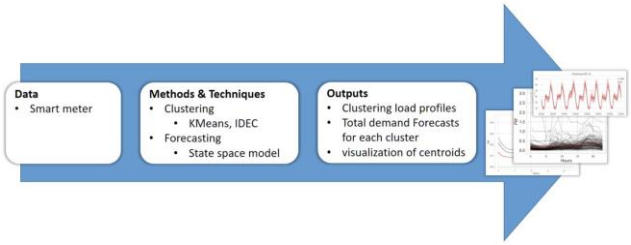
Machine Learning for Green Energy

MARKET NEED

- Recently smart meters have been widely deployed in many countries. These devices replace conventional electrical meters and are able to provide measurements for time intervals of typically less than one hour and can send these to the utility.
- This technology provides utilities a large amount of data and the opportunity to use this data to improve the way they run the grid.
- This project explores machine learning techniques to analyse smart-meter data. The idea is use deep learning based clustering approaches to find similar energy consumption patterns and then using these patterns to forecast total demand for each cluster.



TECHNOLOGY SOLUTION

We developed a web based tool to perform clustering and forecasting on smart-meter data. The tool includes two main components:

1. *The use of deep learning based autoencoders to jointly extract deep embedded features and cluster time-series data.*
2. *The use of a probabilistic machine learning model for forecasting.*

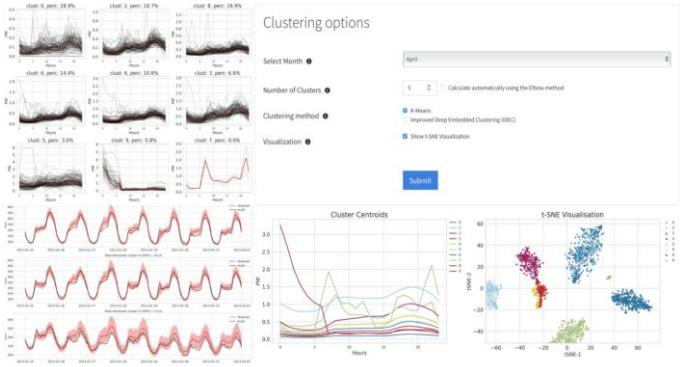
The tool has been extensively tested on a real-world smart-meter dataset called London Smart Meter Dataset.

We developed a demonstrator application to show how to use machine learning to cluster time-series data and perform forecasting on it.

APPLICABILITY

Our tool is highly configurable:

- *Applicable for different business domains involving smart-meter data.*
- *Easy to train and detect new types of patterns in smart-meter data.*
- *Provides explanation based on intuitive visualisation and charts: Cluster visualisation, t-SNE visualisation, forecasting graphs.*



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