Thesis Report 13 : 25 May - 1 June

Goals
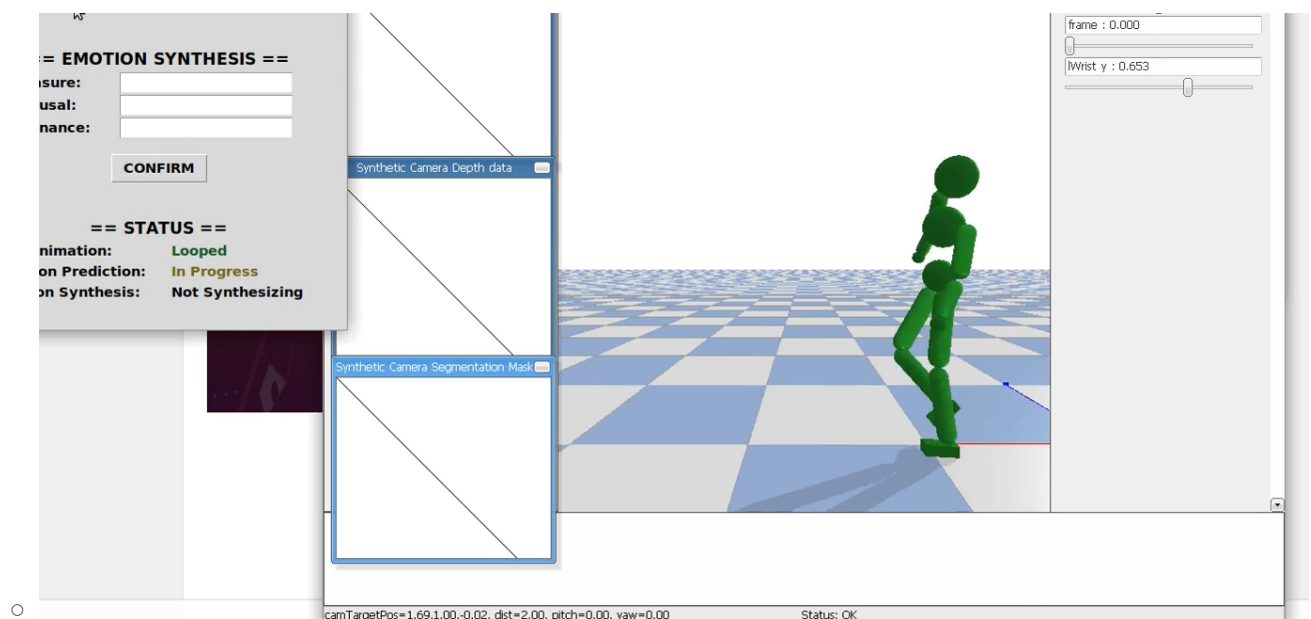
- Integrate Inverse Kinematics with the rest of the project ✅
- Integrate Motion Synthesis with the rest of the project ✅
- Try to convert the Bandai Dataset ✅
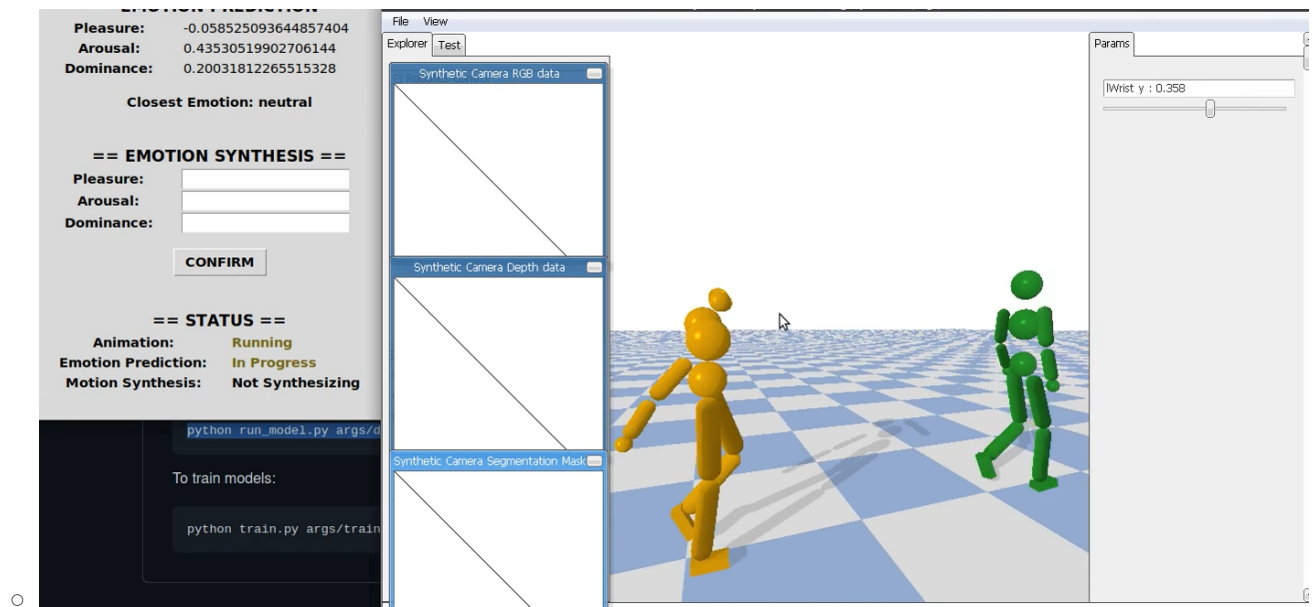- Try to find some conferences/journals ✅

