ID de Contribution: **3** Type: **Non spécifié**

Machine Learning Competitions: a Meta-Learning Perspective

mercredi 26 janvier 2022 14:00 (40 minutes)

Our research aims at reducing the need for human expertise in the implementation of pattern recognition and modeling algorithms, including Deep Learning, in various fields of application (medicine, engineering, social sciences, physics), using multiple modalities (images, videos, text, time series, questionnaires). To that end, we organize scientific competitions (or challenges) in Automated Machine Learning (AutoML) and expose the community to progressively harder and more diverse settings, ever-reducing the need for human intervention in the modeling process. The code of winning teams is open-sourced.

In this presentation, we adopt the perspective that every challenge has a secret goal: that the winning algorithm will meta-generalize, i.e. perform well on new tasks it has never seen before. In particular, AutoML challenges, which test participants on multiple-tasks, can be thought of as meta-learning devices, aiming as training algorithms to perform well on tasks drawn from a particular domain, such that they will perform well in the future on similar tasks. Taking that angle, we apply the same principles of learning theory used to harness overfitting at the "regular learning level"to explain how to select a winner without meta-overfitting the tasks of the challenge. We will end with tips on how to organize your own challenge to further your own goals, and effectively meta-generalize!

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