

**Name:** Nasser Alkhulaifi, MSc, PMP



**Industrial Partner:**



Provide services and solutions to the oil and gas market, specialise in performance observation and monitoring of plant equipment, operations and processes through evaluation and visualisation of real-time data.



**Supervision Team:**

Dr Nicholas Watson

Dr Isaac Triguero Velazquez



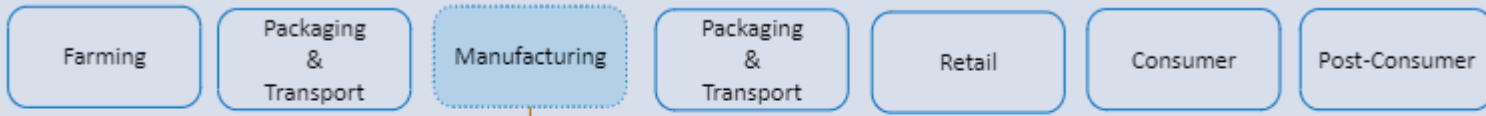
This work was supported by the Engineering and Physical Research Council [Grant number is EP/S023305/1] and by (Intelligent Plant)

Food Production  VS  Energy Production

 IIOT & ML capabilities

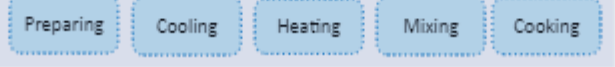


Better (data-driven) energy monitoring in food manufacturing → better energy efficiency → save energy and reduce environmental impact and encourage sustainable industrial operations.

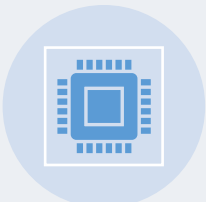


Energy monitoring, modelling, prediction, optimisation and performance evaluation

Focus



How Can Machine Learning Techniques be Efficiently Utilised to Improve Energy Efficiency in Food Manufacturing?



Understand contemporary challenges and opportunities in energy monitoring and modelling in food manufacturing, and how they can be addressed using data-driven techniques.

- Literature Review
- Study 1 (Pilot Project):



**Data collection:** 12 weeks of energy consumption data were collected & analysed from two different food drink companies in Nottingham.

**Findings:** Human interaction with the food manufacturing systems (chiller systems) has an impact on energy consumption behaviour.

**Next step:** Energy consumption prediction of two different food manufacturing systems (chiller systems) using deep learning techniques improved with explainable AI (XAI) models.

- Study 2:

**Data collection:** 7 months of energy consumption data were collected + production data from one of the UK's biggest food companies.

**Goal:** Looking for energy-saving opportunities (reduce energy consumption)

→ **Next step:** analysis, ?