# Transparency, Interpretability and Data Availability: Key Challenges in Tackling Climate Change with AI

Joyjit Chatterjee[1], Nina Dethlefs[1]
[1]University of Hull, United Kingdom
j.chatterjee-2018@hull.ac.uk

With growing natural disasters, rise in carbon emissions and faltering ecosystems, the need for furthering research in climate change has become integral. Recent studies have shown that data science can play a vital role in better understanding natural phenomena and discovering novel insights. Although no silver bullet, machine learning (ML) has been successfully utilised in an array of applications, ranging from prediction and assessment of droughts and floods, energy control in grids, water quality modelling, operations & maintenance (O&M) of renewable energy sources such as wind and solar energy etc.

However, the existing studies suffer from 2 prime challenges:
(1) Lack of data availability - domain specific information e.g. from wind turbines, is often commercially sensitive, making it difficult to procure large amounts of useable data - especially new kinds of data which can possibly generate significant new insights. Transfer learning techniques can help learn from little or no labelled data, ensuring accuracy and helping algorithms to generalise better.
(2) The black-box nature of (deep) ML models makes them suffer from the problem of transparency, wherein, although predictions can often be made with high accuracy, confidence and trust in the model decisions is difficult. A human intelligible diagnosis of when, why, what and how a model performs (or not) is essential. Hybrid ML techniques can bridge the gap between transparency and accuracy, and causal inference can help discover hidden insights from data. Natural language generation can further help in generating informative reports and descriptions of natural disasters and O&M strategies for renewable energy sources.

We believe that there is enormous opportunity for the data science community to pursue research to tackle some of these challenges in ensuring reliable decision making and envisage that making data-driven decision support systems intelligent and transparent would have a significant impact in tackling climate change.