PM: Li Guangpeng

As the leader of the group, my responsibility is to manage the whole team and the progress of the project. At all stages of this project, I was responsible for the negotiation and communication between groups and my team member. Besides, at the system design stage, I helped our architect Zhang Tong to choose the technical route, which includes looking up and reading the related papers. At the implementation stage, I was responsible for training and running the deep neural network. Because the performance of the network is not satisfactory, I was responsible for the improvement of the network. And I went to the laboratory in Li Siguang Building to retrain the network by using the better condition of hardware.

Tester and Coder: Wang Huining

I am Wang Huining. As a member of the popcorn algorithm group, Chen Xi and I are the common coders and testers.

In the first part of the algorithm, we use Faster-RCNN to recognize the spine image. Faster-RCNN is a classic deep learning target detection algorithm based on CNN, and the algorithm has good performance in running speed and recognition accuracy. After the mid-term evaluation, in order to further improve the accuracy of the algorithm, we optimized the model and retrained the model with the latest training set and equipment.

The second part of the algorithm is to calculate the Cobb Angle according to the spinal center point, using curve fitting and inflection point calculation methods. We also wrote the Lenke classification for further requirements.

In the unit test, we did the repeat tests and error input tests for the algorithm. In the integration test, we tested the interaction with the server. The robustness, accuracy and efficiency of the algorithm are verified. Finally, we updated the test report.

Tester and Coder: Chen Xi

I am Chen xi. In the popcorn algorithm group, Wang Huining and I are the common coders and testers.

In terms of coding, the algorithm is divided into two parts. In the first part, we use the Faster-RCNN to identify the location of the spine in the spinal images. Faster RCNN is a target detection algorithm based on deep learning. This algorithm makes the target detection speed greatly improved. After the midterm evaluation, we retrained the model with the latest training set and optimized the model in order to further improve the accuracy. In the second part, the Cobb Angle is calculated based on the spinal center point using curve fitting and inflection point calculation methods. In addition, we also wrote the Lenke classification.

In terms of testing, for the unit test, we carried out a lot of repeated tests to check code defects. For the integration test, we mainly tested the interaction with the server and the consistency of the interface. And we formed the final test report.

Requirements Analyst: Hong Yue

t has been an unusual course experience where students seem do not care about scores since they already got offers, but not me. I have put much effort to the project to play my part as well as I could while preparing my application for my Master abroad, not only for respect, but also in case of getting a conditional offer.

I played two crucial roles in the project—RA and liaison. I spent weeks learning the structure and concepts for a professional requirement analysis. And I started a Wechat group for communications between RAs to reach a consensus on basic background thoroughly and to write a better analysis. The first audio meeting I organized was on Sep. 30th, lasting for about two hours, where everyone gave their effective opinions. We had more discussions later on involving more people for better communication. I asked Prof. Yin many questions for real demands for the product to talk with coders and architect better. I also kept in touch with other groups to help move projects forward. I modified the analysis many times until the end. My RA, communication, and organization skill improved much!

Thanks for teacher and everyone. It’s very rewarding.

Architect: Zhang Tong

In this DSD course, as an algorithm architect, I was responsible for designing the algorithm used by our group and wrote the design documentation of the algorithm for developers to develop the algorithm. Our algorithm is based on the classical target detection algorithm Faster R-CNN, which has been proven to be very effective in obtaining target detection results by extensive testing. Faster R-CNN first efficiently extracts the features of the input image, then predicts the region of interest, and finally on the predicted region of interest Perform classification and regression. For target detection, the regression center point and the offset of the length and width relative to the anchor are used. Based on the target detection results of Faster R-CNN, we fit the centroid of the target frame to obtain a fit curve for the spine. This fitted curve helps us to be able to compute the cobb angle and further get the specific lenke type based on the lenke typing method. Our algorithm is more efficient and stable in accomplishing the expected target, producing more accurate cobb angle and lenke typing results. From requirements analysis to integration testing, our team worked well together and within the team. I believe my software engineering ability will be further improved after this DSD course.