

Capstone Weekly Diary

Ziyu Wang, Student Number:17210720158

I keep this diary from 27th Jan to 21st Nov. The frequency of the diary is around one week. When doing this capstone work, I had met many practical problem, and finally we solved them mostly. From which, I learned a lot.

2018/1/27

Today I first attended the capstone course. For my flight is on last Wednesday, I missed the first course. And I listened to the topics that we can choose, and had a discussion on each topic. This week we had to make our choice, and before that I took several hours to look up material on those ideas and finally decide to choose the topic of Mirror Therapy.(6 hours)

2018/2/3

Those week we have a lecture of team building and leader responsibility, which teaches me a lot. And on Monday, we knew which team we are in, and I am in the team Mirror Therapy. On the evening home, we sent email to each other, and built a group chat in our instant message application. On Tuesday evening, we held our first group meeting in ARC building. In the meeting, we met each other, and chose our leader: Miss Tan. During the 2 hours meeting, we talked about our work, and shared our ideas on the topics. Then, leader gave us work and set the schedule of our project. Then, on Wednesday, we have contact with our tutor, Professor Ye, and he gave us some information on the project, and told us that he would come to Finland himself on next week. And we also negotiated with students in Professor Ye' s lab, and knows better about the project. (10 hours)

2018/2/10

On 5th Feb, we have our kick-off presentation. Before that, we use several days to finish our slides and to decide our schedule. My part is the milestone, our schedule, the risk and the problem that we may meet in our project. To finish our part, it took me 4 or 5 hours with my teammate Hong Ye to talk about our problem and set up our milestone. And before the presentation, we had another

meeting in ARC building, to have our presentation rehearsal. And after the kick-off presentation, in the following days, we talked about the problem we found during our kick-off presentation. And trying to modify our schedule better. (12 hours)

2018/2/17

This week is our traditional Chinese New Year, and we have great time. In this week, we appoint our meeting with Timo and Iris on 14th Feb. and on Monday and Tuesday, we have talked about the problems we want to ask Timo and what we may met during the meeting with Iris which takes us several hours. And on 14th Feb, the Wednesday, which is also the Valentine's Day, we spend one hour meeting with Timo, and Timo answered many of our questions, and after that, we had a meeting with Iris from 16 to nearly 19 in the evening. In the meeting with Iris, we had a great time, and we learned how to be a team, and how to finished a project as a team. After that, we also voted for our rules. And after finished the meeting, I wrote the rules and send them to everyone in our team. The rules are:

- Tan has access to wrist band. Each member wanting to use the wrist band please contact Tan.
- Each member will check out WeChat once a day at least.
- We help each other. If you are stuck, ask your team members for help.
- Commitment to a task is expected. If you do not want to do a task, inform the leader/team in time.
- We regard problems as opportunities to learn and improve. No blaming on people!
- We see conflict as a resource to optimize our work, not as a reason to get upset.
- Inform the team asap, if you cannot make a deadline or have trouble with a task given to you.

After that, the other days in this week is our traditional Chinese New Year, I have not do much work during that period, and just spend about an hour to talk about our schedule.

(15 hours)

2018/2/24

This week I have read some articles on the EMG signals from online. And Looked for EMG obtaining and analysis related scientific articles from online, reading the articles to get a better idea of how EMG signal works, what kind of preprocessing is done before the raw data we receive, what methods are used to analyze the data. And preparing for the presentation at 2018/2/26. (7 hours)

2018/3/3

In this week, we have a presentation in ARC building. Just before the presentation, I spend some time to think what kinds of risks we may meet.(two hours) And listed some of them and prepared to talked them in the presentation. And read some articles in the internet about the myo bracelet. I have found a website of myo bracelet and there are already some of the usage of myo in field. I searched some of the articles on the usage. (8 hours)

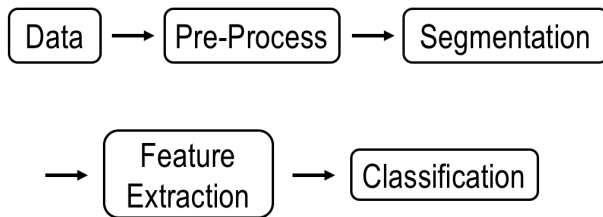
2018/3/10

After consulting with researchers in Fudan, we received some data that they captured some time ago. And I looked up in some article and start to program the pre-process method to de-noise. Test some Low Pass Filter design the pre-process containing:Normalization,Absolute Value,Window size ,Low Pass Filter

(10 hours)

2018/3/17

Deign the algorithm, the picture of algorithm is like below.



I am trying to finish the pre-processing stage. However, because we don't have the myo, I only have sample signal to do the process, I test the filter and finally decide the feature of filter. However in the design of segmentation, I meet problems. After hours of consideration, I still don't have clue how to solve the problem.

(10 hours)

2018/3/21

Design the Feature Extraction process.

- Time domain features
 - Mean
 - Zero crossing rate
 - Maxima/Minima
 - Autocorrelation
 - Cross correlation
 - Linear correlation coefficient
 - Standard deviation
 - Etc.
- Frequency domain features
 - Spectrogram
 - Correlation
 - Spectral roll-off
 - Spectral centroid
 - Spectral flux
 - Etc.

