

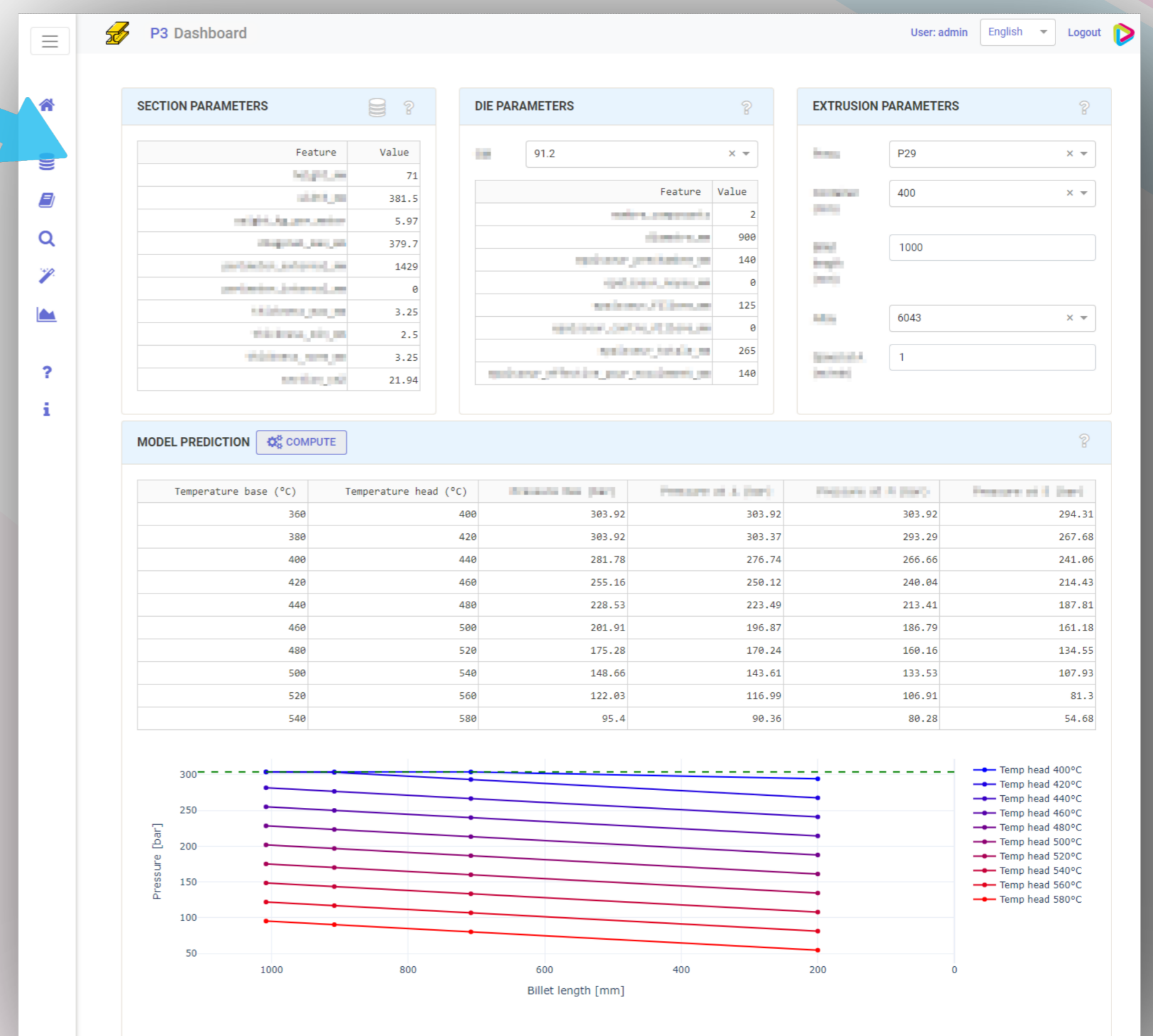
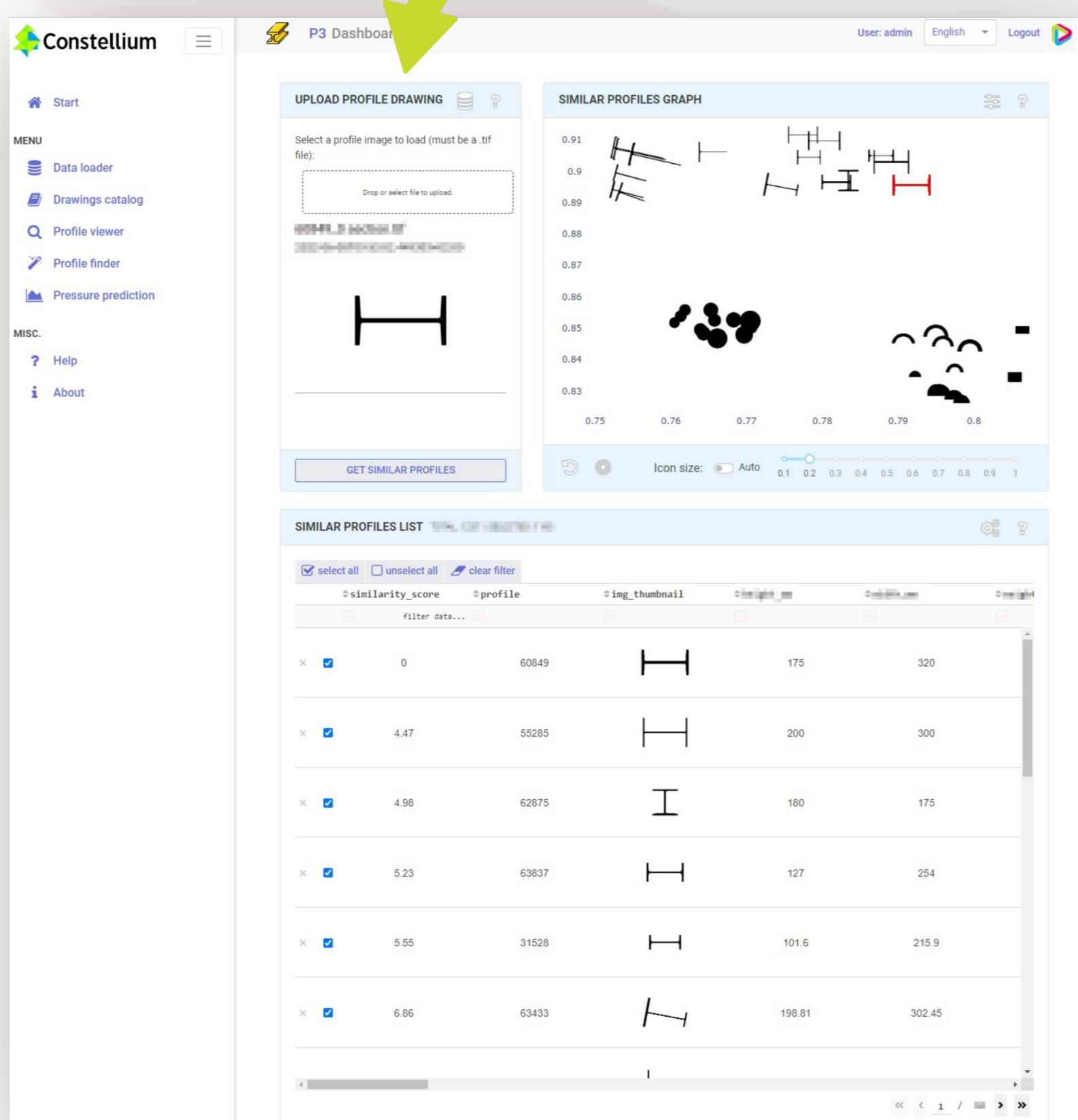
PRESS PRESSURE PREDICTION

