POSTER EXPOSITION

Poster 2

Brunel University London

Rationalisation of steel grades and specifications

Sadegh Jalalian

AUTHOR OF POSTER:
Sadegh Jalalian

INSTITUTION:
Brunel University

OTHER AUTHORS:
Professor Hamid Assadi, Brunel Univeristy
Professor Isaac Chang, Brunel University
Professor Zhongyun Fan, Brunel University

ABSTRACT:
This study introduces a multi-step approach to classification of steel grades with a primary motivation to facilitate reducing the existing number of grades and enhancing recyclability. The relationship between chemical composition and mechanical properties are investigated initially for the case of carbon and stainless steels using the artificial neural network technique. In addition, the examined group of steels are classified into four distinct subgroups based on their properties, by using the Principal Component Analysis (PCA) and k-means clustering methods. Moreover, we utilise the Shapley Additive Explanations (SHAP) method to identify the most influential features within each group. Finally, we outline an algorithmic method of reclassification that can be applied to steel grades, as well as any other datasets, where the aim is to minimise the number of classes while maintaining the coverage of the property space.

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