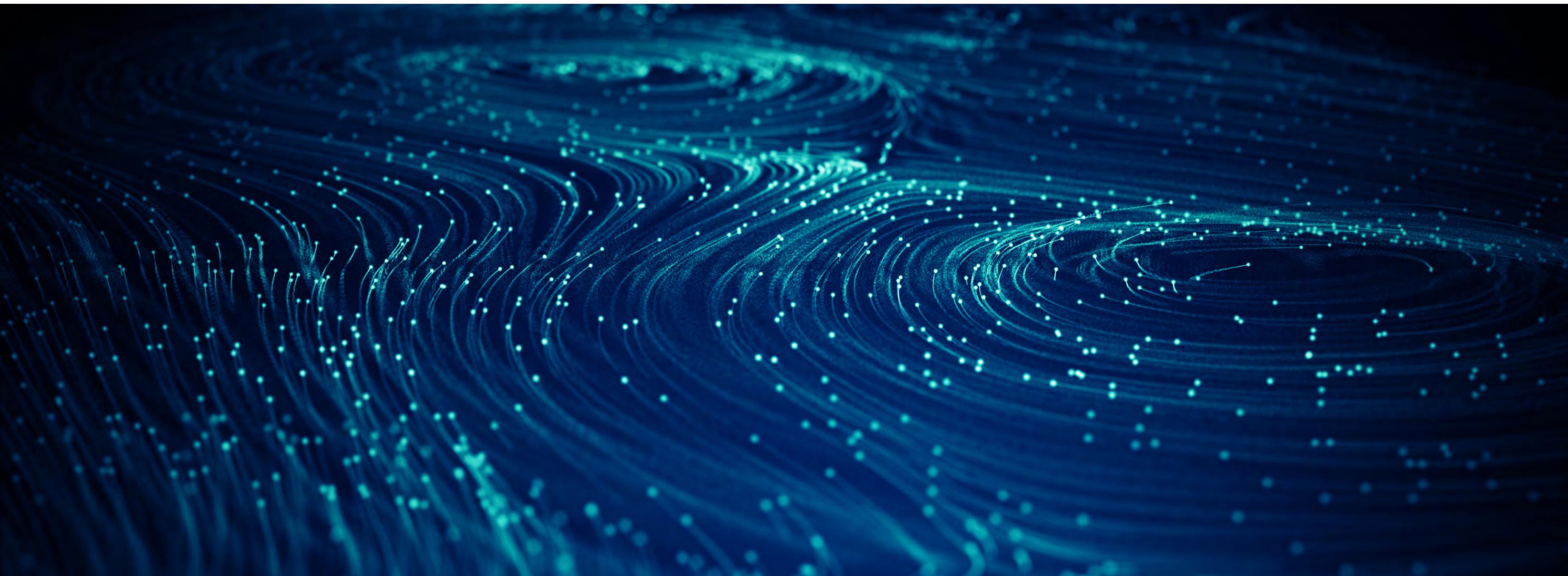


Bringing AI to life: Defining and building the AI taxonomy with The Data City

Helping the UK to become a world leader in AI with a novel approach to data capture and classification.



Introduction

With thousands of active businesses in the UK and an average company growth rate of 9.3 percent, the AI sector is one of the most profitable and labour-efficient economies in the country.

But establishing the performance of the industry isn't enough. To identify more opportunities and deliver effective policy making – both essential to the UK's objective of becoming a world leader in AI – it's crucial to understand the differences between regions and the type of AI offered to support different sectors.

The Data City enlisted the help of Innovate UK KTN's AI sector lead, Dr Caroline Chibelushi, to help improve their existing methodology and produce a new AI taxonomy. Her expertise was the key to capturing the data needed to map out the sector more effectively, as well as driving business growth.



Understanding the importance of AI taxonomy

Taxonomies allows us to categorise things based on similarities or characteristics. It can be used to organise and index knowledge, making it easier to find the information we're looking for. AI is making an impact on everything around us; and a representative AI taxonomy plays a key role in helping us to understand and visualise this impact.

Capturing the data needed to differentiate by region is just as important as understanding the strengths of the UK AI sector as a whole. Building reliable datasets about the AI economy in the UK is vital for sustainable economic development, and creating a taxonomy was fundamental in achieving this. It also provided the capability to extract and connect use cases with technology, regulations, skill requirements and much more.

The Data City wanted to work with an expert in AI who also understood how machine learning methods work. As one of the pre-eminent AI experts in the UK, Dr Chibelushi helped The Data City to develop and reinforce their existing methodology and make it more robust.

Whilst existing taxonomies are available and being used in the AI community, many don't deliver accurate data or represent industry change. Creating a tool to extract and analyse information more easily would allow businesses and governments to better navigate and understand the AI ecosystem and economic trends.

Who we are

Innovate UK KTN exists to connect innovators with new partners and opportunities beyond their existing thinking – accelerating ambitious ideas into real-world solutions.

We create diverse connections to drive positive change, establishing a network of innovators so powerful that its ideas will change the world.

Innovate UK KTN also works with businesses such as The Data City beyond completion of the original project, seeking out new opportunities for future projects and innovation, to support further expansion and economic growth.

