

# Electricity Load Forecasting

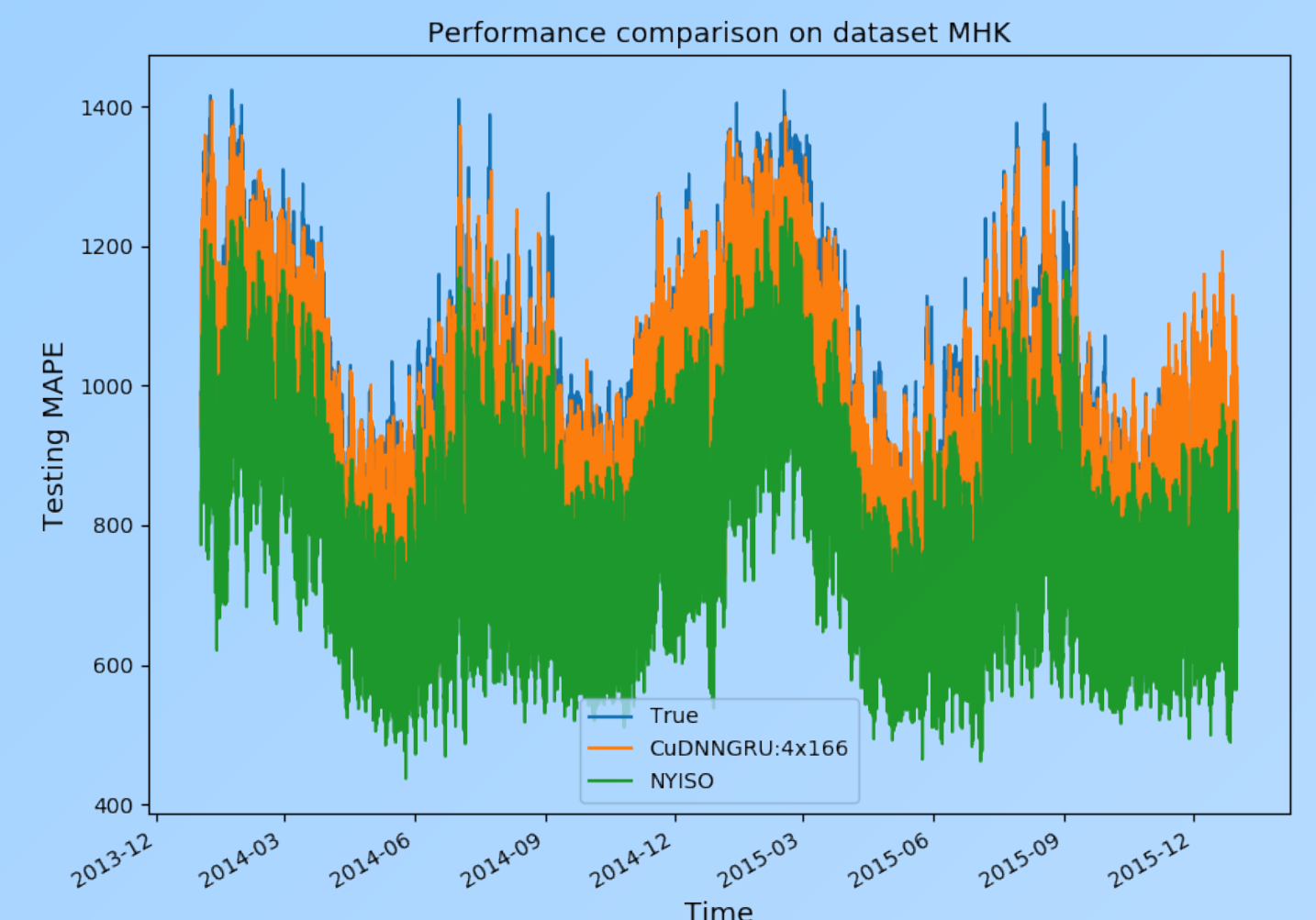
## Motivation

Electricity is the essence of modern life and any improvements in its delivery and usage can greatly impact people's lives and the environment.