Last Week Leftovers:

- Finalize project loop ✅
- Find a good conference to attempt to publish on ✅
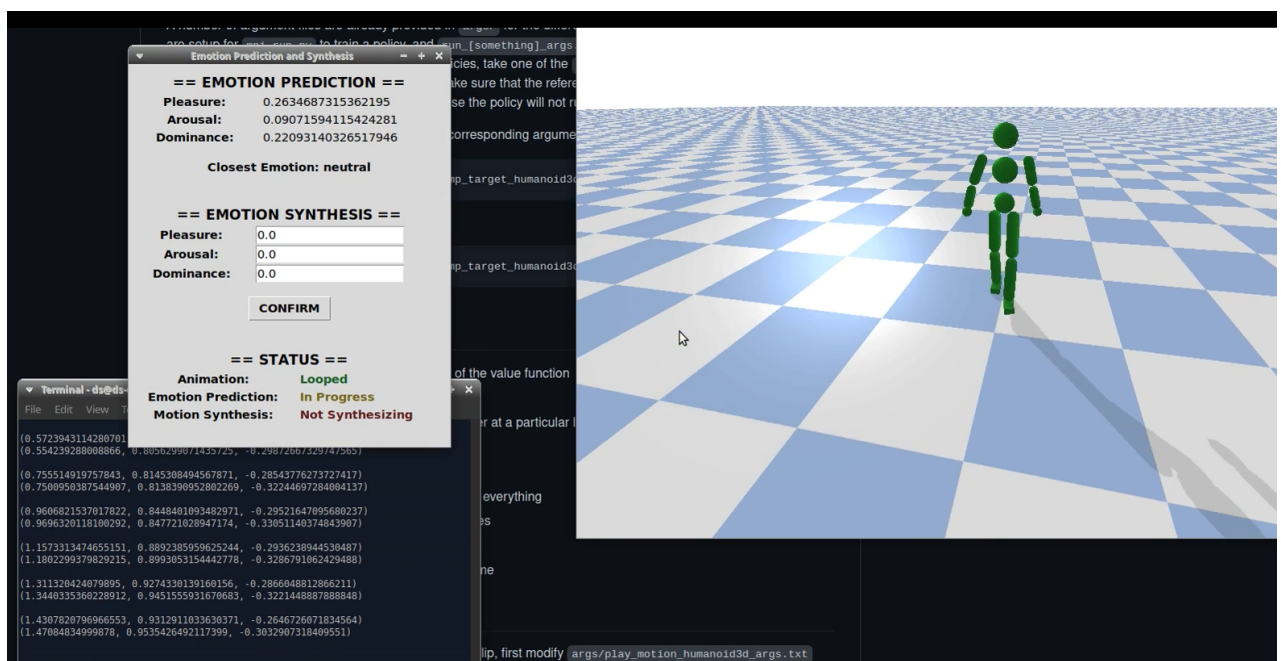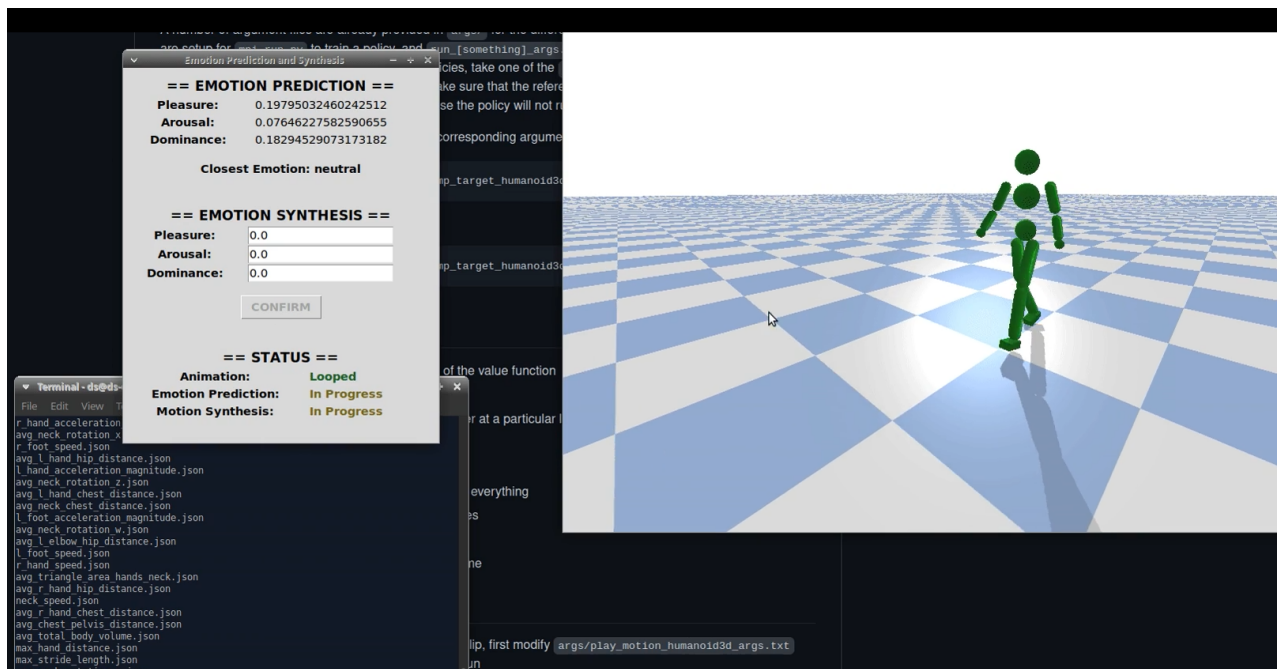
Done

