# Development of Posture-Aware Language Models for Automatic Exercise Recognition

Master-Thesis

TECHNISCHE UNIVERSITÄT DARMSTADT

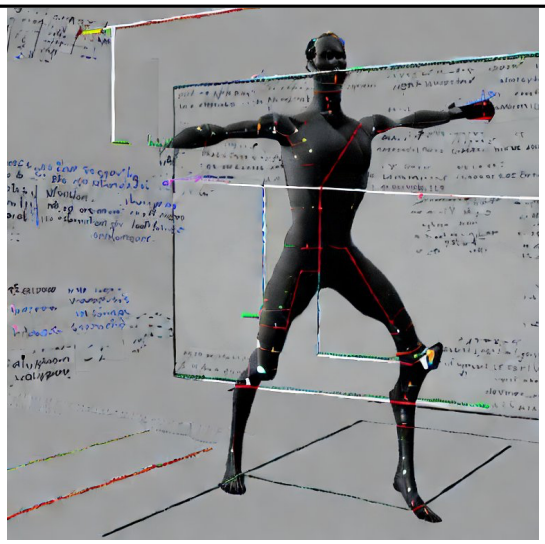

Image source: https://stablediffusionweb.com/#demo

## Motivation

Applications that intend to automatically recognize exercises usually require training individual classifiers for each exercise. Instead of training models for individual exercises, we can use a textual description of a posture (e.g., “starting from an upright position, extend both arms forward, then more your left leg backwards”) and motion capture data (e.g., accelerometer and positional data). After training the relationship between text descriptions of postures and motion capture data, we can ultimately learn to determine whether a whole exercise execution has been done right or wrong.

## Tasks

In this thesis, you should explore approaches for full-body pose recognition based on motion capture data and text descriptions. Towards this end, a full-body motion capture suit, equipped with 10 inertial measurement units should be used. Thereby, you should collect sensor data for different physical activities and train machine learning models to learn the relationship between the text description of a pose and its accelerometer or position data.

The thesis can be written in English or german.

## Requirements

- Experience with machine-learning
- Good python skills

## Keywords

Full-body recognition, Natual Language Processing, Motion Capture, Inertial Measurement Units

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Theoretical (Analytical)

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Empirical (Simulation)

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Practical (Implementation)

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Literature

**Dr.-Ing. (habil) Stefan Göbel**
Serious Games
www.etit.tu-darmstadt.de/serious-games