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Team D: Deeply Emotional

Teammates: Luxing Jiang, Keerthana P G, Ritwik Das

ILR04

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Individual Progress

Since our last progress review I have been debugging why the automated data pre-processing was not working for the entire Semaine dataset. The reasons that it did not are explained in the challenges section of this report.

I have also changed the design of the robot so as to design something only for the Fall Semester Experiment (a 1 DOF freedom). The design reflects recommendations by the TAs in regards to the large second moment of inertia that will need to be overcome by weak steppers. For the FVE we will have a simple vertical column with a short junction onto which a webcam is mounted. We felt that the webcam would suffice as a piece of hardware as we are not interested in using the depth element of the Microsoft Kinect.

I have 3D printed several components that will connect the steppers to the aluminium extrusion and allow for the robot to be turned on the spot about the Y-axis (rotated about the vertical axis). Version 1 of this looks like this:

Figure 1: Top Left: 3D Printed Part, Bottom Left: Mating with vertical extrusion, Right: With the rest of skeleton + Camera

The stepper in this this case would lie beneath the black 3D printed part and would itself be connected to a universal mounting hub that itself is connected to the stepper shaft.

I have ordered most of the components but as disclosed in the challenges section we have shifted our strategy in light of the unpleasant surprises we got from opening up the boxes. Still… we have the webcams ready for the test.

Challenges

We have developed our data pre-processing code by taking 3 folders out of the ~90 folders in the entire dataset and writing code that can automatically parse through those 3 files and thereby the rest of the dataset. It turns out however that the dataset is rife with differences from folder to folder, both from the quantity of raters, to the whether or not certain dimensions of emotion are rated. This was problematic to analyse because the dataset is very large and named in a pretty convoluted way and so it was time consuming to sift through why the code would break when parsing through the entire dataset. Some reasons it would break were as simple as the creators of the dataset pressing "enter" at the bottom of one of the label .txt files and thereby creating an additional line with only a whitespace in it and thereby confusing the parser. Some raters decided not to rate the intensity at all, and so we decided to preserve data by choosing to remove one of the labels from the label vector as opposed to removing the many videos that did not have this intensity label.

As far as the actual robot goes, we found several issues with putting it all together. These mainly come from the fact that the trade studies of certain components were slightly rushed as the robot needed to be put together quickly and because of reading faulty dimensions. The steppers that we ordered were in fact the size of a rabbit and we have redesigned the robot to make it work with smaller steppers that were readily available in the lab.

Teamwork

Ritwik:

Completed the bimodal network and has begun training it and documenting the results. He also helped Keerthana with developing the final version of the PCB as well as the face tracking for the robot human tracker.

Luxing:

He worked on the first draft PCB.

Keerthana:

Completed the PCB, and worked with Ritwik to develop the human tracking software for the robot. Keerthana also wrote basic framework for text pre-pre-processing. She also wrote a draft of the bi-directional processing LSTM for the tri-modal network.

Future Plans

We hope to have completed the robot from a hardware assembly standpoint.

We also hope to have gotten the servo to rotate the robot based on where the human is in the scene. This would quite simply be version 1 of our human tracking system.