

# Master's Thesis Assignment



154460

Institut: Department of Computer Graphics and Multimedia (DCGM)  
Student: **Vlasák Jiří, Bc.**  
Programme: Information Technology and Artificial Intelligence  
Specialization: Computer Vision  
Title: **Web application for setting up an ergonomic position on a bicycle**  
Category: Computer vision  
Academic year: 2023/24

## Assignment:

1. Familiarize yourself with the issue of computer support for sitting ergonomics on a bicycle.
2. Research existing methods and applications for setting up the correct posture.
3. Design and implement a video and/or camera based web application for custom bicycle seating.  
Compare the approach based on the automatic detection of the rider's pose with the traditional marker-based motion capture method.
4. Experiment with the application, assess its properties in a user study, and/or further synthetic experiments. Discuss avenues for future development.
5. Present the achieved results in the form of a video, poster, article, etc.

## Literature:

- Burt, P.: Bike Fit: Optimise Your Bike Position for High Performance and Injury Avoidance. A&C Black, 2014.
- Alberto Menache: Motion Capture Primer, In The Morgan Kaufmann Series in Computer Graphics, Understanding Motion Capture for Computer Animation (Second Edition), Morgan Kaufmann, 2011.
- Wade L, Needham L, McGuigan P, Bilzon J. Applications and limitations of current markerless motion capture methods for clinical gait biomechanics. PeerJ. 2022 Feb 25;10:e12995. doi: 10.7717/peerj.12995. PMID: 35237469; PMCID: PMC8884063.

Requirements for the semestral defence:

Points 1-3 of the assignment.

Detailed formal requirements can be found at <https://www.fit.vut.cz/study/theses/>

Supervisor: **Čadík Martin, doc. Ing., Ph.D.**

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Beginning of work: 1.11.2023

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