

MONTHLY REPORT - NOV 2016

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1 Research activities in October

	AUGUST - 2016	SEPTEMBER - 2016
TOPIC	Network embedding and motifs in network.	Vandalism detection and knowledge graph.
IDEA	Use the graph's motif as a guide for the random walk in network embedding. The biased random walked generated by my model emphasizes on the local motif community of the network. Besides the motif walk, I also proposed the inverse motif walk to discover not-motif-community to use as negative samples.	Detect vandalism in Wikidata by neural random forest, or train a specialized neural network to detect edge-case vandalism output by the traditional random forest model. For triple scoring, I mined the Google's rank score for each person's name using Google Knowledge Graph API. By using the aforementioned Google's score and the similarity score learned by Skipgram model from Wikidata's text corpus, we train a simple feed-forward neural network to classify the popularity of each name-job or name-country on a scale of 0 to 7.

ACTIVITIES	I have conducted extensive experiments on BlogCatalog3 dataset (undirected triangle motif), and some preliminary experiments on other datasets (bipartite and larger datasets). My model (named MAGE) shows superiority compared to previous models. The reason for such performance lies at the number and quality of the negative samples obtained. I also wrote a paper and submitted to AAI'17. The result for AAI'17 will be available on December 2016.	I have assembled a team of 4 (Nukui-san dropped out due to his own project) to participate in WSDM Cup 2017. This year WSDM Cup 2017 consists of 2 task: Vandalism detection on Wikidata and Triple scoring. Details are given in the reference.
REFERENCES	Deepwalk [?]; Planetoid [?]; LINE [?]; node2vec [?]; MAGE source code [?].	WSDM Cup 2017 [?]; Vandalism detection [?]; Triple scoring [?].

2 Research plan in October

	OCTOBER - 2016
TOPIC	Rare event detection, knowledge graph, and submodular models on graph.
PLAN	I will continue to develop my ideas for the WSDM Cup 2017 as mentioned in the previous section. October 15th, we will submit our first prototype of both systems (vandalism detection and triple scoring). On the other hand, I am studying about set theory and graphical submodular models because I want to conduct a concrete mathematics proof for my motif walk model, which was submitted to AAI'17 last month. Furthermore, I have great interest in submodularity and random processes, I plan to write my Master thesis on this topic.
REFERENCES	Submodularity [?]; Submodularity in graph [?]; Matroid [?].

3 Problems

Currently I do not have any serious problem in my research. However, There is a few minor problems that I will be grateful if you share some of your comment if possible.

- Rare case prediction with machine learning. Currently, the vandalism takes about 7% of all edit on Wikidata. The simple ZeroR model can easily achieve 93% accuracy by predicting all edit as “valid”. We have choosen the Random Forest (and its variant XGBoost) for this problem. However, we want to use some deep architecture (which performs very bad in this task). I wonder if you can give us some comment on this matter.
- Submodularity in set theory. I have a small wonder about how do you think about the future of this branch of discrete mathematics. I want to write my master thesis on the amount of information (Fisher Information) gathered using some random process on a network. Do you think it is possible for me to pursue such mathematical topic? Please tell me if you prefer my master thesis to be more practical-oriented.

Murata-sensei, thank you very much for your time!

References

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