

Abstracts of Thesis

Ian dos Reis e Aragão

A new Human-Machine Interaction

*Aragão, Ian dos Reis e. **Uma Nova Interação Homem-Máquina**. Electronic Resource. (103 p.) Final report of the Scientific Initiation Project of the Escola Superior de Propaganda e Marketing. Sao Paulo-SP. 2017.*

*Aragão, Ian dos Reis e. **Brain-Computer Interface: a new application for Human-Machine Interaction**. Electronic Resource (16 p.) Article VII Scientific Initiation Seminar ESPM. São Paulo-SP. 2018.*

Abstract

The human-machine interface (HCI) is a constant object of intense research and innovation since there is the assumption that the more intuitive and friendly it is, the more productive the development of this interface will be. In this context, there are also interaction models that work with the capture of signals from the nervous system to create more intuitive and spontaneous interactions known as Brain-Computer Interface (BCI).

Through the study of the state-of-the-art of these interfaces, this work aimed to investigate the application and understanding of the treatment of biological signals for the creation of more natural and intuitive interactions: a) passing through the capture and processing of muscle signals (EMG - Electromyography) in an evasive way collected by the Myo armband; b) designing more fluent interaction architectures; c) developing a user interface based on the signal processing done by Myo; d) creating a proof of concept to exemplify the potential of the interaction created.

At the end of the study, a greater insight was obtained regarding the study area of these user interfaces and their various applications. Allowing the prototyping of an Android application working with HCI and BCI interactions in a residential automation project. Finally, the continuation of this research project was envisioned, broadening the possibilities of studying signal processing and expanding this development to other devices: e.g.: the development of a mechanical arm.

Keywords: Human-Computer Interaction, Brain-Computer Interface (BCI), Electromyography (EMG), Human-Computer Interface (HCI), Myo Armband.

The Development of an Anthropomorphic Mechanical Arm

Aragão, Ian Dos Reis e. **O Desenvolvimento de um Braço Mecânico Antropomórfico**. Electronic resource (67 p.) Final report of the Scientific Initiation Project of the Escola Superior de Propaganda e Marketing. Sao Paulo-SP. 2019.

Aragão, Ian dos Reis e. **The Development of an Anthropomorphic Mechanical Arm**. Electronic Resource (16 p.) Article VIII Scientific Initiation Seminar ESPM. São Paulo-SP. 2019.

Abstract

The processing power of modern computers and the understanding of how the human brain works are two areas that are growing together, thus creating the impression that science fiction can be turned into reality. Nowadays, there is a wide variety of studies in developing new technologies that work on the potential of using computers or machines through human "thought," on the ability to operate an action without it being physically performed. This ability provides a matter of accessibility and convenience for people who have lost motor movement.

In order to help people with motor disabilities, this research project explores some of the development possibilities that come from brain-computer interface technologies. Through the confection of a prosthetic model, a mechanical arm capable of performing actions through the processing of signals from nervous system stimuli and, at the same time, with a production cost infinitely lower than the other prosthesis on the market. Developing a research project with the possibility of reaching more skillful interaction models capable of helping people with several types of motor disability obtain a significant improvement in their quality of life through the conception of a proof of concept that contributes to the state-of-the-art the research developed.

Keywords: Brain-Computer Interface (BCI), Electromyography (EMG), 3D Printing, Myo Armband, Mechanical Arm.

Virtual Reality Project

*Aragão, Ian Dos Reis e. et. al, **Projeto de Realidade Virtual** Electronic resource (84 p.) Course Conclusion Paper (Graduation Thesis) - Escola Superior de Propaganda e Marketing, Information Systems Course, São Paulo, 2019.*

Executive Summary

This project targets the development of a tool capable of assisting the processing of selling real estate and construction projects. During the construction process of real state projects, we identified high costs in the production, maintenance, and security environments built exclusively to assist the sales process that will be discarded later. The goal is to impact the construction market behavior and mindset, providing a new immersive consuming experience that boosts interaction and streamlines the process of selling architectural and engineering projects—improving the economy and sustainability of sales, avoiding high costs in the production and maintenance of physical construction stands, eliminating physical constraints, and simplifying buying and selling construction process by being motivated and tired of seeing costly and inefficient solutions in the market with poor consumer experiences.

We believe there is a need to understand and invest in virtual reality solutions by solving the problem of two buying agents. First is the one who sells construction projects. Those agents usually build prototypes for the end customer to view and experience something similar to the final stage of the construction process of an apartment, for example. They are usually complaining that the construction process of making these prototypes is too expensive and a waste of construction resources. Secondly, the customer who experiences visual limitations of the product developed not seeing how the final product can be due to a limited design less customized.

Presenting virtualization-based services that create a level of immersion that can overcome physical projects' limitations and avoid considerable costs associated with the construction and maintenance of physical projects reduces natural resource waste. Utilizing artificial intelligence techniques to collect consumer profiles and users' feedback and correlate them with market data, focusing on customer experience improves sales performance.

Demonstrating how the process created during the elaboration of the Business Plan worked for the development of this project: from the conception of a solution plan for solving the construction project problems; to the presentation of market analysis in a macro-environmental area; for the beginning of a business model; to the operational process developing services and delivery strategies; to the concept of a marketing plan; and concluding with the maneuverability of the proposed project.

Keywords: Virtual Reality; Business Plan; Construction Business; Real Estate; Architectural, and Engineering projects; Information Systems.