Thesis Project Form

Title (tentative):   Paralympic sports characterization: an approach based on computer vision and deep learning

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Description

Motivation and application domain

Paralympic sports represent the resilience, determination, and skill of athletes with disabilities and studying their techniques not only enhances their performance but also contributes to advancing adaptive sports worldwide. In this thesis project we will focus on archery. By studying the movements and techniques of Paralympic archers, this thesis aims to uncover patterns, refine training methodologies and potentially develop strategies to optimize performances. Understanding individualized motion characteristics could lead to improved training programs and enhanced athletic achievements.

General objectives and main activities

The long-term goal of this project is the identification of quantitative kinematic parameters that should allow the description of Paralympic athletes (particularly, archers). In order to accomplish this goal, the proposed thesis has different aims:
- the research of kinematic parameters that could describe the quantity of motion in a video;
- the analysis of kinematic and EMG activities during archers exercise;
- the definition of differences between motion patterns of unimpaired and impaired people

Training Objectives (technical/analytical tools, experimental methodologies)

The student will learn:
1. Computer vision techniques in order to analyze images and videos;
2. How to use algorithms based on deep learning to estimate the pose of the people in the images;
3. To correlate data;
4. Machine Learning techniques that will allow the clustering and the classification of the data;
5. Improve the knowledge of Matlab.

Place(s) where the thesis work will be carried out: Neurolab, MaLGa Center in collaboration with different clincal

facilities

Additional information

Maximum number of students: 1