

CALL FOR GRANT APPLICATIONS (AE2024-0466)

INESC TEC is now accepting grant applications to award 1 Research Initiation Grant (BII) within the scope of the AI-based Robotic Solution Addressing Compensatory Patterns for Upper Limb Rehabilitation(CTI), 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, with reference 21.

1. GRANT DESCRIPTION

Type of grant: Research Initiation Grant (BII)

General scientific area: ENGINEERING

Scientific subarea: Electrical engineering

Area of Work: Industrial Robotics

Grant duration: 6 months, starting on 2024-12-09, with the possibility of being renewed for a maximum term of one year.

Scientific advisor: Hélio Mendonça

Workplace: INESC TEC, Porto, Portugal

Maintenance stipend: € 601,12, [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:

Develop an intelligent programming module to be applied to a Kuka collaborative robotic manipulator. The main objective is to adjust the trajectory and/or adapt the resistance to movement applied to the arm of the subject being assisted by the robot, taking as input, respectively, whether the subject is performing the exercises well or poorly, and the values ■■ of the robot sensors

3. BRIEF PRESENTATION OF THE WORK PROGRAMME AND TRAINING:

The field of robotics has seen significant advances in recent years, such that current robotic manipulators can perform complex tasks in various use cases. The interaction between humans and robots is a central piece of any robotic system. This grant aims to investigate the design and implementation of an intelligent robotic programming module in medical rehabilitation situations. The objective is to use the KUKA LBR iiwa, a commercial robotic arm, to allow control of a patient's arm, helping to carry out the trajectory or implementing resistance to movement

Thus, the work of this fellowship will involve:

- Acquire values ■■ from the robot's sensors or/and add extra sensors to obtain all the necessary information about the status of the robot arm.
- Develop the software for the intelligent robotic programming module: implement algorithms (e.g. based on machine learning) for adaptive rehabilitation exercises

- Test and evaluate the human-robotic interface in a controlled environment, taking into account factors such as task performance and accuracy and operator comfort
- Control the robotic manipulator with the developed API

4. REQUIRED PROFILE:

Admission requirements:

Candidate must be enrolled in a Degree course in Electrical Engineering, IT, or related areas
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 in MCU and FPGA programming is valued.
- Participation in extracurricular activities in the area of digital systems is valued.
- Ease of working with national and international teams.

Minimum requirements:

- Candidate must be enrolled in a Degree course in Electrical Engineering, IT, or related areas
- Candidate must have experience in Java programming.
- Candidate must have knowledge of ROS.

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%).

DISABILITY INCENTIVE

Candidates who present a degree of disability equal to or greater than 90% will benefit from an incentive (20) in the score of the CV Assessment.

Candidates who present a degree of disability equal to or greater than 60% and less than 90% will also benefit from an incentive (10) in the score of the CV Assessment.

Said score may, in these cases, exceed 100 points.

Candidates must demonstrate the degree of disability during the application, namely through the submission of the Multi-Purpose Medical Certificate of Disability, issued in accordance with Decree-Law no. 202/96, of October 23 - currently in effect.

Candidates must declare, in the application form, the type of disability used throughout the selection process, in order to proceed with the required adaptations.

The Selection Jury is composed of the following members:

- President of the Jury: Hélio Mendonça
- Full member: Manuel Santos Silva
- 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 2024-11-07 to 2024-11-20

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

