Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Job Description

Reference ID:	TBA
Job Title:	Machine Learning Engineer
School/Department:	ADAPT SFI Centre, School of Computer Science and Statistics
Principal Investigator:	Prof Ashish Kumar Jha, Prof Athanasios Georgiadis
Duration:	1 year, April 1st
Salary	Gross Salary starts at the <u>Research Fellow</u> pay scale. Annual increments apply on IUA Pay Scale.

The Wider Research Project

The Machine Learning Engineer is required to contribute to a new commercialisation project called MarSci. The project led by George Filippou, Marketing Scientist (formerly at TikTok and Facebook) and Phd candidate in Statistics, involves collaboration with Principal Investigators Prof. Ashish Kumar Jha (Business School) and Prof. Athanasios Georgiadis (School of Statistics). The project aims to revolutionize the digital analytics industry. Modern marketers face two major challenges: Where to allocate marketing investments and which marketing channel is effective. These challenges are driven by fragmented data sources, complex consumer journeys and lack of resources. MarSci aims to solve this by offering an integrated solution combining data visualization, cross-channel attribution (MTA), and media mix modelling (MMM). MarSci simplifies the use of advanced machine learning and AI for digital analytics, empowering marketers with actionable insights.

The Machine Learning Engineer holds a Master's or PhD in Computer Science or a related field and will bring over 2 to 3 years of experience in building ML and training AI models, specializing in machine learning, neural networks, and predictive analytics. Their expertise in AI and machine learning is critical to developing MarSci's innovative modeling techniques, such as interpreting Multi-Touch Attribution (MTA) and Media Mix Modeling (MMM). They will work closely with data engineers to optimize AI-driven insights and provide real-time recommendations.

Context

The role will be located at the ADAPT SFI Research Centre, housed within the School of Computer Science & Statistics at Trinity College Dublin. ADAPT is recognized globally as a leading SFI Research Centre specializing in AI-Driven Digital Content Technology. It brings together top-tier academics, researchers, and industry collaborators to advance cutting-edge science, foster public engagement, develop innovative business solutions across various sectors, and enhance Ireland's international standing. The ADAPT Centre is coordinated through the School of Computer Science and Statistics at Trinity College Dublin.

The School of Computer Science and Statistics holds the distinction of being ranked as Ireland's top institution in its field (QS Rankings) and earned a Bronze Athena Swan award in 2021 for its commitment to gender equality. The School actively promotes equality, diversity, and inclusion, encouraging applications from all qualified individuals, particularly those from underrepresented groups. It provides a collaborative and supportive environment, ensuring staff and students can thrive academically and personally, with a focus on maintaining a healthy work-life balance.

Main Responsibilities

As part of the overall project, this Machine Learning Engineer will work on the following tasks:

1. **Algorithm Development and Implementation**:
   - Develop models for Multi-Touch Attribution (MTA) which can shed light into complex consumer journey challenges.
   - Develop ML models for Media Mix Modeling (MMM) - combine existing ML models and innovate model transformation for Media mix modelling.

2. **AI research and development:**
   - Train open-source AI models in order to support the vision of MarSci for better data interpretation.
   - Utilize AI models in order to define hyperparameters which will be used for Media Mix Modelling.
   - Extend existing AI developments in order to support MarSci's solution.

3. **Model Optimization and Deployment**:
   - Conduct evaluations and fine-tuning of machine learning models to ensure optimal performance.
   - Deploy machine learning models into production environments, ensuring scalability and reliability.

4. **Innovation and Research**:
   - Stay informed about the latest advancements in artificial intelligence and machine learning to integrate state-of-the-art techniques into the platform.
   - Explore and apply emerging methodologies to enhance predictive analytics and decision-making capabilities.

5. **Agile Development**:
   - Employ Agile methodologies to drive iterative development, ensuring continuous delivery of impactful features.
   - Participate in sprint planning and deliver prototypes aligned with short-term milestones and the platform's long-term vision.

6. **System Architecture and Scalability**:
   - Contribute to defining the technical and architectural requirements necessary to support the platform's growth and innovation.
   - Balance the immediate project goals with strategic plans for scalability and future development.

Administrative

As a Machine Learning Engineer in Adapt, the person will occasionally be required to engage in administrative tasks in support of the PI and Commercial Leads overall activity. This may include drafting sections of reports for funding bodies; organising a programme of suitably themed group meetings and seminars; contributing to research funding proposals; drafting of ethics applications; and other such tasks as they arise.