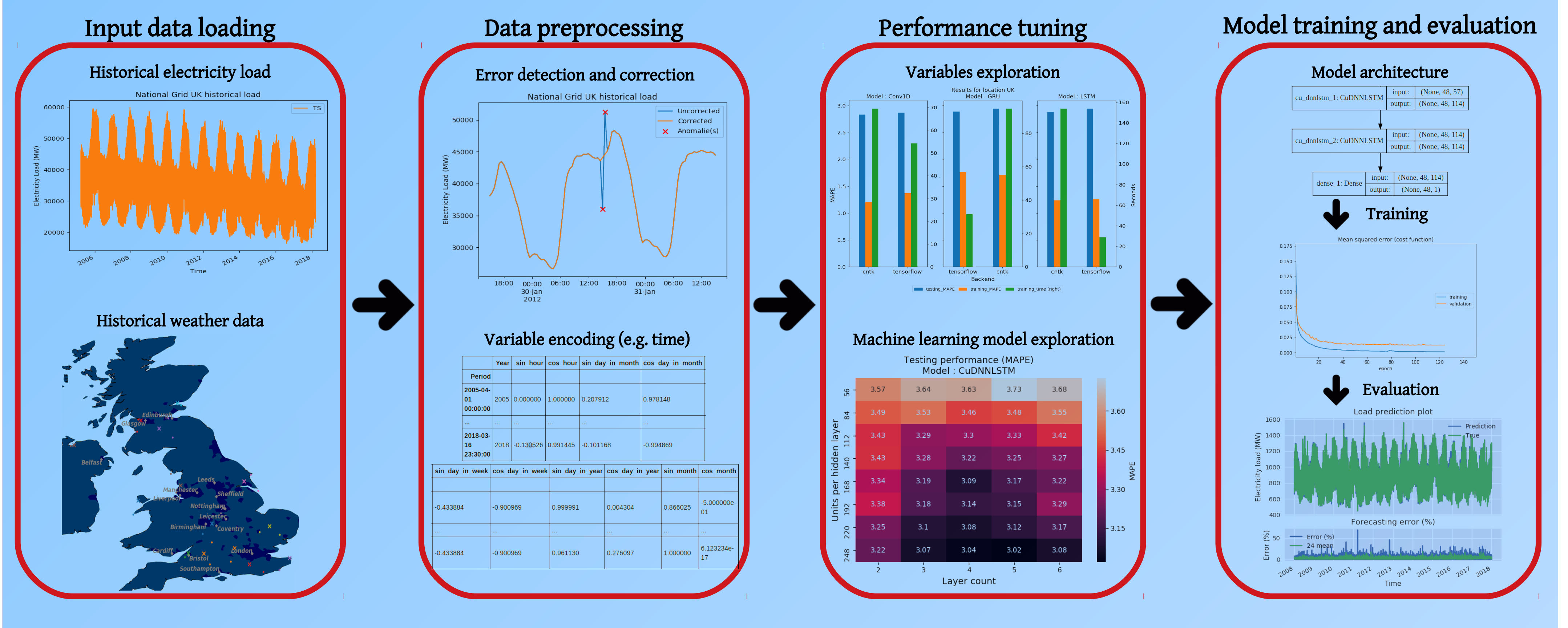
This project was motivated by a Scottish industrial partner looking for a forecasting module to be used in distributed electric grids.

Many approaches to solving this problem have been attempted, from statistical methods such as ARIMA to complex neural networks and ensemble models [1].

In this project, we tackle the problem of electricity load forecasting using Deep Learning neural networks and the Python data science ecosystem.