(12 hours)

2018/3/28

Next week is Easter Holiday. I tried to program our signal analysis code and help to build up Aliyun cloud platform. It took me 5 hours to finish the uploading data and download data from cloud platform. And still working on the signal analysis. Meanwhile, finish a demo of KNN classification and SVM classification algorithm.(8 hours)

2018/4/4

This week is Easter Holiday. And I spend some time to have holiday, so this week's work don't contains much. Read some articles on the myo, and I've heard that next day we will have our myo. That's really good news. We have discussed that we should each one owns the myo one day. (8 hours)

2018/4/11

Today we have a meeting, We prepare our presentation this week. And since we have the myo, we test it and use it to collect some of the signals. However, we found the collect signal software is only for windows platform, which cause us many troubles for half of our team is using a Macbook. So the collecting data process is depends on only one people.

And since we can collect data, I spend some time doing the auto segmentation. It takes long time to finish this work.

And we also separate our work on presentation, spend several hours to finish the ppt and have a rehearsal. (17 hours)

2018/4/18

Two days earlier, we had an meeting. This week I try the CNN algorithm on data. The framework I used is Keras, and total number of data is around 100. We train

our data, However, because we don't have much data, the deep learning method seems not practical to use.

But, anyway we have a good start. Besides, we also spend some time collecting data. (20 hours)

2018/4/25

This week we mostly preparing our final exam of our course. Most of time read the articles on machine learning and Keras. (10 hours)

2018/4/30

This week, most of time spend on choosing cloud platform. I spend much time in choosing an cloud platform. And finally choose the Aliyun platform. For it can be used easily in China, and for student it have a great discount. And after paying the bill, we have an IP for one month. Meanwhile, keep collecting signal. (22 hours)

2018/5/7

Today we have our Project pitching presentation. Before that we spend some time have a rehearsal for the coming presentation. And in this week , I keep testing my algorithm, use 1D CNN to predict data. And also trying to modify my code to use 2D CNN(23 hours)

2018/5/14

This week, finish CNN classification code. And apply some method such drop out layer, BN layer to improve accuracy. (19 hours)

2018/5/21

I improve my algorithm to segmentation data. And keep collect EMG data. Meanwhile, I test a KNN method, however, it don't achieve very good result.

(15 hours)

2018/5/28

Today we have our final presentation in Finland. This time we have our status Review with Demo. We try our best to present our work. Before that we spend some time to rehearsal our presentation. And in our previous meeting. We talked our future plan in China. Because after that we will have a three months' vocation. (19 hours)

From June to August : Summer Vocation

2018/9/1

Today is our first day back to school. And we are happy to get together again. And in deed at the first a few week in new semester, it is quite busy for us. (12 hours)

2018/9/8

This week we have an online meeting. This time we talk about problems we met in our job, and what kind of problems we facing when we put each of our part together. This time what we discuss most is data collection. When we real collect data from patient, we need to automatically collect data, and automatically analysis data. We have an application to connect myo and collect data, and save it as csv in pc. When we close the application, it can generate a csv file. So we decide to modify the application and build a new application of automatically collect data.

Another issue is telecommunication. We decide to build a server to use socket to transfer data.(18 hours)

2018/9/15

In this week, I rewrite our algorithm with Pytorch framework, which is more easy

to transplant to other PC. Meanwhile, we also spend a lot of time in collecting data. Because of lacking data, our accuracy cannot achieve very high.(18 hours)

2018/9/22

In this week, I also modify our algorithm, and add normalization in our pre-procession, and add batch normalization layer in our neural network structure. And we buy a new aliyun server, since our previous one is closed because we do not pay our bill. And I spend some time equip the server.(19 hours)

2018/9/29

I use RNN to be our classification model, and achieve good result. So I decide to use RNN as our final algorithm to classification. And I also finish the uploading algorithm of computer and server.(10 hour)

2018/10/6

I modified our algorithm with LSTM. And it achieve good result.(10 hours)

2018/10/13

Previous day we had meetings. After talking with Yisi Zhang, we decide to upload a JSON file containing our result to the server. So I modify our code and finish the uploading data. (10 hours)

2018/10/20

We try to connect each part, at least we can send data to the server, and mobile phone can down load data. And we achieve our goal. And start to prepare the presentation on Oct 27. (8 hours)

2018/10/27

In this week, we have a presentation take place in China. Just before that day, we had a rehearsal of our presentation. And what we will do in that day.(6 hours)

2018/11/3

Keep collecting data. And modify our algorithm. At that time, most of our algorithm is finished by me (7 hour).

2018/11/10

Talked with Yisi Zhang who is doing the APP, and we decide to add detection system, which prevent transfer the data we had transferred. (5 hours)

2018/11/18

Prepare for our final presentation. And we separate work to each and make our slides and summarize each' s work.(16 hours)

2018/11/20

We had a meeting, and rehearsal our final presentation. And we also shoot a short demo video, in case that there is not enough time for demo in final presentation. (14 hours)

2018/11/21

Final presentation!