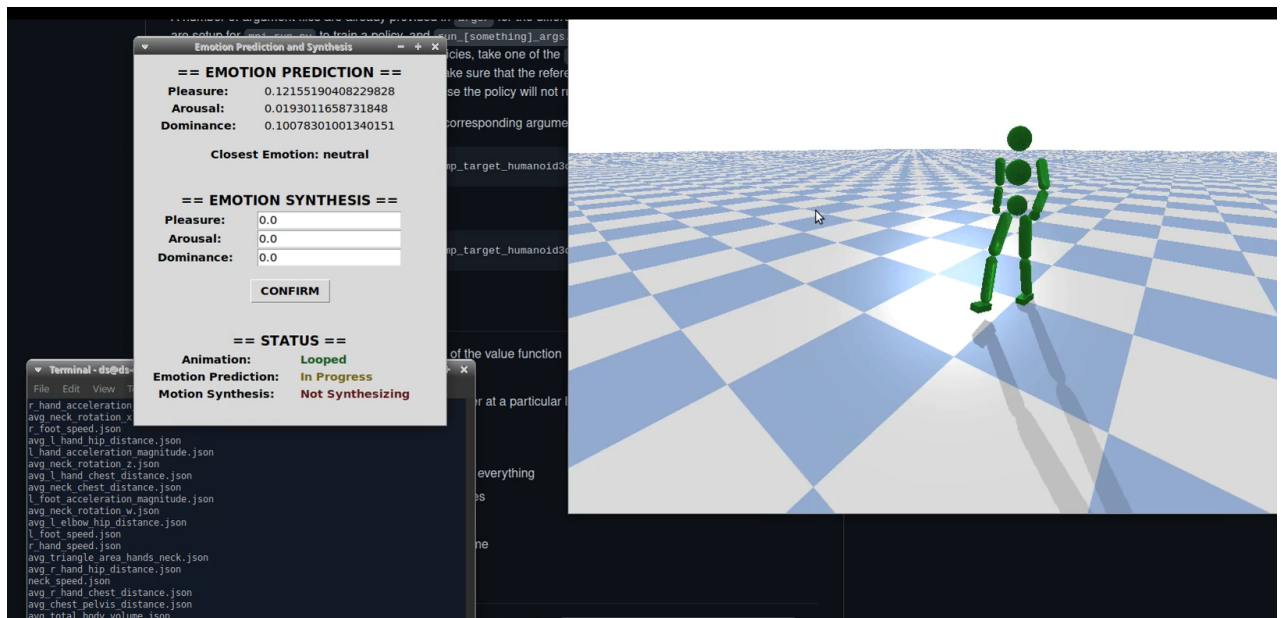- **Created an Inverse Kinematic Solver Class**:

