Project Minutes

Oct 14 Mentor Meeting

To Do

- Follow the instruction deploying the software on our own laptops and making it work.
- Try to use the data from CMS to execute some simulations in order to get familiar with the software and process.
- Get familiar with the basic knowledge of Particle Physics.

Arrangement

- The group meeting will be held at 10:00 am every Monday.
- Questions should be collected on Friday before the meeting.
- An additional meeting will be held at 10:00 am this Wednesday, Oct. 16th.

Oct 16 Mentor Meeting

Progress

- Every member has tried to settle the software environment.
- Some of us still have some problems and we will help each other solve it this will.

To Do

- Keep working on the virtual machine and the software installation.

Oct 21 Mentor Meeting

Progress

- A new member has been assigned to our project.
- All of us except the new member have installed the virtual machine and CMSSW.

To Do

- Search the key words about particle physics: Scattering angle, Energy, Momentum, Rapidity, Traverse momentum, Compact muon solenoid, Different layers of CMS detector, Magnetic field in a particle detector, Lepton, Quarks, Gluons, Anti quarks.
- Search answer for the two questions:
  1. What is the CMS and what is it used for?
  2. What are the components of the CMS?
- Help the new member get familiar with our project and install the virtual machine and software.

Oct 28 Mentor Meeting

Progress

- We have searched the answer to the two questions and the keywords.

To Do

- Keep working the software and physics knowledge and try to find out a research direction.
- Think about the content of the midterm report.

Nov 1 Group Meeting

Progress

- We have tried two different analyzers on CMS website, and get the raw data (pipeline) from CMS. We also found a way to display the result.
- We discussed the process of CMS data obtaining.
- Split the writing task for the midterm report to every member.

To Do

- Write the assigned part of the midterm report and post it to Google Drive when finished.
- Finding an initial goal of what to do with the data.
- Prepare questions about the midterm report for the next mentor meeting.

Arrangement

- Bingchao and Jiawang write the first part of the report.
- Xiao writes the second part.
- Jeremy writes the third and fifth parts.
- Mam writes the fourth part.

Nov 4 Mentor Meeting

Progress

- Get some suggestion from the mentor about the midterm report.

To Do

- Complete the midterm report before the deadline.

Nov 9 Group Meeting

Progress

- Everyone has completed the assigned part.
- Discuss and modify some unclear parts.

To Do

- Polish the report and prepare questions for the next mentor meeting

Nov 11 Mentor Meeting

Progress

- Let the mentor have a quick look at our report and do some final changes.
- Get the paper list for further reference.

To Do

- Go through the paper and try to find a direction from them.

Nov 12 Group Meeting

Progress

- Split the paper reading task. Each person read 5 paper and chose one of them sharing to the team next week.

Arrangement

- Jiawang 1- 5
- Jeremy 6 - 10
- Mam 11 -14
- Xiao 15 -19
- Bingchao 20 - 23

Nov 17 Group Meeting

Progress

- Everyone shared their reading result.
- We chose paper Application of a Convolutional Neural Network for image classification to the analysis of collisions in High Energy Physics as our major reference.

To Do

- Everyone goes through the paper and finds the way to represent the experiment.
- Prepare the questions for the mentor meeting.

Nov 18 Mentor Meeting

Progress

- Update our direction choice to the mentor.
- Run some examples from the paper.
- Solve some confusion about the paper.

To Do

- Keep reading the paper and related documents to get a deep understanding.
- Keep running the code from the public repository of the paper.
- Think about how to add our own initiative base on the paper.

Nov 27 Mentor Meeting

Progress

- We decide to use the analyzer on the paper, but team members face difficulty in resolving issues.
- Share the difficulties to the mentor and seek instruction.

To Do

- Keep working on the code and try to get the output.

Dec 4 Mentor Meeting

Progress

- We finally got the root file, instead of solving environment problem, we share the file directly to reduce time.
- We need the JSON file for the next step.
- We get some hint about the methods that deserve to try from the mentor.

To Do

- Keep finding the solution for creating the JSON file.
- Look at the other part and do some preparation

Arrangement

- Bingchao: Try to create JSON files by modifying the original code.
- Jiawang: Try to create JSON files from the root file.
- Xiao: Read the official document about the analyzer and help create JSON files.
- Jeremy: Looking into the image creation.
- Mam: Start designing the poster layout and write some background content.

Dec 13 Mentor Meeting

Progress

- Mentor commented on our midterm report.
- Confirm the resource we can use on vacation.
- Make a development plan for a vacation.

To Do

- Keep finishing the task in vacation.

Dec 20 Group Meeting (Online)

Progress

- Still facing trouble with json file creation, then we divided into small groups and started looking at the next step
- Jeremy started working on creating images from fake json file.

To Do

- Try to solve the problem in json creation.

Dec 26 Group Meeting (Online)

Progress

- Bingchao, Jiawang, and Xiao got the JSON files successfully, at the same time, Jeremy has managed to create images from fake json file.
- We get a draft layout of the poster from Mam, and we need more content to fill in.

To Do

- Jeremy started to make real image dataset from json file.
- Write content for posters and presentations.

Arrangement

- Jeremy: Create images from json file the team retrieved.
- Bingchao, Jiawang, Jeremy: work on the training model.
- Xiao, Mam: Work on posters and presentations.

Jan 3 Group Meeting (Online)

Progress

- Jeremy trained Inception V3 and VGG16 model and created notebook templates for other team members to try other transfer learning models
- Jeremy suggest using tensorflow.keras application models

To Do

- Bingchao run notebook for vgg16(needed redoing) and vgg19
- Jiawang run notebook for resNet50
- Started to do a comparison experiment to test transfer learning

Jan 8 Mentor Meeting

Progress

-Jeremy tried to increase the performance of the model through augmentation of the dataset but the dataset proved too computationally expensive and took a lot of time to train. Augmentation dataset idea was abandoned and went back to original dataset.

- We have tried several models but with the validation, score limited to 80%.
- We get an explanation about this limitation from the mentor (records are sent in the group chat) with some advice for the next step.
- We get a comment from the mentor about our draft posters.

To Do

- Do more comparison experiment with different optimizer using transfer learning.
- Reduce the content of the poster and polish the words.
- Write the Readme in Git repository with abstract, running guide and more information.

Jan 11 Group Meeting (Online)

Progress

- Discussing the results collated from the transfer learning models that we have trained. Jeremy suggest that there might be a correlation with the number of parameters of the model and how it performs best when entirely frozen layers with the exception of the additional dense layers added to it.

To Do

- Collect the result.
- Finish GitHub Readme file and the poster.