

Enabling more sustainable leather recycling with data science

STFC Hartree® Centre worked with Gen Phoenix, a manufacturer of high-performance recycled leather, to help them understand and improve their production processes through Innovate UK's BridgeAI programme.

Challenge

Up to 39% of leather is wasted when it is cut to shape during final production, and around 49% of unwanted clothing and textiles are discarded in the UK. Gen Phoenix is solving this by creating sustainable, engineered leather from unwanted leather materials destined to go to waste, mainly landfill or incineration. They break the leather materials down to the fibre level before building them back into durable materials which are used in a range of industries, from transport to fashion. The absence of predictive tools in engineered leather development forces Gen Phoenix into trial and error cycles, generating unnecessary cost, waste, and delay. Gen Phoenix have a lot of process data, but it was being collected both manually and automatically without being cleaned frequently, making it challenging to make data-driven decisions. Gen Phoenix wanted to see if they could better use their data to predict the properties of the engineered leather material they produce.

Approach

Our team started by undertaking exploratory analysis on Gen Phoenix's data from a critical production step. Spread across multiple spreadsheets and tables, and consisting of hundreds of variables, their data collection methods were varied, with some collected automatically and some manually by staff. As a result, there were several key variables which needed cleaning to remove errors such as spelling inconsistencies, duplicate values and missing values. After cleaning and combining the data into one dataset, explainable dimension reduction and modelling methods were trialled. These were chosen to enable Gen Phoenix to identify which features are responsible for the changes, so that they can adjust their manufacturing processes accordingly.

“We had previously undertaken this sort of work before using internal resources, but had not been able to process it to a high enough level. The work that the Hartree Centre undertook with us was an exceptional piece of work.”

Justin O’Keeffe
Gen Phoenix



Credit: Adobe Stock

Benefits

Focused on a single critical unit operation, support from our data scientists has been crucial in helping Gen Pheonix to better use data-driven insights to improve their manufacturing processes. This new capability in understanding their data has the potential to save Gen Phoenix time while reducing costs and decreasing energy use, making them more competitive. Gen Phoenix's recycled leather is a more environmentally sustainable option than traditional leather and reduces waste, benefitting our environment and society, while taking advantage of unused available material. Following the success of this BridgeAI project, there is potential to continue collaboration with Gen Phoenix to further explore the insights their data can provide.

At a glance

- Data-driven insights that support improved manufacturing processes
- New capability saves Gen Pheonix time while reducing costs and increasing their competitiveness
- Supporting the development of environmentally sustainable materials
- Testing by Gen Pheonix demonstrates validity and accuracy of prototype model

Who we are

The Hartree Centre was created by UK Government to help businesses and public sector organisations accelerate the adoption of high performance computing (HPC), big data analytics, artificial intelligence (AI) and quantum technologies. We play a key role in realising UK Government's Industrial Strategy by stimulating applied digital research and innovation, creating value for the organisations we work with and generating economic and societal impact for the UK. We are proud to be part of UK Research and Innovation.

What we do

- Boost productivity and innovation for industry
- Offer training and skills development
- Provide insights into future technologies
- Give tailored business development support
- Build bespoke small teams around your project

