no client meeting on week 2 agreed by both client and group members

Time: Mar. 10, 2025, the 1st meeting

Venue: https://uni-sydney.zoom.us/j/85321752379?from=addon and Susan Wakil Health Building, The University of Sydney level 7, room 720

Meeting Minute Taker: Feixiang Wang

Attendances: Feixiang Wang, Mohan Xi, Yang Guo, Weijia Chi, Ruiji Hao, Tonghuan Liu, Milena Simic, Haonan Shen

Apologies: No

Main Contents

- Feixiang Wang introduced his background and plan to organize the weekly meeting with client in future.
- Mohan Xi introduced her background.
- Yang Guo introduced his background.
- Weijia Chi introduced her background.
- Ruiji Hao introduced his background.
- Tonghuan Liu introduced her background.
- Milena Simic (Client, Associate Professor in University of Sydney): She introduced the background of project and some relevant knowledge of biomechanics. She also provided some materials which can help us to know more about biomechanics.
- Haonan Shen (PhD candidate) introduced data examples and held the meeting.

Key Takeaways

- Ensure meeting frequency (twice a week)
- The background of project and data example.
- Next week's meeting topic
- The plan and methods about learning Biomechanics

What's Next

- The client will give us whole data in next week meeting, and we will learn and analyze it
- Feixiang Wang: Read and introduce papers to other group members
- Yang Guo: Build the Demo Model
- Ruhao Ji: How to process video data in computer vision area
- Tonghuan Liu: How to process video data in computer vision area
- Weijia Chi: Introduce data features to other group members
- Mohan Xi: Introduce Biomechanics Knowledge to other group members

We acknowledge Mr. Hunter Xu in assistance of preparing this template.

1st CAPSTONE PROJECT STATUS CHECKING FORM

Project Title:	Use of machine learning to predict the foot progression angle during gait in people with knee osteoarthritis
Project Client:	Discipline of Physiotherapy/ Sydney School of Health Sciences
Group Number:	CS3-1
Date of client meeting:	17/03/2025

Project Information	**Summary of report & feedback**
Overall Information	
Project Description and Scope based on Group's understanding	This project focuses on using machine learning and deep learning to predict key gait parameters—Hip-Knee-Ankle (HKA) angle deviation, Foot Progression Angle (FPA), and Knee Adduction Moment (KAM)—in individuals with knee osteoarthritis (OA). The scope includes: 1. Utilizing 3D marker trajectory data and 2D video data for model training and validation. 2. Comparing the accuracy of predictions using 3D and 2D data. 3. Developing AI models (e.g., LSTM and Transformers) to process biomechanical data and evaluate performance metrics. 4. Simplifying complex 3D motion analysis by exploring 2D video-based predictions for clinical accessibility.
Client's feedback	2D video data will be simulated by removing the x axis of the 3D motion data
Project Expected Outcomes based on Group's understanding	• Machine learning algorithms for predicting HKA, FPA, and KAM: 1. Predict Hip-Knee-Ankle (HKA) angle deviation and Foot Progression Angle (FPA) using 3D marker trajectory data. 2. Evaluate the accuracy of deep learning models in predicting Knee Adduction Moment (KAM) for knee osteoarthritis (OA) patients using 3D marker data. 3. Assess deep learning model performance for HKA, FPA, and KAM predictions in knee OA patients using 2D marker data. • A fully executable algorithm compatible with PC/Mac. • Accuracy metrics (e.g., ROC curve) to evaluate model performance. • Reports on methodology and prediction results ready for publication. • Validation of 2D video data as a feasible alternative to 3D motion analysis. • Insights into the clinical utility of AI-based predictions for knee OA rehabilitation.
Client's feedback	Excellent and comprehensive understanding

Status Highlight	Summary of report & feedback
Overall Project Status	
Progress and Achievements	• Progress 1: Gained firsthand experience with motion capture data collection. • Progress 2: Obtained a partial dataset and analyzed its structure. • Progress 3: Clarified project goals and methodology, including potential deep learning models. • Progress 4: Studied biomechanics concepts and project-relevant research papers.
	Client's feedback: Great work!
Key Issues	
Obstacles & Risks	• Issue 1: Designing a suitable deep learning model ensures high AUC . • Issue 2: Selecting key markers for modeling. • Issue 3: Managing large datasets efficiently. • Issue 4: GPU source if needed.
	Client's feedback:
Next steps	
Plan & Milestones	• Task/Goal 1: Experiment with predicting HKA and FPA angles from trajectory • Task/Goal 2: Begin implementing a baseline deep learning model for KAM prediction • Task/Goal 3: Request additional data from the client if needed
	Client's feedback: Looks great

All group member signatures (either handwritten or digital signatures):

Tonghuan Lin . Peixiang Wang Yang Guo Weijia Chi Mohan Xi Ruhao Ji

Client signatures (either handwritten or digital signatures):

HS