Person Requirements

We are looking for an experienced Machine Learning Engineer capable of working with a multidisciplinary team to deliver the technology stack to deliver the MarSci innovation. Candidates with an interest in AI, working with LLMs and/or ML engineers in digital analytics industry are particularly encouraged to apply

Qualifications

- A primary degree in a computer science or similar and industrial experience.

Knowledge & Experience (Essential & Desirable)

Essential:

- A minimum of 5 years' experience in a software developer role;
- Master's or PhD in Computer Science or related field.
- 2+ years of experience in machine learning model development.
- Proficiency in Python, TensorFlow, or PyTorch.
- Strong understanding of AI systems and predictive modeling.
- Understanding of data architecture, pipelines and ELT flows/technology/methodologies.
- Experience using pipeline technologies within AWS.
- Knowledge of data modeling and statistics.

Desirable:

- **Digital analytics background**: Familiarity with the digital analytics industry and/or familiarity with media mix modeling and attribution methodologies.

Key Responsibilities

- Develop, optimize, and deploy machine learning models, including generative AI solutions, for a range of applications.
- Work with diverse datasets (structured and unstructured) to extract insights and engineer meaningful features.
- Conduct rigorous testing and evaluation of ML models, utilizing statistical techniques and performance metrics.
- Fine-tune large language models (LLMs) to meet specific use cases.
- Collaborate with internal stakeholders to understand their AI/ML needs and translate them into practical solutions.
- Stay updated with the latest research in AI/ML and contribute to advancements in algorithm development.
- Provide mentorship and guidance to junior engineers and data scientists, fostering best practices in coding, algorithm design, and model deployment.

About You

- A degree in computer science, statistics, applied mathematics, or a related quantitative field.
- At least three years of experience in machine learning, with a strong focus on training open-source AI models for specific applications.
- Deep knowledge of ML and AI techniques, with an ability to select the most appropriate approach for different problems.
- Proficiency in Python and familiarity with key ML frameworks such as TensorFlow, PyTorch, and Hugging Face.
- Strong understanding of data infrastructure, including Snowflake, Airbyte, and cloud-based data solutions.
- Hands-on experience with ML deployment tools and environments, such as Docker, Kubernetes, Spark, and Dask.

Desirable

- o Strong familiarity of Python programming and ML frameworks (Jupiter notebook, Google Collab, TensorFlow, PyTorch, HuggingFace, etc.)
- o Very good understanding of data infrastructure (Snowflake, Airbyte, Cloud)
- o Familiarity with standard ML deployment stack (Docker, Kubernetes, Spark, dask, etc.)
- o Solid foundation in statistical modeling and advanced machine learning techniques, including time-series forecasting, multi-touch attribution (MTA), and media mix modeling (MMM).
- o Knowledge of large language models (LLMs), fine-tuning methods, and prompt engineering to enhance model performance and align outputs with marketing analytics objectives.
- o Strong programming skills in Python, R, or Julia, with a focus on building reusable codebases for machine learning applications.

Benefits

- Working with a founding team with Meta/TikTok experience.
- Collaborating with a board of directors with extensive AI experience.
- A creative and enabling environment with impactful research
- Competitive salary and equity
- High-end computer and peripherals
- Pension and social insurance (PRSI) included
- Trinity Day Nursery
- Travel Pass Scheme
- Bike to Work Scheme
- Employee Assistance Programme
- Sports Facilities
- 22 days of Annual Leave
- Paid Sick Leave
- Training & Development
- Staff Discounts locally

Application Procedure

Applicants should email **filippog@tcd**.ie providing the following information when applying:

1. A motivation statement outlining their interest and suitability for the position.
2. A comprehensive curriculum vitae
3. The names and contact details (e-mail) of three referees.

Note:

Candidates who do not address the application requirements above will not be considered for an interview

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Further Information

Informal enquiries about this post should be made to Conor McNally (conor.mcnally@tcd.ie) or George Filippou (filippog@tcd.ie) but applications are only accepted through the procedure outlined above.

Snapshot of the Faculty

The Faculty of Science, Technology, Engineering and Mathematics is located at the east end of the Trinity campus. It brings together eight schools that deliver discipline-specific research and training (**Biochemistry & Immunology, Chemistry, Computer Science and Statistics, Engineering, Genetics & Microbiology, Mathematics, Natural Sciences, Physics).** Each School produces graduates that are leaders, innovators and doers in STEM education and research, in Ireland and beyond.

