**Meeting on October 6, 2023**

**Capstone Project – LLM for Rehabilitation Evaluation**

**Proposed tasks**

1. Extract skeletal information for the squat exercise or for all exercises from videos. Each student can implement a different library for pose estimation, which can be used for comparing the results and evaluating the different pose estimation methods (1-2 weeks)
   1. PoseFormerV2
   2. BlazePose
   3. Video Pose 3d

Or, feel free to use OpenPose, or other libraries for pose estimation

Actions: share the videos form our UI-PRMD dataset

1. Apply data preprocessing. Some of the pose estimation methods output fewer number of joints and some joints need to be simulated (please see the UbiPhysio paper, section 5.3.2). Also, the extracted poses need to be aligned to have the same view. E.g., in the UbiPhysio paper in section 5.3.2, the data preprocessing included Z-normalization (with their respective distributions), skeleton normalization, and alignment towards the Z+ direction. The same approach is also mentioned in section 4.2 in the paper by Zhang, and probably all methods use the same standard data preprocessing. You will need to search for the code for performing the data preprocessing (1-3 weeks)
2. Apply the pretrained VQ-VAE model to convert the motions into tokens. Use the VQ-VAE by OpenMotionLab/MotionGPT to convert the motions to tokens. (1-2 weeks)
3. Process the movements using OpenMotionLab/MotionGPT based on the paper by Jiang. Evaluate the performance of the model on motion-to-text and motion prediction tasks. Motion-to-text: for a given motion, generate text that describes the motion. Motion prediction: for a given motion, predict the quality score. (approximately 2-4 weeks)
4. Record videos with smart phones and repeat the above procedure (2-4 weeks)

Links:

* <https://github.com/OpenMotionLab/MotionGPT/tree/main>

Note:

It is preferred to check the codes in the paper by Zhang, if the time permits:

<https://github.com/qiqiApink/MotionGPT>

Actions:

* Arrange to get access to the GPU server