



TCD SCSS and CKDelta AI Research Partnership

Funded PhD Positions in Artificial Intelligence

CKDelta have recently established a research programme in collaboration with the School of Computer Science & Statistics, Trinity College Dublin. The *AI Research In Action Programme* will establish a globally excellent research team which will assist in the application of leading edge AI techniques to a range of real-world problems within the utilities sector.

Trinity College Dublin, located in the heart of Dublin, is Ireland's number 1 university and ranked 87th internationally (QS Rankings 2024). The School of Computer Science and Statistics, Trinity College Dublin is the highest ranked School of Computer Science on the island of Ireland (QS World University Subject rankings 2024) and delivers a collegiate, friendly, and a world-class research-intensive centre for academic study and research excellence attracting scholars of global calibre from across the globe.

CKDelta is headquartered in Dublin, Ireland, and is part of CK Hutchison Holdings Limited, a multinational conglomerate employing 300,000 people in over 50 countries around the world. CKDelta is an AI software business within the CK Hutchison Holdings Ltd group, leveraging data, expertise and intellectual property on a conglomerate scale. The company has a mission to empower customers with insights that transform decision-making and deliver impact, leveraging assets from across CK Hutchison group companies. CKDelta develop and offer innovative solutions across utilities, retail, financial services, transport and logistics solving digital transformation challenges to promote a safe and sustainable future.

A number of fully funded PhD scholarships are available providing a tax-free bursary of €25,000 per annum for 4 years together with fee payment. Two areas will be addressed in the first instance:

1. Predictive Maintenance

One of the key challenges that many industries face is how to optimise the maintenance of their assets and equipment, while minimising the costs and risks of failures. Predictive maintenance is a data-driven approach that uses AI to monitor the condition and performance of assets and importantly to predict when they need servicing and/or replacement. This facilitates maintenance scheduling at the optimal time, avoiding unnecessary downtime, reducing operational expenses, and improving safety and reliability.

Predictive maintenance can be applied to various types of assets, such as pumps, valves, turbines, generators, boilers, compressors, pipelines, cables, and transformers. By collecting and analysing data from sensors, historical records, weather history & forecasts, and other sources, predictive maintenance models can identify patterns and anomalies that indicate the health and degradation of the assets. These models can also provide recommendations and alerts for preventive actions, such as adjusting the settings, cleaning, repairing, or replacing the components.

CKDelta is working with Northumbrian Water and Northern Gas Networks on projects that would benefit from the use of predictive maintenance techniques.

2. Early Warning Systems

Early warning systems are a set of tools and methods that aim to detect, monitor, and forecast potential threats or disruptions to utilities companies. In the case of the water industry, it provides benefits in cases such as leaks, bursts, floods, sewerage overflows and blockages. By combining IoT sensor data from various sources, such as flow meters, pressure gauges, water quality sensors, and smart valves, combined with weather historical and forecast data an early warning system can provide timely and accurate information to water operators, managers, and customers, enabling proactive and preventive actions to mitigate the impacts of water-related hazards.

The objective of this piece of work is to provide an early warning system that can improve the efficiency, reliability, and resilience of the water network, reduce operational and maintenance costs, enhance customer satisfaction and trust, and protect public health and the environment.

CKDelta is working with Northumbrian Water to create an early warning system.

Applications ought to have a 2.1 or 1 Degree in Computer Science or cognate discipline and/or an M.Sc in Computer Science/cognate discipline. Applications will be received until the positions are filled.

Prospective candidates would be expected to have an interest in several of the following areas: Artificial Intelligence, Multi-Agent Systems, Machine Learning, Data Analytics, IoT systems & Ubiquitous Sensing. Interested parties should send a detailed academic Curriculum Vitae together with a letter of application indicating their interest in research, TCD SCSS and CKDelta AI Research Partnership, to Professor Gregory O'Hare Gregory.OHare@tcd.ie with a subject heading "AI PhD Application".