One of the main businesses at Constellium Sierre is the extrusion of aluminium profiles. This process consists of pressing heated aluminium through a mold to obtain a long bar with a specific sectional shape. Although extremely versatile in terms of achievable profile shape, this technique still has some limitations, notably physical constraints from the press. Indeed, extrusion induces more or less pressure inside the press which depend, but not only, on the required profile shape, the aluminium temperature and the extrusion speed. The problem is there is no simple formula to compute that, so instead, the pressure and extrusion parameters are estimated based on historical production, by searching manually in the database the profiles most similar to the new one.

Thus, this project goal is to help the press operators by offering them an AI based tool capable of first: recognizing the shape of a given profile image and suggesting all look-alike past-produced profiles, and second: predicting the required pressure given the profile shape and process parameters.



Similar profiles ? Pressure ?



DATA COLLECTION

Several types of interesting data were scattered around in Constellium. Thus, the first step was to collect and analyze them.

This important process allowed to regroup more than 9000 profiles drawings (in different file formats such as pdf, tif, dxf, etc), alongside their geometrical and categorical data, as well as more than 730'000 measurements coming from the extrusion processes, which consist of a mix of scalars and time series data.

ARTIFICIAL INTELLIGENCE

Once the data were cleaned, multiple models of machine learning and more particularly neural networks were trained.

At the end, one model was conceived to predict the pressure, and another to characterize the profiles from their images in order to regroup the similar ones.

USER INTERFACE

Eventually, an interface for the models (screenshots above) was developed and deployed through a web server at Constellium.

In this way, every operators are able to quickly and easily use the predicting tools directly from their work station computer.

