CALL FOR GRANT APPLICATIONS
(AE2022-0226)

INESC TEC is now accepting grant applications to award 1 Research Grant (BI) within the scope of the EESDataLab funded by FCT co-financed by the Portuguese Foundation for Science and Technology I.P. (PIDDAC) and by the funded by the European Regional Development Fund (ERDF), through Operational Agenda for Competitiveness Factors Programme (POFC), project (reference MIT-EXPL-ACC-0057-2021

1. GRANT DESCRIPTION

Type of grant: Research Grant (BI)

General scientific area: COMPUTER SCIENCE

Scientific subarea:

Grant duration: 5 months 21 days, starting on 2022-10-01.

Scientific advisor: Alexandre Carvalho

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 875,98, according to the table of monthly maintenance stipend for FCT grants (http://www.fct.pt/apoios/bolsas/valores), paid via bank transfer. Grant holders may be awarded potential supplements, according to a quarterly evaluation process (Articles 19, 21 and 22 of the Regulations for Grants of INESC TEC and Annex II), up to a maximum limit of 50% of the monthly maintenance stipend.

INESC TEC supports costs with registration, enrolment or tuition fees, during the grant duration, under the terms established in the internal document: "Payment of Tuition fees to grant holders".

The grant holder will benefit from health insurance, supported by INESC TEC.

2. OBJECTIVES:

Point Set Registration (PSR) groups a set of techniques used in spatio-temporal data mining applications. In previous studies, the Coherent Point Drift (CPD) technique presents excellent results in terms of efficiency to solve problems of rigid and non-rigid registers and the Bayesian Coherent Point Drift (BCPD) technique demonstrates an interesting potential with excellent results in large datasets, if the selected parameter set is correct. The objectives of this fellowship are (1) to advance the knowledge of the state of the art in the area of spatio-temporal information systems (indexing and automatic detection of events); (2) to identify and select the appropriate methods for the study in question; (3) Select and test machine learning techniques as an alternative to CPD and BCPD techniques for detecting change over spatio-temporal objects. (4) Participate in reports, publications on change detection on spatio-temporal objects, (5) develop research capacity through the application of selected methods and exercise critical thinking in evaluating the research process and the results obtained.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

Recent technological advances have made it possible to collect volumes of data on the evolution of spatio-temporal phenomena that are much greater than the existing capacity to analyze them and extract relevant information in various scientific areas. Therefore, tools capable of automating processes of quantitative analysis of spatio-temporal data are increasingly needed, guaranteeing levels of objectivity, precision and reproducibility compatible with the performance of scientific work. The activities presented below are part of the Automatic detection and representation of change task of the EES Data Lab project and continue the work carried out so far in the detection of spatio-temporal events. To evolve the results obtained in a master's thesis in the representation and automatic detection of events related to a space-time entity, already carried out in this context and scope of the project. It is intended:

1) complement the results achieved in the thesis and broaden the knowledge of the state of the art in the area in algorithms for the detection of change of the point set registration class using machine learning, as a central part in the calculation of differences between pairs of geometric shapes that represent two states of a spatio-temporal entity;

2) select the most promising algorithm based on the choice;

3) experiment, compare and draw conclusions from the results obtained.

Expected results:

a) state of the art report carried out in 1)

b) report of the experience carried out in 2) and 3)

c) complete and publish a scientific article exposing the work performed and the results obtained;

d) activity report

4. REQUIRED PROFILE:

Admission requirements:

Master's or integrated master's student in the areas of computer science or computer engineering
The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

Preference factors:

experience or courses in artificial intelligence and/or machine learning.

Minimum requirements:

- current average course evaluation equal or superior to 14 values;
- not having overdue curricular units
- experience in application development (python, java, javascript);
- experience in algorithms and data structures;
- excellent performance in programming, software development

5. EVALUATION OF APPLICATIONS AND SELECTION PROCESS:

Selection criteria and corresponding valuation: the first phase comprises the Academic Evaluation (AC), based on the criteria referred to in Article 12 of the Regulations for Grants of INESC TEC, while the second phase comprehends the Individual Interview (EI). All factors are evaluated on a scale of 0 to 100, taking into account the applicants' merit, suitability and conformity with the preference factors.

The weight of the AC factors are as follows: Academic Qualifications (FA, 60%), Scientific Publications (PC, 0%), Experience (EX, 30%) and Motivation Letter (CM, 10%).

Candidates who score less than 50 points in the AC average will be considered excluded on absolute merit. The top five candidates approved on absolute merit will be qualified for the individual interview. The Final Grade (CF) is obtained by the weighted average of AC (80%) and EI (20%).

The Selection Jury is composed of the following members:

President of the Jury: Alexandre Carvalho
Full member: Rui Pedro Rodrigues
Full member: António Coelho
Substitute member: Ademar Aguiar

Release of results and prior hearing: the results of the selection process, as well as the terms and procedures for prior hearing, will be released to the applicants by email, under the terms referred to in Article 13 of the Regulations for Studentships and Fellowships of INESC TEC.

6. FORMALISATION OF APPLICATIONS:

Application Documents:

1. Motivation letter;
2. Curriculum Vitae (must include the list of previous fellowships, their type, beginning and end dates, funding entities and host institutions);
3. Certificate or diploma degree dully recognised in Portugal;

- Documents proving the awarding of academic degrees and diplomas, or the according recognition - in cases of academic degrees or diplomas granted by a foreign higher education institution - can be dismissed in the application process, and replaced by the applicant's declaration of honour, with the verification of said condition taking place during the grant's hiring stage. The submission of the certificate is mandatory when signing the contract.
- Academic degrees or diplomas awarded by a foreign higher education institution require an authentication by a Portuguese higher education institution, and the corresponding registration on the DGES platform, in conformity with Decree-Law no. 66/2018, of August 16, and Ordinance no. 33/2019, of January 25. More information available on the website https://www.dges.gov.pt/pt/pagina/reconhecimento?plid=374

4. Proof of enrollment in a degree awarding study cycle or in a non degree awarding Higher Education program.
    - The proof of enrollment may be presented just during the grant hiring stage.
5. Signed declaration stating the infringement of the grant holder's duties (article 14, no. 4)
6. Documental evidence to support the country of residence, residence permit or other legally equivalent document, in cases where the applicant is a foreigner or non-resident in Portugal - valid until the beginning of the grant.
7. Other supporting documents relevant to the final assessment.

Failure to deliver the required documents within the 90-day period after the date of the notice of the conditional awarding of the grant implies its cancellation.

Application period: From 2022-08-01 to 2022-08-31

Submission of applications: the application will be formalised by submitting the form available in the *Work With Us* section of INESC TEC website.

7. BINDING LEGISLATION AND REGULATION

The hiring process shall comply with the current legislation regarding the Research Grant Holder Statute, approved by Law no. 40/2004 of August 18, in its current wording, as well as by the Regulations for Grants of INESC TEC and for FCT Grants Regulation in force.

For more information, please check the Regulations for Grants of INESC TEC and relevant annexes at www.inesctec.pt/bolsas