

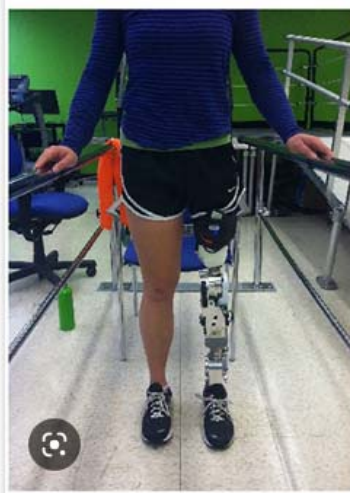
Bachelor's Thesis, Term Project

Surface Pressure Reconstruction for a Prosthetic Socket based on the Linear Variable Differential Transducers (LVDT) Using Clinical Data

Main Advisor(s): (Assoc. Prof. Dr. Eng. Amir Roushdy)

Co-Advisor(s): (Eng. Malek Mahmoud, Eng. Hussein Hatem)

In this work, we present a novel approach for reconstructing surface pressure distribution for a prosthetic socket using linear variable differential transducers (LVDT) and clinical data. The proposed system utilizes LVDT sensors embedded within the socket to measure the surface pressure distribution and clinical data to optimize the design of the socket. The reconstructed surface pressure information is used to provide a more comfortable and secure fit for the patient, as well as to improve the ease of use and durability of the prosthesis. **There is a Master's student from Mechatronics Engineering Department, Senior Researchers from ARATRONICS also available to help and advice and The Lab Engineer from ARATRONICS, guiding and directing the student with Assoc. Prof. Dr. Eng. Amir Roushdy.**



For more details please contact:

Assoc. Prof. Dr. Eng. Amir Roushdy, Room: C7.108, E-mail: amir.ali@guc.edu.eg, Web site: www.aratronics.com

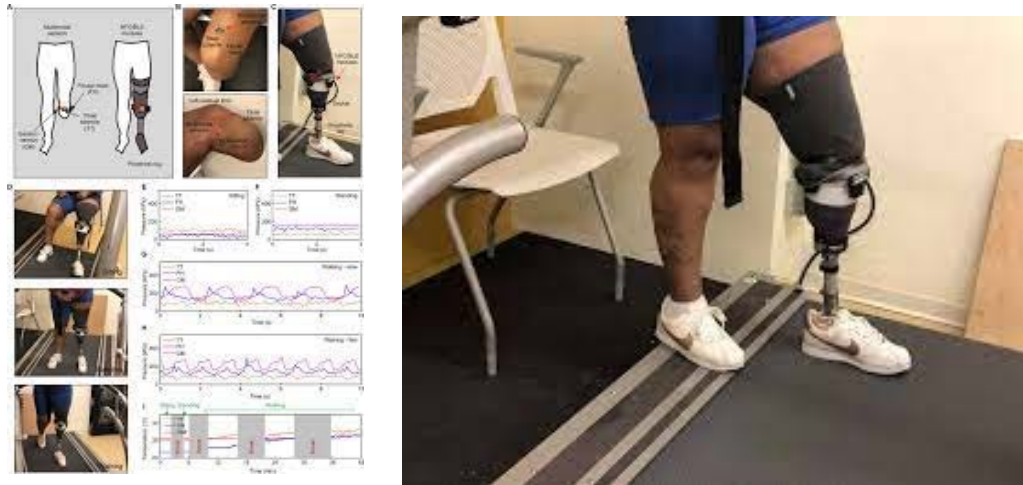


Fig.: BCI at the ARATronics Research Center

Project description and objective:

The proposed system is also designed to detect any abnormal pressure distribution and alert the user. The system is evaluated through simulations and experiments on test patients, showing significant improvement in the comfort and fit of the socket, as well as the ability to detect and alert abnormal pressure distribution. This work highlights the potential of advanced sensing technologies and clinical data for improving the performance and usability of prosthetic sockets. We will do that with our Doctors of Physical Therapy Program at Cairo University (ElQasr Elany)

Research focus of this project:

- Literature review on the project should be studied properly.
- Not only, creating a software control system for the project but also the hardware.
- Experiments using the gadget and control system should be built properly.
- The outcomes must be documented.

Requirements:

- Passionate to learn more about Robotics, automation, and control.
- Prior mechatronic design expertise is desired like "SolidWork".
- Enthusiasm for completing actual practical work with 3D printing staff (design fabrication and construction).
- A method of working that is both structured and self-contained.

General tasks of the project:

- The complete design for the Robot is already exist in the ARATronics Lab and the ARATronics Lab Engineer will hand it to you from the first day.
- ARATronics will support you with the CAD robot design on Solidwork. You, will adjust some parts on the design to fit with the motors and actuators in the local market.
- Fabricate the Robot using 3D printer.

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- Assembly all parts of the Robot.
- Motion control study for the Robot.

Other notes:

- A weekly meeting with the advisors will be required for this project, as well as weekly progress updates (*The meeting could be more than once during the week based on your progress and based on your achievements*).
- You should to be in the Lab two days per week (*It could be more than two days based on your progress and based on your achievements*).
- All reports must be prepared in the style of a research paper.
- The outcome of this research will be published in one of the coming international Conferences and , or Journal