Accenture – FS.AI – Digital Twins

TIN-ACC-024

About the Organisation

Accenture's FS.AI practice, the department that works on providing AI-based solutions for financial services, sits within the wider multidisciplinary Data & AI team of experts across a range of academic and industry backgrounds. Join our team to help transform leading organisations and communities around the world. Accenture is driving these exciting changes and bringing them to life across 40 industries in more than 120 countries. The sheer scale of our capabilities and client engagements and the way we collaborate, operate, and deliver value provides an unparalleled opportunity to grow and advance.

Role Description and Responsibilities

Digital Twins are virtual representations of real-world objects, systems, or processes that are used in various industrial settings for real-time monitoring, analysis, and optimization. Accenture FS.AI has recently made vast progresses in the development of Digital Twins for financial services. These models have allowed several of our clients to attain deeper insights into their processes, optimize said processes, and predict future behaviours proactively.

Accenture FS.AI currently owns proprietary, advanced Python libraries that generate real-time updating graph-based Digital Twins leveraging state-of-the-art machine learning models. The next stages in the development of these libraries involve the introduction of novel process optimization strategies and the enhancement of predictive model capabilities. These features, however, are tied to a few theoretical challenges. The implementation of standard optimisation algorithms is complicated by the intricate nature and inherent stochasticity of most real-world system. Moreover, the predictive power of the Digital Twins is often challenged by the observations whose features do not resemble the ones encountered during the training of the underlying Machine Learning models. The aim of this project is to research and develop algorithmic solutions to these challenges, and then implement them as part of our Python Digital Twins library.

The Opportunity

We are seeking an individual who will assess and implement different approaches for the parameter optimisation of stochastic, multi-step temporal processes, modelled through ensembles of machine learning models. The selected individual will also work on exploring of novel strategies to enhance the predictive capacity of Digital Twins in scenarios involving out-of-distribution observations.

This research initiative will be conducted as a part of the Accenture FS.AI R&D team. Throughout the project, you will receive guidance and supervision from our Digital Twins
research unit. Furthermore, you will gain extensive exposure to various ongoing Accenture initiatives involving the integration of Digital Twins within the financial sector industries.

This role will require strong Python programming skills, including object-oriented and test-driven development, and a good understanding of statistical concepts related to machine learning models, time series, graph-theory and optimization techniques.

**Intern responsibilities:**

Your primary responsibilities will involve providing support to the Research & Development team through the development of solutions for the following challenges:

- How to combine simulations and parameters optimisation strategies to identify parameter values that maximise business outcomes of interest;
- How to enhance the models’ predictive accuracy to deal with novel situations whose feature values do not resemble the ones encountered during the training phase.

After an initial exploration and evaluation phase, you will also be expected to carry out the implementation of the selected strategies as part of our proprietary Python Digital Twins library.

**Expected Outcomes**

The outcome of this internship will be the release of production-ready extensions of our Digital Twins library that implement strategies for parameter optimisation and prediction of outcomes for out-of-training-distribution observations.

**Supervision and Mentorship**

This role will be supervised by, and report into Accenture’s FS.AI Data-Science community co-lead Chiara Cotroneo. The selected individual will become a member of Accenture’ FS.AI Data Science R&D group and will be expected to participate in the team’s collaboration and learning and development activities.

**Person Specification**

The ideal intern will have:

- A demonstrable passion for finding algorithmic solution to machine learning-related problems.
- A deep understanding of the best practices in Python development and strong familiarity with data structures and algorithmic efficiency;
- Ability to pause their PhD for the duration of the internship and to return to their studies upon completion.

*When applying, please highlight any experience with parameter optimisation or generalisation of out-of-distribution observations, and your current level of exposure to the development of novel Python libraries.*
Internship Logistics

This internship will be based in Accenture’s UK HQ in Fenchurch Street, London.

**Start date:** January/February 2024  
**Duration:** 6 months.  
**Remuneration:** It will be pro-rated based on an equivalent annual salary of £35,000.

*This is a full-time position, and we regret that we are unable to consider part-time applications.*