Description of Funded Research Projects
1st Call for H.F.R.I. Research Projects to support Post-Doctoral Researchers

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Research Project Title:

Design and Development of a Reconfigurable Metamorphic Manipulator System

Principal Investigator:
Vasileios Moulianitis

Popular Title:

Design and Development of a Reconfigurable Metamorphic Manipulator System

Scientific Field:
Engineering and Technological Sciences

Host Institution:
University of the Aegean

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The OVIDIUS proposal aims at the development of an integrated reconfigurable metamorphic open kinematic chain manipulator system, for application in the field of therapeutic and post-op massaging. However, the main aim of the proposal is to provide the means that will enable robotics to achieve a higher configurability level, which is one of the main key technological aspects that will enable the evolution of robotics in the future.

OVIDIUS project specific goals are: i) hardware design and development for the structuring of reconfigurable metamorphic open kinematic chain manipulators; ii) software tool development for the kinematic and dynamic modeling of metamorphic manipulators; iii) control scheme development for the proposed reconfigurable metamorphic robot system; iv) the development of optimization methods, for proposed system functionality as well as reconfiguration and metamorphosis; and v) the development of a laboratory TRL level 5 demonstrator.

The scientific impact of proposal outcomes is expected to be quite significant, as it will provide tools, methods and module design methodologies, along with openly available software libraries dispersed through various depositories and the ROS platform; these can be utilized for the design and development of reconfigurable metamorphic manipulators, for future implementation in other application domains. As such, the economic impact is also expected to be significant, while the envisaged implementation of robots in domains such as servicing, tending etc., will increase the acceptance rate of robot implementation in society.

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Project Impact on Society

Work-related musculoskeletal disorders are characterized by the World Health Organization as a major international health problem. Also, the ever-aging population has led to an increase in the occurrence of age-related musculoskeletal conditions. In combination with the usual number of cases due to typical causes (injuries, surgical rehabilitation), it is evident that the number of patients in need of treatment or rehabilitation is increasing rapidly.

The project aims to create a robotic system for treating and rehabilitating above conditions, allowing for more patients to have direct access to health benefits, while being economically tolerable and maintaining a high level of effectiveness. In addition, project results will be available for use in further applications, such as assistance for the disabled and the elderly, introducing robotics in the daily life of citizens as an important tool for improving its quality.

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To me, H.F.R.I. funding would mean...

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It is a key instrument for the continuation of the research being carried out in the Greek public university. Through the funding, an expert scientist and a doctoral candidate will be able to produce new research data in robotics.

The Principal Investigator,
Vasileios Moulianitis

Funding

Amount: **117,135 €**

Duration: **36 months**

Foundation: **H.F.R.I.**

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