PhD Student Vacancy for the Lowcomote Project

Capability Discovery and Reuse in Low-code System Models

CLMS UK Limited is hiring a PhD Student for its Lowcomote Project in collaboration with the University of York (UK), hosted in their Athens Branch in Greece.

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, Low-code 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: Capability Discovery and Reuse in Low-code System Models

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

Objectives: Different systems within similar domains tend to share capabilities (e.g. retail systems tend to share capabilities related to the management of customers, products, orders and payments), which in the absence of effective discovery and reuse mechanisms are wastefully re-invented from scratch. This can hamper both productivity and feature-completeness. As such, facilities for automated discovery and recommendation of relevant capabilities through semantic analysis of models of other low-code systems are much desired.

The aim of this project is to facilitate model-level component discovery and reuse through automated identification of relevant low-code system model fragments from other, related system models. To achieve this aim, the project will investigate the use of a graph-based repository[1] that can accommodate models from different low-code systems and establish probabilistic links between their components, as well as a reinforcement learning-based[2] approach to improve the accuracy of such links.

Expected results: The project will facilitate the discovery and reuse of relevant capabilities for low-code systems. It will achieve this by introducing a graph-based repository that will accommodate and analyse models of different low-code systems, in order to produce accurate recommendations about missing or underdeveloped features. This will enhance both the productivity or low-code system engineers and the feature-completeness of the produced low-code systems.

Requirements

Degree: Master's 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 Greece 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)

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[1] A. Garcia-Dominguez, K. Barmpis, D. S. Kolovos, M. A. A. da Silva, A. Abherve, and A. Bagnato. "Integration of a Graph-based Model Indexer in Commercial Modelling Tools". In: Proc. ACM/IEEE MoDELS. MODELS '16. Saint-malo, France: ACM, 2016, pp. 340–350.

[2] L. P. Kaelbling, M. L. Littman, and A. W. Moore. "Reinforcement learning: A survey". In: Journal of artificial intelligence research 4 (1996), pp. 237–285.

Starting date: 1st September 2019

Remuneration:
The monthly gross remuneration (including employer taxes) will amount 3.500,49€ (if the researcher has no family) or 4.000,49€ (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

CLMS (http://www.clmsuk.com) was established in 1998 with a vision to simplify business change management, with specific focus on IT Systems. CLMS has spent years of research in developing innovative technology and software solutions and services that help organisations turn their business models to modern software components. CLMS is constantly developing the Model Driven Development platform zAppDev, which is an innovative development framework promoting speed of development, software quality, agility and flexibility.

CLMS's headquarters are in London, UK and the CLMS' branch located in Athens, Greece. The Athens' branch employs 20 software and research engineers specialized in model-driven development by using, maintaining, updating and extending our own low-code platform. CLMS' proprietary low-code software, enables their personnel to constantly evolve their competences on model-driven engineering and low-code systems by using cutting edge technologies. One of the key products of CLMS is the zAppDev Software Engineering platform. zAppDev has been used at ERP level systems for SMEs in Greece and for the Greek Public sector. In the private sector zAppDev has been used to implement solutions in heavy industry (cement), in Security Services, in Road Management and in Banking.

The ESR will be hosted at CLMS Offices in Greece:

> CLMS (UK) LIMITED
> Athens Branch,
> Andrea Papandreou 19,
> Marousi, 151 24,
> GREECE

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 ESR15 on reusing low-code models by transformation chains.	Universita Degli Studi Dell'Aquila (Italy)	M22-M24 (October – December 2020)
2	Collaboration with ESR7 on using mined interaction processes for capability discovery.	Johannes Kepler University of Linz (Austria)	M32-M34 (August – October 2021)

Supervisors

Yannis Zorgios (yz@clmsuk.com)
Antonis Mygiakis (a.mygiakis@clmsuk.com)

Application process

All applications shall be sent before 2nd May 2019 by filling in the form on the Lowcomote website: https://www.lowcomote.eu/esr/08/ .

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).