

# Human Action Recognition - Intelligent Models for Classifying Actions By Children

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University of Dublin, Trinity College, 2022

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The main purpose of this paper is to develop individual models that can predict actions such as Stand on one leg, Stand on Tiptoe, imitating pre-defined custom poses and Run-Pick. Which are performed by children of different age groups, along with this the time taken for performing the action is also predicted. The input data consist of unlabelled videos in which children are performing the mentioned action. Based on analysing various similar models, a system design is formulated which mainly consist of feature selection and model selection. Various methods such as Convolutional neural nets, Media Pipe library for feature selection are evaluated and based on their compatibility with the existing set of inputs MediaPipe is selected. The paper also discusses methods through which annotation of raw video inputs can be converted into information that is suitable for model training. Custom heuristics and video normalization techniques have been discussed that can be applied for each action and corresponding label set is generated. Based on this information various ML models such as Deep Neural Network, Random Forest are trained, and their performance is evaluated. For time dependent action, as Deep Neural Networks fails a Recurrent Neural Network using LSTM cells are implemented. Generated models are further analysed and optimizations that can be incorporated with in the future iteration are mentioned.

**Keywords:** Gesture Detection, Deep Neural Networks, Random Forest, Recurrent Neural Network, Data Annotation, Normalization techniques, LSTM, Convolutional Neural Networks, MediaPipe.