MACHINE LEARNING AND DATA-DRIVEN APPROACHES FOR OPTIMIZATION AND UNCERTAINTY QUANTIFICATION IN AERODYNAMICS

600 - DATA SCIENCE, MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

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ABSTRACT

In recent years, the production of huge amount of data in computational sciences has made attractive the capability to exploit such data to extract knowledge and enhance the prediction level. In aerodynamics, parametric studies, trade-off analyses and optimizations represent a precious information tank which could foster the usage of data-driven and data-fusion models in engineering practice. However, the maturity level of such models is quite low and the associated best practice is still in the preliminary stage: on one hand, machine learning techniques and neural networks are well-known and offer a wide range of choice for different purposes, from cluster analysis and dimensionality reduction to classification and regression; on the other hand, the type and preparation of aerodynamic/geometric data to be handled is not straightforward and may strongly depend on the real scope of the task, giving rise to widely different interpretations and forms of the data-driven application [1]. Machine learning techniques commonly used in the area of Artificial Intelligence (AI) and Data Mining (DM) can represent a valuable support to reduce the computational cost required for aerodynamic analysis and uncertainty quantification [2].

This minisymposium aims at collecting and disseminating new ideas in application of machine learning and data-driven approaches for aerodynamic analysis and uncertainty quantification focusing on real world problems. This minisymposium also aims to disseminate the main activities and results of the GARTEUR action group AD/AG60 on this topic.

REFERENCES

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