

The role of Mathematical Optimization to enhance Transparency in Data Science



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ABSTRACT. There is a pressing need to make Data Science tools more transparent. Despite excellent accuracy, state-of-the-art Data Science models effectively work as black boxes, which hinders model validation and may hide unfair outcomes for risk groups. Transparency is of particular importance for high stakes decisions, is required by regulators for models aiding, for instance, credit scoring, and since 2018 the EU has extended this requirement by imposing the so-called right-to-explanation in algorithmic decision-making. From the Mathematical Optimization perspective, this means that we need to strike a balance between several objectives, namely accuracy, transparency, and fairness. In this presentation, we will navigate through some novel techniques that embed explainability and fairness in the construction of Data Science models. This includes the ability to provide global, local and counterfactual explanations, as well as model cost-sensitivity and fairness requirements. We will show the versatility of our methodology when applied to more complex data types such as functional data.

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