PhD Student Vacancy for the Lowcomote Project

Deploying and Scaling Knowledge Models in Data Science

British Telecom is hiring a PhD Student for its Lowcomote Project in Adastral Park, Ipswich (UK).

The Lowcomote project

The MSCA ITN 2018 project Lowcomote will train a generation of experts that will upgrade the current trend of Low-code development platforms (LCPDs) to a new paradigm, Lowcode Engineering Platforms (LCEPs). LCEPs will be open, allowing to integrate heterogeneous engineering tools, interoperable, allowing for cross-platform engineering, scalable, supporting very large engineering models and social networks of developers, smart, simplifying the development for citizen developers by machine learning and recommendation techniques. This will be achieved by injecting in LCDPs the theoretical and technical framework defined by recent research in Model Driven Engineering (MDE), augmented with Cloud Computing and Machine Learning techniques.

The Lowcomote project will train the first European generation of skilled professionals in LCEPs. The 15 future Early Stage Researchers (ESRs) will benefit from an original training and research program merging competencies and knowledge from 5 highly recognised academic institutions and 8 large and small industries of several domains. Co-supervision from both sectors is a promising process to facilitate agility of our future professionals between the academic and industrial world.

Partners

IMT Atlantique (FR), University of York (UK), Universidad Autónoma de Madrid (ES), University of L'Aquila (IT), JK University of Linz (AT), British Telecom (UK), Intecs (IT), Uground (ES), CLMS (UK), IncqueryLabs (HU), SparxSystems (AT), Metadev (ES), The Open Group (UK)

Training activities

The training program of Lowcomote aims at enabling the recruited ESRs to develop a broad range of scientific, technical and transferable skills that will prepare them for fruitful careers in academia and industry, namely thanks to training led by world experts in the field and timely and high-quality feedback by all co-supervisors.

In particular, the network will provide training for the three main competences needed for developing future LCEPs:

- MDE, for domain analysis, language construction and code generation;
- Cloud computing, for an efficient use of the Cloud infrastructure to manage a large number of users and artefacts;
- Machine learning, for building smart assistants for citizen developers.

Other training activities will include communication, career development and plan, and entrepreneurship.

Phd. research topic: Deploying and Scaling Knowledge Models in Data Science

Within the context of the Lowcomote project, the Phd candidate will work to the following specific research subject.

Objectives: Data science is playing an increasingly important role in industrial settings and in particular in large enterprises. Managing workforce allocations, improving customer support and improved insight in fault rates are only a few areas in which large enterprises can leverage the significant amounts of data they collect. A major challenge however lies in the development of applications that take advantage of these insights that offer acceptable performance, scalability and longevity. This challenge emerges from the conventional development practice that is employed in data science research and innovation. The initial stages of a data science project is very much exploratory and research-oriented as at that point the exact potential and use of the available data is still unknown. Using research-support tools and development environments a knowledge model is created that is typically suitable as a proof-of-concept but does not offer the required performance and scalability. Therefore a second development stage is required, typically referred to as down-streaming, which focusses on reimplementing the knowledge model in a more suitable environment to ensure an application that is production-ready. As this downstreaming stage is currently mostly manual there is a significant impact in time and to the adoption rate of knowledge models, which is further exacerbated by the fact that knowledge models require frequent updates due to changes in the environment and general trends in the data on which they are based.

This project will investigate high-level abstraction languages for LCE knowledge models that are created in data science research and development, in order to help developers downstream such models into scalable, production-ready applications. Developers should not have to deal with the repeated translation of knowledge models to more highly performant technology platforms, but rather focus on creating the infrastructure to accommodate the use of such models in real-world application.

