SIAM Meeting on 10/29/20 - Talk by Professor Anuradha Annaswamy
Founder and Director of the Active-Adaptive Control Laboratory at MIT

- Prof. Annaswamy introduced her talk, "Control for Learning Adaptive Control and Real-Time Learning."

- Prof. Annaswamy began by explaining that systems are transitioning from "traditional to smart," in the sense that increasing, distributed data is enabling autonomous decision making.

- Prof. Annaswamy explained the current divide between autonomous and human transportation systems, showing that computer systems have a long way to go before being considered safe by the public and regulatory agencies. She gave the recent Boeing 737 Max crashes as an example.

- Prof. Annaswamy covered the idea of learning in adaptive systems, taking into account performance error, which is measured, and parameter error, which is unknown.

- Prof. Annaswamy introduced the approaches to machine learning, including approximation of a nonlinear mapping, neural network, optimization of a cost function, and reinforcement learning. She covered her higher-order learning algorithm for image un-blurring, which was more capable than existing algorithms.

- Prof. Annaswamy finished by summarizing, saying learning is more important in adaptive control based on a stability framework, so control comes before learning. Safety-critical systems should adapt first, then control.

Alex Gisi and Bozenna Pasik-Duncan, Agnieszka Miedlar
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