As well as these eight schools, the Faculty is made up of three Trinity College Research Institutes, five National Research Centres and three Units. Together these represent approximately 30% of the staff in the College.

Researchers in the Faculty address challenges that are complex and multi-faceted. They do this by continuously asking the fundamental questions of how? and why? They seek out answers to current and future challenges in climate change, food and water security, sustainable urbanisation, personal privacy, healthy ageing and eradicating infectious diseases. They lead innovations at the frontiers of science and technology often in high-level multi-disciplinary teams based within the Schools, Research Institutes and Centres.

The three Trinity Research Institutes are:
• **CRANN -** The Centre for Research on Adaptive Nanostructures and Nanodevices
• **TBSI -** Trinity Biomedical Sciences Institute
• **TCIN -** Trinity College Institute of Neuroscience

The four National Research Centres are:
• **ADAPT -** The SFI Centre for digital content and media innovation
• **AMBER -** The SFI Centre for Advanced Materials and BioEngineering Research
• **CONNECT -** The SFI Centre for digital content and media innovation
• **ENABLE -** Connecting communities with smart urban environments through the Internet of Things
The three units that support our teaching and learning mission are:
• **Biology Teaching Centre -** responsible for the coordination of all Biology teaching to Junior and Senior Freshman students in Science, as well as providing service teaching to other groups within the College.
• **Comparative Medicine Unit -** aims to advance knowledge and improve the health and wellbeing of humans and animals by servicing, and providing, world-class facilities and infrastructures, to the Trinity research community.
• **Science Course Office -** responsible for facilitating the Junior and Senior Fresh undergraduate Science Programmes.

Trinity College Dublin, the University of Dublin

Trinity College Dublin, the University of Dublin is Ireland's leading university, one of the top ranked universities in Europe and a member of the League of European Research Universities. It is currently ranked 98th in the QS World University Rankings 2023. Founded in 1592, the University is steeped in history with a reputation for excellence in education, research, and innovation.

Located on an iconic campus in the heart of Dublin's city centre, Trinity has 18,000 undergraduate and postgraduate students across our three faculties – Arts, Humanities, and Social Sciences; Science, Technology, Engineering and Mathematics; and Health Sciences.

The pursuit of excellence through research and scholarship is at the heart of a Trinity education, and our researchers have an outstanding publication record and strong record of grant success. Our research charter outlines the principles that are central to our research vision:
www.tcd.ie/research/about/charter

Trinity has developed **19 broad-based multidisciplinary research themes** that cut across disciplines and facilitate world-leading research and collaboration within the University and with colleagues around the world. Trinity is also home to five leading flagship research institutes:

- n **Trinity Biomedical Sciences Institute (TBSI)**
- n **Trinity College Institute of Neuroscience (TCIN)**
- n **Trinity Translational Medical Institute (TTMI)**
- n **Trinity Long Room Hub Arts and Humanities Research Institute (TLRH)**
- n **Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN)**

Trinity is the top-ranked European university for producing entrepreneurs for the past seven successive years and Europe's only representative in the world's top-50 universities (Pitchbook Universities Report 2021).

Trinity has been incorporating sustainability right across the university. Commitments to sustainability have been made in the Strategic Plan (2020 – 2025) and via Trinity's environmental sustainability practices under nine goals in areas that range from biodiversity to sustainable transport and green procurement.

For more on these sustainability commitments, please visit **www.tcd.ie/provost/sustainability/initiatives**

Trinity is home to the famous Old Library and to the historic Book of Kells as well as other internationally significant holdings in manuscripts, maps, and early printed material. The Trinity Library is a legal deposit library, granting the University the right to claim a copy of every book published in Ireland and the UK. At present, the Library's holdings span approximately 7 million printed items, 500,000 e-books and 150,000 e-journals.

With over 130,000 alumni, Trinity's tradition of independent intellectual inquiry has produced some of the world's finest, most original minds including the writers Oscar Wilde and Samuel Beckett (Nobel laureates), the mathematician William Rowan Hamilton and the physicist, Ernest Walton (Nobel laureate), the political thinker Edmund Burke, and the former President of Ireland Mary Robinson. This tradition finds expression today in a campus culture of scholarship, innovation, creativity, entrepreneurship, and dedication to societal reform.

Rankings

Trinity is the top ranked university in Ireland and ranked 98th in the world (QS World University Rankings 2023). Trinity ranks in the top 50 in the world on 4 subjects and in the top 100 in 17 subjects (QS World University Rankings by Subject 2021).

Full details are available at: **www.tcd.ie/research/about/rankings**