

# Machine Learning Intelligence for low voltage network management

## Providing unique insights into real-world network behaviour through intelligent algorithms

Artificial Intelligence (AI) can turn unfeasible tasks involving elaborate analysis of huge quantities of data into feasible ones. It can automate lengthy and complex learning tasks and codify human knowledge.

Machine Learning (ML) is a branch of AI and concerns the construction and study of systems that can learn from data. This includes representation (encoding knowledge), generalisation (performing well on unseen data) and prediction (based on known properties learned from the training data). It is a method of data analysis that uses algorithms to iteratively learn, automate model building and find hidden insights.

With expertise across machine learning, engineering, mathematics and physics, Kelvatek's highly specialised team of data scientists and PhD specialists are deploying Artificial Intelligence algorithms and Machine Learning capabilities to solve DNO challenges.

### Driving value from data

Machine Learning works best on multidimensional, repeatable, automated, accessible and accurate data. Data from a network of sensors is therefore ideal for learning new models and creating insights.

Challenges that our team have solved in the low voltage space include:

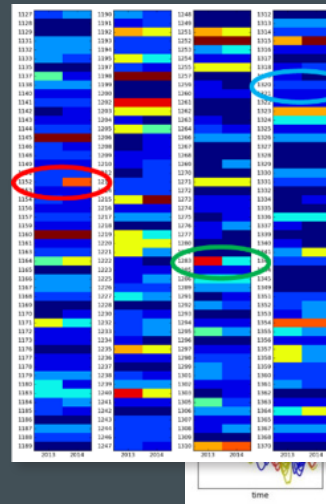
- Identifying load cluster centroids from the Low Carbon London project data allowing anomalous and unexpected behaviour to be detected.
- Developing novel neural network algorithms to identify the specific asset (joint, mid-cable or termination) that has failed from fault data.
- Using Time Domain Reflectometry for fault detection and identifying the behaviour of lowered lines.
- Using N-Dimensional harmonics data to identify electronic devices connected to LV networks.
- Using Machine Learning to maximise the value from the deployment of network sensors for CI/CML reductions.

### Benefits

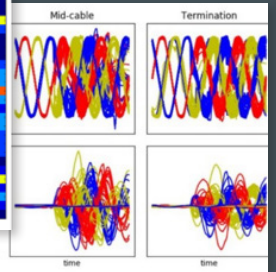
- Faced with the challenge of increasingly large data sets and varieties of scenarios, our expertise enables us to synthesise new models and create powerful new approaches to the challenges presented by smart networks and the Net-Zero transition.
- Our proven AI algorithms can crunch through new approaches and answer new questions at an unprecedented speed.



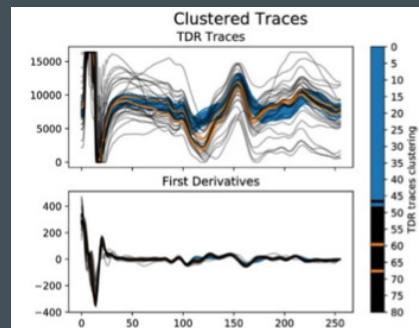
Our machine learning team in Parma



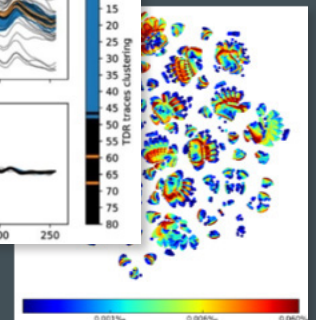
Clustering and anomaly detection on Low Carbon London load profiles



Neural networks to identify asset type from fault data



Clustering analysis to detect lowered line behaviour



Harmonic fingerprinting of electronic devices