

Human Action Recognition: An approach to assess the loco-motor skills in children

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Human action recognition is a prominent interdisciplinary field of research in the area of Computer Science, Machine Learning, and Artificial Intelligence due to its the potential revolutionary applications and the prolonged list of challenges. The focus of this dissertation is to apply Human action recognition to assess the loco-motor skills of children. This is a challenging problem, especially because of the unpredictable nature of the children, which exacerbated the inherent nature of humans to execute the same action in a plethora of different ways. In addition, there are also the classical challenges to the problem, including the variations in the camera view point, background cluttering and the quality issues. The dissertation starts with a brief review of the state-of-the-art literature on Human Action Recognition. Based on the literature reviewed, an overview of the tasks are presented, followed by a brief discussion of the technologies used to achieve the feature extractions and models used to perform the action recognition. Further, the paper focuses on the methodology employed to achieve the specific task of action recognition from the videos of children. The set of actions focused on the dissertation are specifically designed to assess the loco-motor skill of the children, and the final outcome of the work will deduce the number of times a specific action was perform. The feature extraction was performed using the MediaPipe library and custom heuristics were defined to label the extracted features. The action recognition was performed using Deep Neural Network, Random Forest Classifier and LSTM models. The models showcased around 80% accuracy based on the heuristics defined.