

## Bachelor's Thesis, Term Project

# Brain Computer Interface (BCI) used to Control the Action and Movement of the Humanoid Robots

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

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

In this project we would like to create devices which would allow people to feel embodied, in the body of a humanoid robot. To do so we are trying to develop techniques from Brain Computer Interfaces (BCI) so that we can read the peoples thoughts and then try to see how far we can go from interpreting brain waves signals, to transform them into actions to be done by the robot. By the way all the devices and the helmets that would be able to measure the Brain activity would be available for you. **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.**



**Fig.:** BCI at the ARATronics Research Center

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For more details please contact:

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### **Project description and objective:**

Basically what you see is how with one pattern, called the SSVEP, which is the ability to associate flickering things with actions, it's what we call the affordance, means that we associate actions with objects and then we bring this object to the attention of the user and then by focussing their intention the user is capable of inducing which actions they would like with the robot, and then this is translated.

### **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.
- 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

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