

Let's Take Back Control: A Journey through a Novel Generation of Control Techniques for Performance Engineering

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ABSTRACT

Optimizing the performance of complex systems has always been a central issue for the control theory community. However, ideas and tools from this field often require very precise assumptions and extensive tuning to perform well, making them unsuited for a non-specialist practitioner.

In recent times, however, the influx of the machine learning community has brought a wave of renewal in the field, making many of these powerful methods finally applicable outside academic examples.

In this talk, I will discuss my journey at the border between control theory and machine learning, from classical system identification and model-based control to modern autotuning data-driven techniques. I will also shed light on how this novel generation of much more user-friendly techniques can easily be applied to improve the performance of a large class of systems, including software ones.

CCS Concepts

• Computing methodologies ~ Artificial intelligence ~ Control methods ~ Computational control theory

Author Keywords

Control theory; machine learning; identification for control

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BIOGRAPHY

DANIELE MASTI was born in Siena, Italy in 1993. Daniele Masti received the Bachelor's degree in computer and information engineering from the University of Siena, Italy, in 2015, the Master's degree in electric and automation engineering in 2018 from the University of Florence, Italy and the PhD in systems science in 2021 at IMT School for Advanced Studies Lucca, Italy. Since 2022, he is a researcher in cyber security at IMT School for Advanced Studies in Lucca, Italy. His main research interest lies at the border between control theory and machine learning, with the overall aim of bridging the gap between the two, and network security.



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