

## Introduction

### Background

- **Biomechanics** is a common sub-discipline within movement science, biomedical engineering and human factors.
- Learning biomechanics is meaningful to avoid occupational injury and/or enhance sports performance.
- Undergraduates often fear and delay taking their required biomechanics course, as they perceive it highly demanding in mathematics and physics.
- The inclusion of laboratory experience improves learning outcomes in biomechanics. However, implementing laboratories in biomechanics curriculum can be challenging due to cost and time constraints.

### Research Topic

- As computer-vision algorithms can detect anatomical landmarks positions from images collected by a webcam, we developed a prototype computer-vision-based Android application that could be applied to undergraduate biomechanics courses to help students gain laboratory experience.

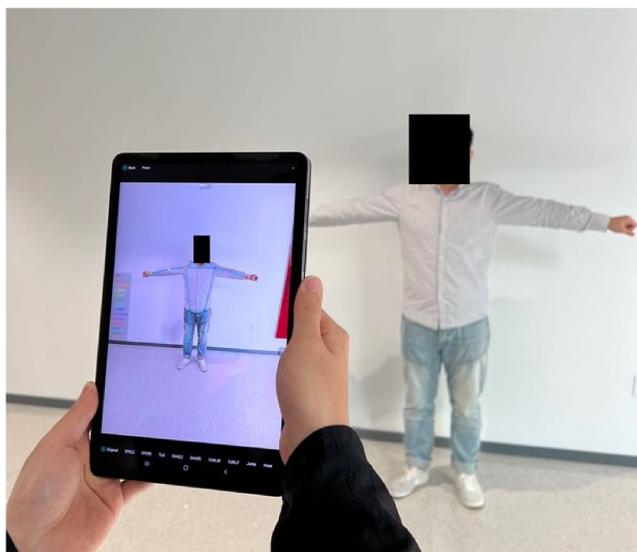


Figure 1. A scenario that a user launches the proposed app to detect joint kinematics data.

## Method

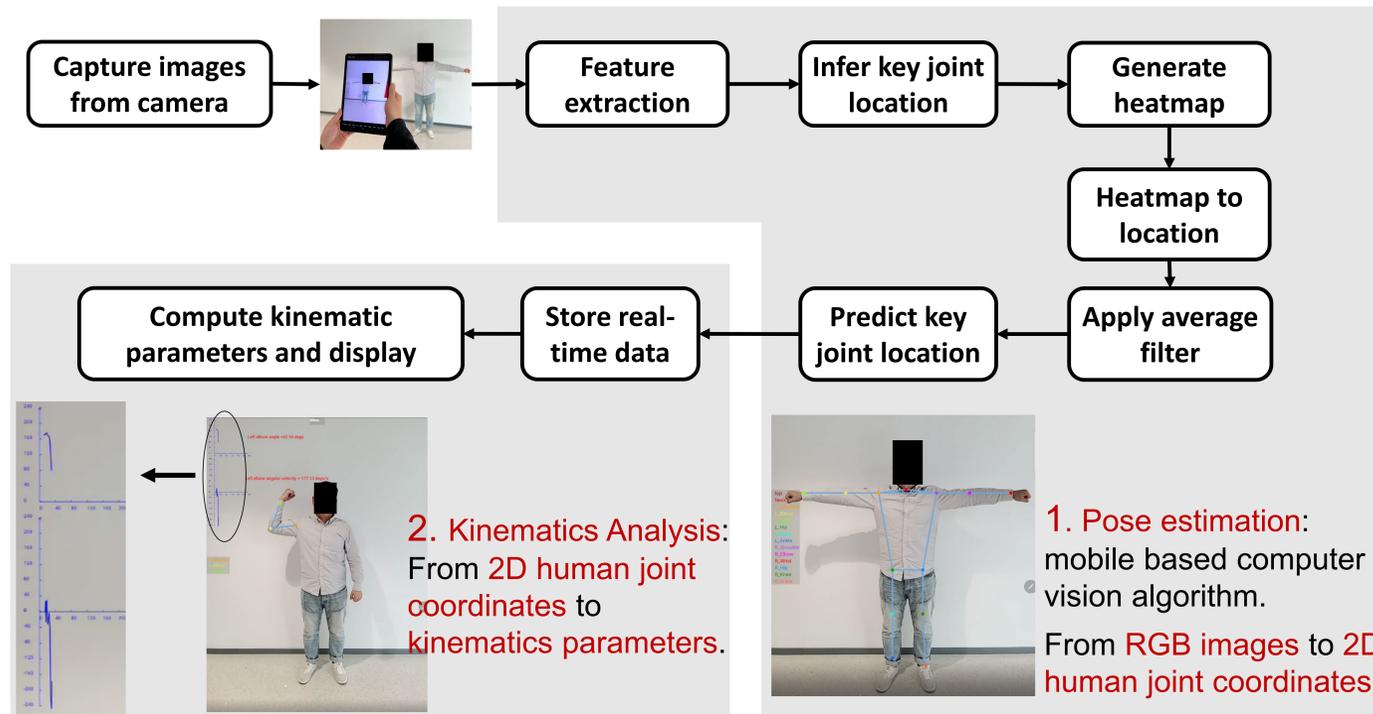


Figure 2. System overview.

