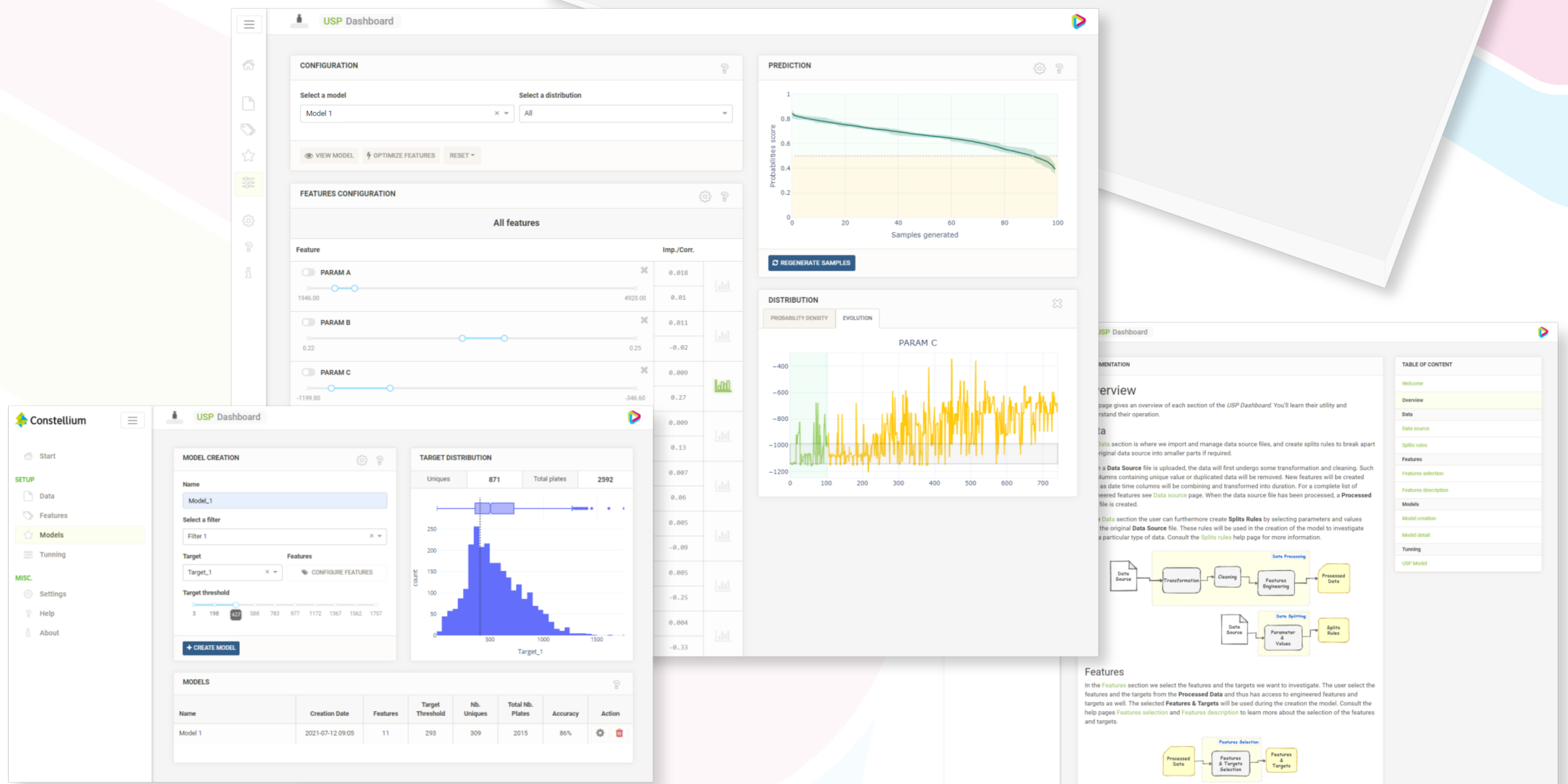


UNIQUE STABILITY PLATE

The Unique Stability Plate (USP) project falls within the context of data science. It aims to study the **manufacturing processes of aluminum plates** and thus discover manufacturing parameters (or a recipe) that make aluminum plates more stable.

Residual stress, or the stability of an aluminum plate, is a major concern for precision machining companies to achieve consistently good results. Emphasizing the actual manufacturing parameters responsible for **the stability of an aluminum plate**, is a game-changing information and grants Constellium a major advantage in the aluminum manufacturing industry. The project was made possible thanks to several years of continuous monitoring of process data by Constellium and collaboration with the Idiap Research Institute and the Smart Process Lab of the HES-SO Valais Valais as research partners to bring artificial intelligence skills and scientific inspiration.

PARTNERS



DATA

The heart of an Artificial Intelligence project is the data. Preparing and pre-processing the data is the most important step in any AI project before algorithms can be applied.

Understanding the shape, type, and importance of each piece of data is key to success getting a good model. To have an expert knowhow about the process behind the data can be advantageous. This project contained approximately 130x5000 data points.

ARTIFICIAL INTELLIGENCE

With the advent of computational statistics, the ambition of the project was to use the Machine Learning (a subdomain of AI) approach, to model the statistical dependencies between the measured residual stress and the recorded production parameters. Different ML algorithms approaches have been investigated throughout the project, namely a Random Forest (RF) and its variant as well as an Artificial Neural Network (ANN) and other custom algorithms.

The RF model has been selected in this project.

DASHBOARD

A dashboard application (images above) has been realised by the SPL group as a tool to automate the method and explore the data in the long term.

The continuing recording of the process data and the ability for Constellium to run the algorithm on many different datasets with a few clicks, is a huge potential to make a significant breakthrough in aluminum plate stability.