Developing the Taxonomy

Dr Chibelushi developed her AI taxonomy in three steps, starting with a clear differentiation between AI and cybernetics. This enabled her to use one to enhance the performance of the other, whilst maintaining a distinction between the two. Though both are based on the binary logic principle and human-machine interaction, cybernetics is not AI.

AI is based on the idea of creating machines to mimic human intelligence and behaviour. Cybernetics is the science of human-machine interaction that employs the principles of feedback, control and communication. IoTs,

digital twin, robotics and apps are examples of cybernetic concepts, which use AI in different ways but weren't considered when developing the taxonomy.

Having previously supported businesses across the UK AI sector, Dr Chibelushi used her experience – alongside literature review – to identify the language used to define the AI taxonomy content. The sector scenarios and AI technologies used then allowed for the development of the early version of the taxonomy shown in the table (right):

Early AI taxonomy developed by Innovate UK KTN

Data Analysis	Pattern recognition, correlations, outliers, prediction, optimisation, visualisation
Enabling AI Platform	Pre-built algorithms and code frameworks
Image Processing	Also known as Computer vision/Machine vision. Performing some operations on images in order to extract useful information
Signal Processing	Audio processing, for example: Alexa, Chatbots, speech to text (real-time translation)
Natural Language Processing	Text understanding, prediction, translation
Cognitive Computing	Real-time analysis of environment content and intent
Data Manipulation	Data improvement, data integration, data modelling and simulation, real-time data transmission

Refining the Taxonomy

Once Innovate UK KTN had developed this first version of the taxonomy, it was submitted to The Data City to be refined alongside Dr Chibelushi. The team led by Fatima Garcia then used this taxonomy to develop their Data Explorer tool and performed other activities including:

- Applying the taxonomy to production of RTICs (Real-Time Industrial Classification)
- Finding promising and critical companies across the sector

These practical applications of the AI taxonomy helped set the basis for a novel process of producing industrial data, particularly in the production of RTIC methodology. You can read the full report to find out more about how the taxonomy was developed on [The Data City's website](#).

Using the AI taxonomy and RTIC methodology together has since had an increased role in evidence-based decision making in the UK, especially within critical policy-making and networking organisations. We explore the impact and results in the next section.

Results and Impact

Working with an authority such as Innovate UK KTN has given The Data City authenticity in the space, producing a taxonomy already proven to be the best available. By developing a robust methodology that could be applied to other sectors, they've also been able to attract new audiences and grow as a business, securing enough revenue to grow their employee base by five times.

The Department for Digital, Culture, Media and Sport (DCMS) was interested in identifying critical and promising AI companies working in the UK. Innovate UK KTN and The Data City partnered to produce a series of RTICs that make it possible to find the targeted companies.

This allowed for the mapping of AI companies across the UK, revealing where the fastest-growing companies are and how funding is being distributed. For example, the data showed that the regions receiving the most funding weren't always those growing at the fastest rate, reinforcing the idea that investment in the UK favours areas in the south to the detriment of other regions.

This data will allow and encourage investors to distribute funding across different regions, building a strong AI sector that is well represented at both a local and national level.

Read more about national and regional insights on [The Data City's blog](#).

The AI taxonomy was crucial in achieving this result, not only because it enabled the DCMS to map the sector, but because it set the basis for taxonomy production elsewhere.

The number of institutions engaging with this taxonomy is testament to its impact. As well as the DCMS, the Bennet Institute – part of the Productivity Institute – and other regional organisations have used the AI definition and RTIC in research projects to better understand the sector.

Over 3000 individuals have requested information on these taxonomies, and even more are accessing this information via reports published into the public domain.

There are currently over 130 economists and statisticians using the platform in their work, whilst the taxonomies are being used by almost all national government departments, local authorities and a wide range of non-governmental organisations such as the Catapults and Innovate UK.

Conclusions

Working with Dr Chibelushi to develop the AI taxonomy was a critical step for The Data City, especially in the definition of RTIC methodology. Producing a dataset that successfully targeted companies working in AI allowed The Data City to map out the sector, identify trends and influence policy making, as well as replicate the same methodology for other sectors.

The Data City have also improved their authority in the space, thanks to their association with Innovate UK KTN, allowing them to attract new audiences and grow their business. Dr Chibelushi is continuing to support The Data City on future projects and innovation, with plans already in the making.

This project represents a key step forward for economic data capture and industrial classification methods, creating an alternative approach to represent industries and determine their size and value.

It will also have a profound effect on the development of the UK's AI industry, helping to measure the adoption of AI and its impact on the UK economy, and allowing decision makers to identify high-growth regions and distribute funding in a more equitable way.

Contact Us

Innovate UK KTN has the expertise and extensive network to help innovators realise their goals, and exists to connect them with new partners and new opportunities. We can help with anything from idea development and investor-readiness training to crucial introductions with industry-leading businesses.

Our goal is to help accelerate ambitious ideas into real-world solutions, whatever your current level of readiness. Whether you have an idea, a ready-to-market solution or are seeking support for something in between, our government-funded, non-competitive programme can help.

If you're looking to develop your AI project, please contact our AI expert:



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