    - Created a class responsible for taking in desired positions for certain joints and computing and outputting a pose that respects them

    - Integrated with both Mocap Visualization and Trained Model execution

    - Example Videos (Using IKSolver to change the desired height of the left hand): https://imgur.com/EBeITmq ; https://imgur.com/SxXQbUh

- **Integrated Motion Synthesis** / **GUI** / **IK Solver**:

  - Integrated all of our models to give the user the possibility to specify new P,A,D Coordinates

  - The system takes these, computes the coefficients and the changes to the motion - https://i.imgur.com/hs8Yrls.mp4

  - The motion synthesis is done in a parallel (using multithreading)

  - This effectively completes the project's loop, but there are still some problems that need solving:

    - The heuristic rules need to be improved
    - There's a problem with our LMA Extraction - we were retrieving the link's center of mass positions, rather than their "world position of the URDF link frame" which is what PyBullet's Inverse Kinematics solver expects to receive
    - PAD-LMA Models need improving

- **Managed to convert the Bandai Dataset to work with DeepMimic**:

  - After tweaking the undelrying BVHToDeepMimic library, managed to convert the Bandai dataset's BVH into a DeepMimic friendly format
  - Now extracting LMA features to retrain the models

- **Researched some Conferences**:

  - ~~Conference on Games - 30th April~~
  - ~~Digital Games Research Conference - October 2021~~
  - ~~International Conference on Movement and Computing - 4th March~~
  - ~~International Conference on the Foundations of Digital Games - 8th April~~
  - ~~Symposium in Computer Animation - 24th May~~
  - ~~SIGGRAPH Asia - Technical Papers: 19th May~~
  - SIGGRAPH Asia - Posters - 1st August
  - International Conference on Computer Systems, Graphics and Animation (2023 https://conferenceindex.org/event/international-conference-on-computer-animation-icca-2023-september-lisbon-pt) - 1st July
  - **IEEE International Symposium on Multimedia - August 9th (https://www.ieee-ism.org/dates)**
  - VisGraph - October 10th https://visigrapp.scitevents.org/ImportantDates.aspx

- **Researched some Journals**:

  - The Visual Computer - https://www.springer.com/journal/371
  - Computer Animation and Virtual Worlds - https://onlinelibrary.wiley.com/journal/1546427X
  - Graphical Models - https://www.journals.elsevier.com/graphical-models
  - Computers & Graphics - https://www.journals.elsevier.com/computers-and-graphics

Left Undone

Problems

Notes

Thoughts

Surprisingly enough, this week went by basically without a hitch. Managed to accomplish all I set out to do so that's nice. That's not to say that there weren't issues. Basically spent the majority of

my time integrating all of our subsystems that were, up to this point, all working individually, so had to rewrite a lot of code to make everything work in tandem (especially the Motion Synthesis module). But regardless the main implementation part of the project is done.

That's not to say that the project is presentable yet. The models still need to be improved, and most importantly, I still need to rewrite our heuristic rules because, as of now, they're not producing too good of changes. This may also be due to our PAD-LMA model.

On the bright side, I finally managed to make the Bandai dataset work and am now extracting the LMA features to retrain our models. Since all of these animations are running/walking animations I believe this dataset will produce better motion changes to our use case of "walking animation tweaking", so I'm pretty hyped to spend this next week working on retraining the models and all that.

I'll also start writing this week, since I will be mostly doing some model training, I'll have enough free time to dedicate to writing.

Work Hours

- Worked everyday except Sunday from about 11am to 8pm