

## Topic: Implementation of HMM-based gait analysis pipeline in Python

Gait analysis is used in different domains, one of them being neurological diseases. The department of molecular neurology has a large data base of gait data from patients of different diseases. For patients suffering from hereditary spastic paraplegia, an algorithm developed by Martindale et al. is used to extract gait parameters, such like stride time from the available data [1]. Unfortunately, the current implementation does not allow deployment to clinical daily practice and hinders further development of the algorithm.

Therefore the MATLAB project needs to be transferred to Python while ensuring that the same results are produced. In a first step, the MATLAB project is currently being restructured to help you to get a good understanding of it. Furthermore, parts of the algorithm have already been transferred to Python, which can be used as a starting point.

Additionally to transferring the functionalities to Python, a comprehensive code documentation will have to be made in close cooperation with researches in the MaD Lab. According to the student's needs and skills, the basic code structure, functionalities and documentation will be reviewed probably (bi-)weekly.

Eligible students have experience in Python programming but not necessarily in MATLAB. Prior knowledge in code documentation is not necessary but might be helpful. In case of questions, please use the contact form on our website.

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## References

- [1] Martindale, C.F. et al.: *Technical Validation of an Automated Mobile Gait Analysis System for Hereditary Spastic Paraplegia Patients*. IEEE Journal of Biomedical and Health Informatics, 2019.