Log-book on Semester Project Supervised by Ph.D. Tabatabaee Hossein

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November 10, 2021

Monday, 4 Oct 2021

- Watched two YouTube videos recommened by Ph.D. Hossein: 1. "An Introduction to Network Calculus" and 2. "RTAS 2021 Presentation (40) Tightening Network Calculus Delay Bounds by Predicting Flow Prolongat"
- Did the note on Network Calculus which be seen from Github repo. (Now the repo is private so a hyperlink cannot be inserted here)

Tuesday, 5 Oct 2021

- Re-read paper part I, II and III, i.e., Introduction, Related Work and Network Calculus Analyses
- Had a discussion with Ph.D. Hossein and solved my questions which can be seen from the conference records.

Wednesday, 6 Oct 2021

- Read paper part IV "Flow Prolongation in the NC FIFO Analysis"
- Learned the overview of GNN including GNN working flow, the usage of GNN, the difference between GNN and other NN, the classification of GNN and the mathematical expression of GNN. The note can be seen from "GNN Note". I am really sorry that I took the note in Chinese which is faster for me to comprehend.

Thursday, 7 Oct 2021

- Read paper part V "Effective FP Predictions with a GNN" and understand the overall procedure of how GNN is implemented in FP.
- Learned the general framework for GNN including Message Passing Neural Network, Non-local Neural Networks and Graph Networks which can be seen from "GNN Notebook".

Sunday, 10 Oct 2021

- Learned Cross Entropy Loss which is used as a loss function in the paper, including the mathematical function of Cross Entropy Loss, the application of Cross Entropy Loss in single classification and multi-labels classification problems.

Monday, 11 Oct 2021

- Read paper part VI "Numerical Evaluation" and part VII "Conclusion".

- Learned “FFNN”, “GGNN” and “GRU” which can referred in the note folder.

Tuesday, 12 Oct 2021

- Had a discussion with Ph.D. Hossein and figured out the overall procedure of the paper.
- Review the video “RTAS 2021 Presentation (40) Tightening Network Calculus Delay Bounds by Predicting Flow Prolongat”

Saturday, 16 Oct 2021

- Had a quick view on paper “The DiscoDNC v2 - A Comprehensive Tool for Deterministic Network Calculus”
- Installed JDK 16.0.2 and Apache Maven 3.8.3.
- Clone the repo from NetworkCalclus.org including all necessary submodule. However, I am facing some problems when setting up the project in Eclipse when following the steps in README.md. Dependencies cannot be found and the code is not run with the expected output.

Monday, 18 Oct 2021

- Run the functional test on NetCal/DNC successfully including getting the rtc.jar to run the MPA RTC Curve Backend and the Tests, and compiling jars with Maven
- Drafted the Project Contract.

Tuesday, 19 Oct 2021

- Modified the contract draft with Ph.D.Hossein; made a weekly discussion and signed the contract with him.
- Cloned the dataset and tried to undertand the dataset.

Thursday, 21 Oct 2021

- Investigate prepare_dataset.py and tried to install all the needed package. However, failed to install torch_sparse.
- Took a look on PyTorch official website, trying to solve the questions above but failed. It seems to be the compatibility between MacOS and CUDA.

Friday, 22 Oct 2021

- Checked and upgraded the pip list according to the reference given by Karim Hadidane, and successfully solved the questions met yesterday.
- Investigated the data structure in dataserv.ub.tum.de/dataset-train.pbz and graph_transformer.py but haven't finished them yet.

Sunday, 24 Oct 2021

- Check the format of input data and understand the function **def net2basegraph(net)**.
- Drew the diagram based on the first graph generated by "dataset-rtas2021/dataserv.ub.tum.de/dataset-train.pbz"

Tuesday, 25 Oct 2021

- Understand the function **def valid_prolongation(G, flow, s, flow_paths, foi_id)** and **def prolong_graph(G_in, foi_id, flow_paths)** in graph_ transformer.py.
- Drew an illustrative graph after flow prolongation.
- Had a weekly meeting with Ph.D. Hossein

Tuesday, 2 Nov 2021

- Successfully ran Maven test on NetCal/DNC and checked the specific content on the first test case, i.e., S_1SC_1F_1AC_Test.
- Understand the variable and operation naming scheme in NetCal/DNC.
- Had a weekly meeting with Ph.D. Hossein.

Wednesday, 3 Nov 2021

- Wanted to find the service_rate, service_latancy, arrival_rate and burst after the graph prolongation but failed to do that. Consequently, checked the code written by Karim again but several bugs existed this time. Wrote an email, hoping to discussion with Karim within this week.
- Re $maven - test$ DNC and checked network TA_3S_1SC_3F_1AC_SP_Test to see how they input the graph to analyse.
- Followed the tutorial on "DEBORAH official website", but failed to *make*. Will do this again tomorrow after checking the paper mentioned below.
- Read the paper "DEBORAH: A Tool for Worst-Case Analysis of FIFO tandems" part 5.4 'Using DEBORAH'.

- Applied for the EPFL server (waiting to get the permission).

Monday, 8 Nov 2021

- Still cannot use the command *./deborah* with the given 'deborah.exec'
- *make clean* under /deborah/Release. Re-*make* the makefile but failed to do this with the error message:
  "Building target: deborah
  Invoking: GCC C++ Linker
  g++ -o"deborah" -lrt
  ld: library not found for -lrt
  clang: error: linker command failed with exit code 1 (use -v to see invocation)
  make: *** [deborah] Error 1"
  I failed to find the reason behind.

Tuesday, 9 Nov 2021

- Ran code *prepare_dataset.py* but with the error in torch package. I will continue to figure out the reason behind.
- Prepared the weekly report and had a discussion with Ph.D. Hossein.
- Still couldn't solved the question in DEBORAH, so we decided to focus on DNC first. Ph.D. Hossein told me that he would ask his colleague who has used DEBORAH before, for some ideas.