System Documentation: Digital Range of Motion (ROM) Tool

By

Kinelytix

team

Authors

Georgia Batsioudi, David Delean, Iarina Frîncu, Giuliano, Giuliano Murillo Rojas, Piotr Sutkowski, Maksymilian Tomaszewski, Cody van Haalen, (Scrum Master/Proxy)

What This Tool Does

This tool helps measure how well people can move their bodies (their Range of Motion, or ROM) using video. Basically, you upload a video into the system, and you can select parts of the body to measure angles and movements—faster and more accurately.

How the System Works Frontend:

- Built with **JavaScript, CSS**, and packaged with **Electron** to make a desktop app.
- Lets the user:
    - Enter info like participant ID, task, configuration, trial, and date. ○

        Start analysis of videos to measure angles and movement.
    - Export data (like Excel files) with angle measurements and logged in information.
    - Store videos into a backend database.

Backend:

- Built with **Python and Django**.
- Stores all files and data on the computer, locally (no internet needed).
- Uses video analysis to find joint angles using markers (automatic or manual).
- Saves results in folders with clear structure.

We chose **Electron** so the tool works like a desktop app that can still use web technologies. It can work offline, which is important for researchers, since most of the time they do the tests outside.
We used **Django and Python** because they are great for handling data and work well with libraries like OpenCV, which we used to analyze the videos.The tool keeps everything stored locally in organized folders, so it's easy to find later. Researchers don't need to be tech experts to use it.

Backend Requirements (Python Libraries Used):

Here are the main packages used in the backend and what they're for:

numpy==1.26.4

asgiref==3.8.1 Django==5.2.1

django-cors-headers==4.7.0

djangorestframework==3.16.0

packaging==25.0

sqlparse==0.5.3

typing_extensions==4.13.2

tzdata==2025.2

waitress==3.0.2

opencv-python-headless==4.7.0.72

All of these are listed in a **requirements.txt** file so future developers can install them easily.

For the front-end the dependencies can be found on the package.json file.