Expected results: The first objective of the project is to develop a reference model for the transformation of knowledge models to specific target platforms. A core focus of this model is to prevent regression, i.e. ensure functional behaviour, across transformations while facilitating highly scalable applications to be developed with the transformed model. A second core focus of this model is the ability to ensure consistent API black-boxing, meaning that APIs for interaction with the knowledge models can be agreed as a contract. This should make it possible to automate the replacement and deployment of an updated knowledge model inside a (running) application. We expect a significant reduction of the time required to downstream knowledge models into production applications, with development times potentially reduced 30-50%. Further benefit will be achieved with the automated redeployment of updated knowledge models. Currently due to the overhead involved this is not done, resulting in applications with deteriorating accuracy as time passes. The ability to easily deploy updated models will significantly improve the relevance and accuracy of the applications over a longer period of time.

Requirements

Degree: Master degree in Computer Science or equivalent providing access to PhD programs.

Language: English proficiency must be attested either through a previous English language diploma, or an internationally recognized proficiency test (at least C1 level of the Common European Framework of Reference for Languages i.e. IELTS, IBT, TOEFL or Cambridge).

Career: When starting their contract (September 2019), selected researchers should be within the first four years of their careers. This means being both within a four years window following their most recent graduation and not having been awarded a prior doctoral degree so far.

Mobility: At the time of recruitment, the researcher must not have resided, or carried out his/her activity in the UK for more than 12 months in the 3 years prior to recruitment date.

Employment conditions

Full-time Equivalent Position

Duration: 36 months, including 2 secondments of 3 months each at other consortium members' premises (see Hosting institution section)

Starting date: 1st September 2019

Remuneration:
The gross remuneration will amount to £41,000 per annum (if the researcher has no family) or £43,609 per annum (if the researcher is married, in civil partnership or has dependent children).

Research, Training and Networking costs:
All relevant expenses linked to the research and training activities (travel, accommodation, etc.) will be paid by the project budget.

Hosting institution

BT is one of the world's leading communications services companies, serving the needs of customers in the UK and across 180 countries worldwide. BT is the largest communications services provider in the UK, with around 9.4 million voice lines, around 9.3 million retail broadband customers, a TV base of 1.7 million customers and a mobile 4G customer base of 18.6 million. BT's main research and development centre is in Adastral Park in Suffolk, UK, and is home to over 3,700 of BT's top scientists, engineers and business people. Our employees include many who are world leaders in their specialist fields, working at the forefront of new technologies and standards development in areas such as broadband applications and services, IP and data networks, data science and AI, virtual and augmented reality, IT, mobility and converged services, network design and management, and business applications and services.

The ESR will be hosted at BT's global research centre at Adastral Park as part of BetaLab team.

> BT Technology, Service & Operations
> Adastral Park
> Barrack Square, Martlesham
> Ipswich IP5 3RE

The ESR will be enrolled on the PhD program of the University of York with regular visits for participating in events and meeting with academic supervisors.

The ESR will spend 2 secondments of 3 months at the premises of 2 project's members as detailed in the following table.

	Planned Secondments	Hosting Partner	Start – End Date
1	Collaboration with ESR10 on testing of application within LCEPs.	IMT Atlantique (Nantes, France)	M20-M22 (August – October 2020)
2	Experimentation, in collaboration with ESR5, on knowledge models from usage traces of low-code mobile applications	Universidad Autonoma de Madrid (Spain)	M30-M32 (June – August 2021)

Supervisors

Joost Noppen, johannes.noppen@bt.com
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Detlef Nauck, detlef.nauck@bt.com

Application process

All applications shall be sent before the 3rd May 2019 by filling in the form on the Lowcomote website: https://www.lowcomote.eu/ .

Applications are composed of the following documents in English (and when necessary a certified translation of official documents):

1. a complete CV with references to past research and training experiences;
2. a motivation letter highlighting the consistency between the candidate 's profile and the chosen ESR position for which they are applying;
3. at least 2 reference contacts (could be substituted by a reference letter, which should be in English or in certified translation)
4. scan of the degree qualification.
5. proof of proficiency in English (either through a previous English language diploma, or an internationally recognized proficiency test - at least C1 level of the Common European Framework of Reference for Languages i.e. IELTS, IBT, TOEFL or Cambridge).

For inquiries please contact the project lead Joost Noppen (johannes.noppen@bt.com)