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Monthly Report - March 2017

1. Research activities in March 2017.
2. Research plan in April 2017.

Collaborators: Arie-san, Choong-san, Kaushalya-san.

1 Research activities in March

Motif in Complex Network

Update current results. I compiled some network datasets and run experiments on node labeling. These networks are quite large (YouTube, Wikipedia, Synthetic network) so the full motif analysis is not possible. My experiment is conducted assuming these networks have motifs similar to other (smaller) social networks and citation networks.

March 01 → Mar 16

Rebuttal IJCAI'17. I have received and wrote 4 rebuttals to the reviewers. Although the discussion period has started for IJCAI'17 (after the reviewer received the rebuttals), I haven't received any reply from the reviewers as of the time this report is written. The rebuttals can be found here: https://goo.gl/pBj5dz.

March 29 → Mar 31

Wavelet basis. To earn a deeper understanding of my methods and graph convolution method, I have reviewed my linear algebra. During this period, I studied discrete Fourier transformation, discrete Cosine transformation, wavelet transformation, and other related techniques. The highlight of my study here is that my method of using the motif Laplacian matrix as the basis for graph convolution can be understand as the dilation operation in convolutional neural network.

March 10 → April 03

CREST-Deep Compression

Study loss surface of a deep model. Since my network compression approach is discrete optimization, I need to understand about: 1. Loss surface properties with respect to the network weights; and 2. The theoretical background to measure accuracies of a deep network. There are some interesting conclusion and insight from papers, which I will present in my future progress presentation.

March 12 ➔ Mar 31

Build Caffe from source. I have successfully build the deep learning tool Caffe from source and written a tutorial for building it on our website `net-titech`.

March 25 ➔ Mar 26

Research Progress Presentation. I have summarized the research progress and idea of our project members and presented in the CREST-Deep project meeting. The slide can be found here: `https://goo.gl/mKb7a7`.

March 10 ➔ April 03

2 Research plan in April

Motif in Complex Network

Fix paper according to reviewers. As the reviewers of IJCAI suggested, I will make same changes in my paper. I will make one short and one longer version for possible journal submission.

April 14 ➔ Apr 20

Determinantal Point Process. Determinantal Point Process is a time-consuming process to select a diverse set of items (with respect to some pre-defined diversity scoring function). The application to graph of this process is still unexplored and vague (there are some work but the quality is not high). I will work with Arie-san on applying the DPP to complex network. My goal is to compare the DPP (time-consuming, good performance) with my diversity submodularity model (fast estimation, the performance might be lower than DPP). The result from here will give me great insight about network coverage, network summarization, and also experimental data for my thesis.

April 20 ➔ Apr 30

CREST-Deep Compression

Compress weight matrices using JPEG algorithms. Following the professors' suggestion in my presentation on April 4th, I will recreate the result from deep neural network compression papers (Hans, Ullrich, etc.) and deploy cuda-JPEG to extract model on-demand. There can be some performance trade-off, but overall the result might be interesting as we will run compressed model on general purpose processors (Nvidia GPUs).

April 05
➔ Apr 21

Develop method to perform convolution with JPEG images. The convolution operation can be done in the frequencies domain (i.e. using DCT coefficients) in the same manner as in the spatial domain. Taking advantage of this fact, we can directly use the compressed image or video as input and run on compressed network. This idea heavily depends on implementation, therefore I will contact Shinoda Lab to discuss about their video and image input format.

April 22
➔ Apr 30