## Design



## Results...

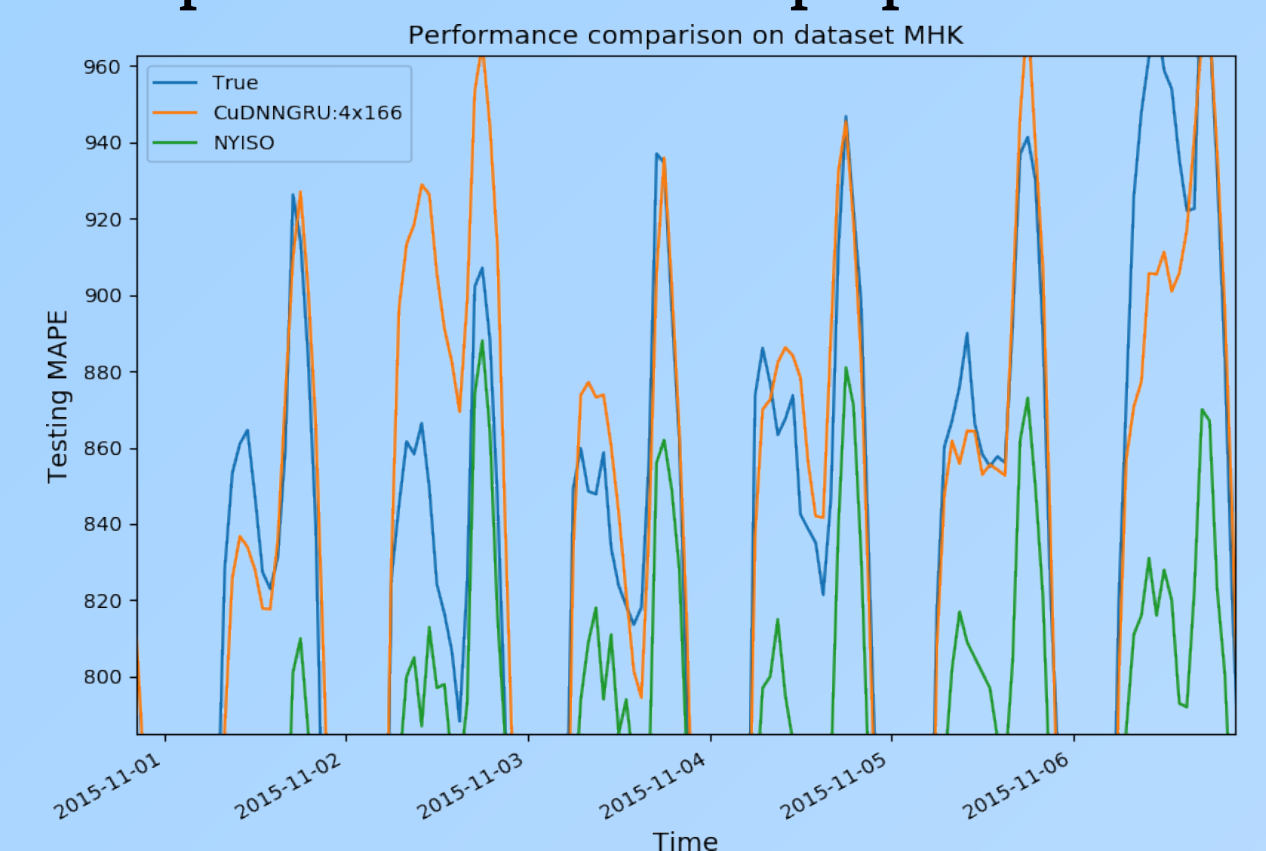
In order to obtain maximum accuracy, the whole machine learning pipeline described above was carefully built : the effects of each step from data ingestion, feature engineering and variable encoding to the training process and model architecture were examined and optimal settings identified.

The models are trained using data from NYISO [2] and National Grid's UK [3] websites. NYISO also provides forecasts, to which our models can be compared. The proposed model outperforms the NYISO forecasts reference on both datasets by a measurable margin.

### Model evaluation (testing MAPE)

	Proposed model	NYISO
NYC	~2.2%	~3.2%
MHK	~3.8%	~16.0%
UK	~2.4%	N/A

### Comparison of NYISO's and proposed model



## References

- [1] Debnath, Kumar Biswajit, and Monjur Mourshed. "Forecasting methods in energy planning models." Renewable and Sustainable Energy Reviews 88 (2018): 297-325.
- [2] New York Independent System Operator, Inc. (n.d.). Market & Operation. [online] Available at: [http://www.nyiso.com/public/markets\\_operations/market\\_data/pricing\\_data/index.jsp](http://www.nyiso.com/public/markets_operations/market_data/pricing_data/index.jsp) [Accessed 12 Aug. 2018].
- [3] National Grid UK (n.d.). Data Explorer. [online] Available at: <https://www.nationalgrid.com/uk/electricity/market-operations-and-data/data-explorer> [Accessed 12 Aug. 2018].