Machine Learning: Crucial Leap Forward for Ordnance Survey

Ordnance Survey (OS), Great Britain's national mapping agency, is on the verge of a quantum leap in its data capture after being granted access to a supercomputer to develop machine learning techniques that will extract extra information and features from aerial imagery and mapping. The Science and Technology Facilities Council (STFC) Hartree Centre's supercomputer being used is, appropriately for OS, named '*Scafell Pike'*.

It is expected that if successful this will lead to new business opportunities for OS at home and internationally. It is also projected that it could bring annual efficiencies of more than £2 million for OS, which by 2024 will rise to £8 million per year.

Quality assurance and standards are also central to the project, as OS seek a better understanding of the decision-making process behind a machine learning network. Having improper AI can lead to public embarrassment and be costly for business. To avoid this, OS hopes to unlock AI's potential by creating quality assurance and standards for the industry.

Farmland hedges

This news builds on OS's already successful work with artificial intelligence (AI) and machine learning to date. It was used to capture and accurately map 373,919km of England's farmland hedges to create a new digital dataset for the Rural Payments Agency, and was deployed in a joint project with Microsoft that saw a machine learn and identify different roof types – it went from zero to 87% accuracy in just five days.

Ordnance Survey Chief Operating Officer, John Clarke, says: "Machine learning has the potential to revolutionise the way OS detects change. We already have the most detailed maps in the world, but extra detail, such as roof tops, roof types, solar panels, street furniture and further data at street level, alongside other AI work we are developing, will be crucial to ushering in new technologies like 5G and self-driving vehicles. We envisage this extra richness in rural and urban areas will enable a variety of industries to improve upon what they already do and unlock opportunity for them".

The impact of having land mapped

John continues: "Already we see this can be valuable in providing agricultural information, improving how as a nation we better manage our environment and how we can make successful, efficient smart cities. Assuring the quality of the new data this will generate is key to the project's success. Can the AI report back the reason why it makes decisions on whether data is right or wrong? That is what we need to establish for ourselves - so the wider science community can also use the same methods.

"The World Bank estimates that only 25-30% of all land in the world is mapped and registered. The impact of this is tremendous considering the follow-on impact that having land mapped and registered gives (land "gets" a value since it can be mortgaged, women's rights, socio-economic impact, foreign direct investments and much more). What we're hoping to develop can help overcome this".

OS have been given access to these leading facilities after successfully bidding in an Innovate UK competition, which sees OS partnering up with the Science and Technology Facilities Council (STFC) Hartree Centre, home of *Scafell Pike*, and scientific study group National Physical Laboratory (NPL), who are working on a best practise methodology for machine learning, aided by the project.