# Control and Machine Learning

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## Abstract

Control theory and Machine Learning share common objectives, as evident in Norbert Wiener's definition of "Cybernetics" as "The science of control and communication in animals and machines."The synergy between these fields is reciprocal. Control theory tools enhance our comprehension of the efficacy of certain Machine Learning algorithms and offer insights for their enhancement. However, this often bounces intricate queries back.The interplay between Control and Machine Learning opens up a new captivating scientific lanscaüpe tp be explored but this can be a labyrinthine task. And this is part of the overall ambitious program of developing Digital Twins technologies.In this talk, we will present some of the contributions from our team at the interface between Control and Machine Learning that can contribute to this ambitious and complex task.We will in particular discuss some neural network architectures, whose success for Supervised Learning can be understood from a control perspective and explain how their dimension and complexity can be minimized. We will also present some challenging open problems.