AM - 11:30 AM

Citizen Data Scientists: How to empower your workforce to make data driven decisions -- video starts at time stamp: 1.03.23

Tim Kraska
Associate Professor of Electrical Engineering and Computer Science, MIT CSAIL
Co-Director, Data System and AI Lab (DSAIL@CSAIL)
Co-founder, Einblick Analytics (einblick.ai)

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Tim Kraska is an Associate Professor of Electrical Engineering and Computer Science in MIT's Computer Science and Artificial Intelligence Laboratory, co-director of the Data System and AI Lab at MIT (DSAIL@CSAIL), and co-founder of Einblick Analytics (einblick.ai). Currently, his research focuses on building systems for machine learning, and using machine learning for systems. Before joining MIT, Tim was an Assistant Professor at Brown, spent time at Google Brain, and was a PostDoc in the AMPLab at UC Berkeley after he got his PhD from ETH Zurich. Tim is a 2017 Alfred P. Sloan Research Fellow in computer science and received several awards including the VLDB Early Career Research Contribution Award, the VMware Systems Research Award, the university-wide Early Career Research Achievement Award at Brown University, an NSF CAREER Award, as well as several best paper and demo awards at VLDB, SIGMOD, and ICDE.

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Citizen data scientists (CDS) can significantly boost a firm’s business value and analytics maturity. Thus, it comes at no surprise that nowadays almost every company is looking into new tools to empower their workforce to make data-driven decisions and improve their business processes. But according to Gartner most CDS tools are focused on automated machine learning and ignore that data, people, and processes play a similar important role. Citizen data scientists need an environment that allows them to work together with SMEs and data scientists to collaboratively explore a problem across the entire model development lifecycle. Automated ML tools only impact a small portion of the development lifecycle.

In this webinar, I will present our findings why many current initiatives to increase the number of Citizen Data Scientist fail, explain why current tools for are still inefficient in fully supporting CitizenData Scientists, and outline how Visual Data Computing, a technique we developed as part of the DARPA D3M program and recently commercialized by Einblick Analytics, addresses many of these challenges in a complete new way by providing the first truly collaborative analytics platform which combines aspects of a workflow engine (like Alteryx) and a visualization tool (like Tableau) with an infinite collaborative canvas (like Miro or Figma).

11:30 AM - 12:00 PM

2021: The year of AI policy laws -- video starts at time stamp: 1.33.50

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Senior Lecturer, MIT Sloan School of Management
Director, MIT Artificial Intelligence Policy for the World Project

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Luis Videgaray is Director of MIT AI Policy for the World Project and a Senior Lecturer at the MIT Sloan School of Management. Prior to coming to MIT, he served as the Foreign Minister and Finance Minister of Mexico. As Foreign Minister (2017-18) he led Mexico´s relationship with the Trump White House, including the successful renegotiation of the NAFTA (now USMCA). He is one of the founders of the Lima Group, created to promote regional diplomatic efforts towards restoring democracy in Venezuela, and conducted Mexico´s leading role in the UN towards an inclusive debate on AI and other exponential technologies. He was named Finance Minister of the Year by both The Banker Magazine and Euromoney Magazine, and a Leading Global Thinker by Foreign Policy Magazine. Before government, Mr. Videgaray had a career in investment banking, advising M&A and private equity transactions. He holds a Ph.D. in Economics from MIT and a BA in Economics from Mexico's ITAM.

We live in interesting times for the world of artificial intelligence policy. From Europe, to the US, to China, 2021 is turning out to be a year of unprecedented legislative activity aimed at creating laws governing the deployment of AI. Indeed, until recently, the focus of AI policy efforts was mostly on establishing principles and/or national strategies for the responsible or ethical development and use of AI. Now, the activity has moved to creating actual laws to regulate AI. This push towards AI legislation is certainly a positive development, as the mere statement of principles is unlikely to create guardrails that are strong enough to effectively mitigate the risks associated with AI. In addition, while the private sector is increasingly taking voluntary steps to avoid ethically problematic uses of AI, some mandatory regulation is in all likelihood needed. However, the current "rush to the bill" is somewhat haphazard, and may create problems of its own. In this talk, we will briefly overview the AI-focused legislative activity in Europe, the US and China, present a categorization of the potential issues in such legislative efforts, and suggest some ideas moving forward.