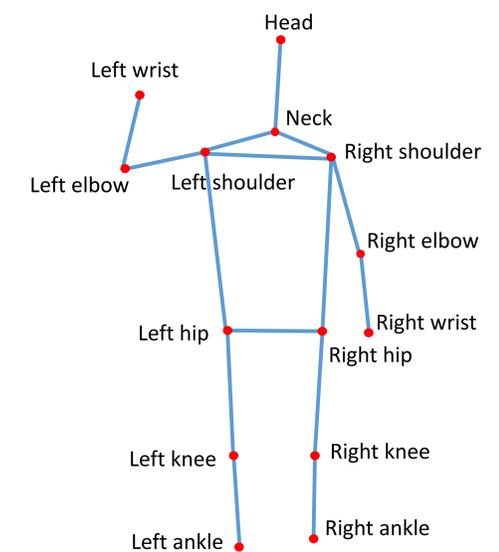


Figure 3. Indexing for the 14 key points (camera view).

## Output biomechanical measures

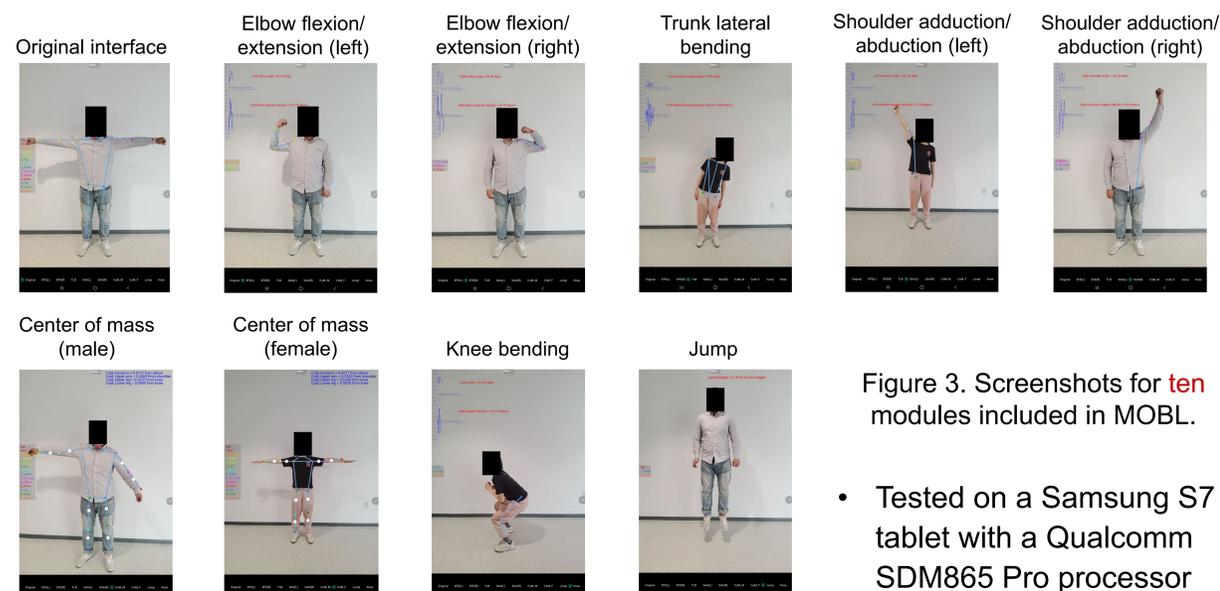


Figure 3. Screenshots for ten modules included in MOBL.

- Tested on a Samsung S7 tablet with a Qualcomm SDM865 Pro processor

## Future work

- The kinematics analysis can be further improved with upcoming advanced computer vision algorithms.
- Additional biomechanical analyses covered in undergraduate courses, such as gait and running analysis, can be added into this application.
- The application's performance in supporting biomechanics knowledge learning and transfer as well as students' self-efficacy need to be quantitatively investigated.