

DESIGN OF A MODULAR MECHATRONIC DEMONSTRATOR WITH VIDEO FEEDBACK FOR CONTROL ALGORITHMS OPTIMIZATION

Goal of the project

The starting point of this research project is the insight that a human does not have a kinematic model of his arms, but still executes manipulation tasks efficiently in unstructured spaces, compared to the classic approach on robotic manipulation where a model of the arm must exist. The goal of our project is to explore the human-like manipulation, where the control system does not have a model of the arm, but relies on vision and machine learning.

Short description of the project

The project aims at using video feedback and machine learning for robotic manipulation

Implementation period

01.02.2020 - 31.07.2020

Budget

47.600 RON (10000 EUR)

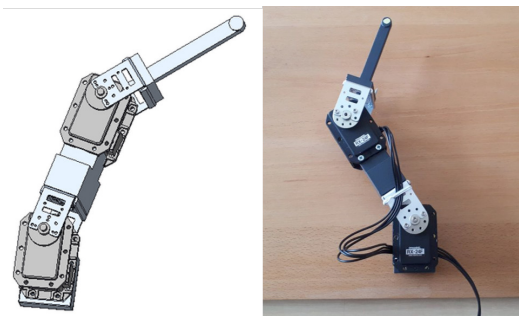
Main activities

The main activities in the project are:

- Development of the Mechatronic structures to be controlled
- Development of the control algorithms
- Testing
- Publishing of results in Proceedings and Journals
- Participation at Conferences
- Participation at Workshops
- Construct the project website:
- <https://arut-mecatronic.weebly.com>
- Project Management

Results

- To achieve our goal, we designed a modular structure to accommodate various types of manipulators (serial, parallel), and with the help of an overlooking video camera, to control the system.



In the above figure is presented an example of a mechatronic structure to be controlled.

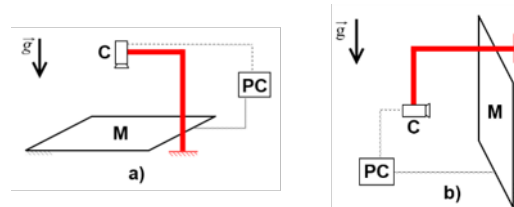


Figure a) and b) show the general system setup which incorporates the Mechatronic system, video camera and controller PC.

Along the constructed system, experimental results were published in ISI Web of Science.

The main result of the project is the construction of a test-bed for various mechatronic structures and control algorithms that is available in the Mechatronics Department to any researcher interested in this type of research.

The research areas of the project are: robotics, mechatronic design, algorithm design and development, machine vision, machine learning and artificial intelligence.

Applicability and transferability of the results:

The research is still in its infancy, there are only a few papers globally that tackle this approach. The proposed strategies apply especially in unstructured environments where manipulation is required.

Research team

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