CALL FOR GRANT APPLICATIONS
(AE2023-0451)

INESC TEC is now accepting grant applications to award 1 Research Initiation Grant (BII) within the scope of the Co-financed by Component 5 - Capitalization and Business Innovation of core funding for Technology and Innovation Centres (CTI), integrated in the Resilience Dimension of the Recovery and Resilience Plan within the scope of the Recovery and Resilience Mechanism (MRR) of the European Union (EU), framed in the Next Generation EU, for the period 2021 - 2026.

1. GRANT DESCRIPTION

Type of grant: Research Initiation Grant (BII)

General scientific area: COMPUTER SCIENCE

Scientific subarea:

Area of Work: Computer Vision

Grant duration: 5 months 29 days, starting on 2024-01-02, with the possibility of being renewed for a maximum term of one year.

Scientific advisor: Manuel Santos Silva

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 541,12, according to the table of monthly maintenance stipend for FCT grants , 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:

Human pose estimation using computer vision for upper limb rehabilitation applications.

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

Human pose estimation is the task that seeks to find the position and orientation of joints in a person's body, for example, in a single frame or a sequence of images. It plays an important role in understanding human movement, having wide-ranging applications in domains such as robotics, human-computer interaction and healthcare. By accurately estimating human pose, it becomes possible to recognize gestures, facilitate immersive games, improve rehabilitation and physical therapy, and enable more natural and intuitive human-machine interactions.

For pose detection, wearable, pressure and vision-based sensors are used. However, wearable sensors can cause discomfort during exercise and can induce unnatural movements that lead to incorrect postures, while pressure sensors only allow the evaluation of a reduced number of exercises. On the other hand, vision-based approaches without markers do not interfere with the patient and allow a wide range of exercises to be captured. Furthermore, using a deep learning approach can capture the most significant features, leading to highly accurate human pose estimates.

Taking this into consideration, the objective of the work to be developed within the scope of this grant is the

exploration of deep learning (DL) approaches for the detection/tracking of the upper limb and its joints based on vision sensors.

The identified frameworks must be analyzed, tested and their performance compared according to a set of key performance indicators (KPI), to be defined.

4. REQUIRED PROFILE:

Admission requirements:

Attendance of a Master's degree in Biomedical Engineering, Master's degree in Bioengineering, or related areas. The scholarship award assumes that the candidate is a student of a study cycle or a non-degree course taught at a Higher Education Institution.
The awarding of the fellowship is dependent on the applicants' enrolment in study cycle or non-award courses of Higher Education Institutions.

Preference factors:

Knowledge of Artificial Intelligence, in particular Generative Adversarial Network (GAN).
Knowledge of open source pose detection frameworks.

Minimum requirements:

The candidate must be enrolled in a Master's degree in Biomedical Engineering, Master's in Bioengineering, or related areas.
Knowledge of programming in Python.

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, 45%), Scientific Publications (PC, 5%), Experience (EX, 45%) and Motivation Letter (CM, 5%).
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: Manuel Santos Silva
Full member: Marcelo Petry
Full member: Luís Freitas Rocha
Substitute member:

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;
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 not having benefited from any other research fellowship (Article 5, no. 5)
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 2023-11-24 to 2023-12-11

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