Yuxuan Yang

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EDUCATION

Southwestern University of Finance and Economics (SWUFE)   **09/2018-06/2022**

➢ BEng; Major: Computer Science and Technology

➢ Overall GPA: 86.54/100

PUBLICATIONS

Yujie Li, Xin Yang, **Yuxuan Yang**, Qiang Gao, Fan Zhou, "Forgetting Prevention for Cross-regional Fraud Detection with Heterogeneous Trade Graph," in AAAI-23 Student Abstract and Poster Program, Thirty-Seventh AAAI Conference on Artificial Intelligence, Washington DC, USA, 2023. (Accepted)

Xin Yang, **Yuxuan Yang**, Junfang Luo, Dun Liu, Tianrui Li, "A unified incremental updating framework of attribute reduction for two-dimensionally time-evolving data," Information Sciences, Vol 601, pp. 287-305, 2022. doi: 10.1016/j.ins.2022.04.026.

Xin Yang, Yujie Li, Dan Meng, **Yuxuan Yang**, Dun Liu, Tianrui Li, "Three-way multi-granularity learning towards open topic classification," Information Sciences, Vol 585, pp. 41-57, 2022. doi: 10.1016/j.ins.2021.11.035.

RESEARCH EXPERIENCE

Forgetting Prevention for Cross-regional Fraud Detection with Heterogeneous Trade Graph   **12/2021-03/2022**

This study proposes a novel solution based on heterogeneous trade graphs, namely Heterogeneous Trade Graph learning for Cross-regional Fraud Detection (HTG-CFD), to prevent knowledge forgetting of cross-regional fraud detection and continuously detect fraudulent transactions in the process of business expansion in new regions.

➢ Established an HTG from original transaction data to cater to graph representation learning and regarded four types of nodes in the HTG, i.e., credit card holders/customers, merchants, time slices, and transactions

➢ Constructed massive meta-paths to describe diverse semantics derived from the given HGT and concentrated on three types of meta-paths, i.e., transaction-cardholder-transaction (TCT), transaction-merchant-transaction (TMT), and transaction-time slice-transaction (TST)

➢ Transferred each target node into a new unified semantic space; projected all the initial representations into a new latent space and then leveraged a node-oriented attention mechanism to automatically learn the weights among the target node and its neighbors; fused multiple semantics in a heterogeneous trade graph with multiple-type meta-paths and learnt the importance of different meta-paths to generate the final representations; formed the final representation by aggregating all semantic-specific embeddings and applied it to further fraud detection

➢ Presented two strategies for knowledge forgetting of previous regions, i.e., knowledge replay and parameter smoothing (the former one was implemented by firstly choosing randomly some transaction data of the previous region as experience buffer, secondly calculating the average attribute vector of the previous region and adding Gaussian prior to generating new transaction data, thirdly sampling randomly some generated transaction data as another experience buffer, and finally using these two buffers for experience replay; the latter one was implemented by using Fisher Information to evaluate the importance of each parameter in model and then adding a smoothing term to constrain the parameter optimization based on Fisher Information

➢ Conducted several experiments on five regions extracted from a financial database and came to the conclusion that in single-regional detection the HTG-CFD significantly outperforms all baselines, which indicates that using the meta-path method can capture more semantic information and that in cross-regional detection, the HTG-CFD has comparable performance with the advanced CL models in most of the tasks and achieves the best performance on the averaged ACC and Macro-F1

Three-way Multi-granularity Learning Towards Open Topic Classification   **09/2020-09/2021**
- ➢ Extracted deep topic features representations using the Bidirectional Encoder Representations from Transformers (BERT) model and performed a mean-pooling on the token embeddings to synthesize the high-level semantic features in one sentence and get the averaged representation
- ➢ Pertained the model with simple softmax loss to learn the feature representation thereby measuring the performance of the acquired decision boundary
- ➢ Defined the centroid for each known class and supposed that the known topic features were constrained in the closed ball areas; calculated the radius of each topic region to obtain the decision boundary; used a new loss function for automatically learning tight decision boundaries that adapted to feature space; applied the centroids and decision boundaries to the classification of known samples and the detection of unknown samples
- ➢ Proposed a new three-way enhanced Density-Based Spatial Clustering of Application with Noise (DBSCAN) clustering model to cluster unknown samples in a finer granularity level
- ➢ Designed a knowledge base to enable the model to implement continual learning
- ➢ Conducted a series of experiments to demonstrate the effectiveness of the proposed model, whose results showed that the model outperformed all baselines in open topic classification

A Unified Incremental Updating Framework of Attribute Reduction for Two-dimensionally Time-evolving Data   **09/2020-07/2021**
- ➢ Employed a matrix-based approach to calculate approximation quality and conduct attribute reduction and designed a unified framework of incrementally updating approximation quality when object and attribute were changed simultaneously, thereby widening the application of neighborhood probabilistic rough sets in an open-world environment and reducing considerably the computational time of attribute reduction
- ➢ Introduced an attribute reduction algorithm based on the previous result to reduce the running time at most times and make the attribute reduction algorithm more stable with two-dimensionally changes of dynamic data
- ➢ Carried out numerical experiments from various perspectives to demonstrate the time efficiency, classification performance, and the wide application of the incremental algorithms

CONFERENCE

Presenter, The 16th International Conference on Intelligent Systems and Knowledge Engineering   11/2021

HONORS & AWARDS

SWUFE University-level Outstanding Graduation Thesis   06/2022
National Top 20 in the 2020 Citibank Financial Innovation Application Competition   05/2021
Honorable Mention in the 2021 Interdisciplinary Contest In Modeling   04/2021
Provincial First Place in the 2020 Contemporary Mathematical Contest in Modeling   10/2020

PROFESSIONAL SKILLS

- ➢ Programming Language: C/C++, Python, Java, MATLAB
- ➢ Proficient in applying PyTorch to developing deep learning models
- ➢ Skilled at using Long Short-Term Memory (LSTM) and Bidirectional Encoder Representations from Transformers (BERT) for natural language processing
- ➢ Adept in Adaptive Decision Boundary, Deep Open Classification, and DeepUnk for open intent detection
- ➢ Excelled at deploying Homogeneous Graph Neural Network (GNN) with DeepWalk, GraphSAGE, Graph Convolutional Network (GCN), Graph Attention Network (GAT) for node classification and link prediction, Heterogeneous GNN with Heterogeneous graph Attention Networks (HAN), Interpretable and Efficient Heterogeneous Graph Convolutional Network (ie-HGCN) and General Attributed Multiplex Heterogeneous Network Embedding (GATNE) for heterogeneous graphs, and HetGNN with Continual Learning to continuous fraud detection