Yuan Sui

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Github: https://github.com/Y-Sui
Personal Website: https://y-sui-aboutme.github.io/

Education

Shandong Normal University, Jinan, China Sep. 2019 – Expected Jul. 2023
Bachelor of Engineering in Computer Science and Technology

- GPA: **3.78/5.0, 87.8/100** | Rank in major: 10/126 | First Prize Scholarship
- English Proficiency (TOEFL-iBT): 111 (R: 29, L: 28, S: 28, W: 26)

Research Interests

Deep learning & reasoning, Transfer learning, Causal inference, Knowledge representation learning, Big data processing & managing, Natural language processing, Semantic parsing

Publications

Published:

[1] **Sui, Y**, Feng, S, Zhang, H, Cao, J, Hu, L & Zhu, N 2022, 'Causality-aware Enhanced Model for Multi-hop Question Answering over Knowledge Graphs', Knowledge-Based Systems, vol. 250, p. 108943. **[SCI-1, IF:8.139]**

[2] **Sui, Y**, Bu, F, Hu, Y, Zhang, L & Yan, W n.d., Trigger-GNN: A Trigger-Based Graph Neural Network for Nested Named Entity Recognition, 2022 International Joint Conference on Neural Networks (IJCNN '22), **[Oral, Core-ranking:B]**

[3] **Sui, Y**, Bu, F, Shao, X & Yan, W n.d., 'Optimization simulation of reflow welding based on prediction of regional center temperature field', Computer Simulation.

[4] **Sui, Y** 2021, 'Question answering system based on tourism knowledge graph', Journal of Physics: Conference Series, vol. 1883, no. 1, p. 012064.

Under-reviewed:

[1] **Sui, Y**, Ma, W, Lou, R, Zhang, K, Vosoughi, S, 'Trustworthy-transformer: Probing Transformer Attention Heads in Multi- and Cross-lingual Tasks', In proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing (EMNLP '22) **[Core-ranking:A]**

[2] **Sui, Y**, Wang, S, Cheng, Reynold, 'Learning Causal Representations for Knowledge Graph-based Question Answering', In Proceedings of the 31th ACM International Conference on Information & Knowledge Management (CIKM '22) **[Core-ranking:A]**

[3] Yan, W, Shi, Y, **Sui, Y**, Tian, Z, Wang, W & Cao, Q, 'Intelligent Predictive Maintenance of Hydraulic Systems based on Virtual Knowledge Graph', Robotics and Computer Integrated Manufacturing. **[SCI-1, IF:10.103]**

[4] Yan, W, **Sui, Y**, Cao, Q & Zhang, L, 'Automatic Relation Recognition for Inventive Design.', Knowledge-Based Systems **[SCI-1, IF:8.139]**

Patents:

[1] **Sui, Y**, Shi, Y, Niu, S, Liang, N & Cheng, X, Intelligent Q&A method and system based on tourism knowledge graph., CN: CN202110739738, 2022-6-21.

[2] Song A, Li, Z, **Sui, Y**, Jiang X & Hu Q, Named Entity Recognition Method for Resume, CN:CN202123275, 2022-5-28.

Research Experience

Learning Causal Representations for Knowledge Graph-based Question Answering
Advisors: Dr. Shu-Hui Wang (ICT, VIPL) & Dr. Reynold Cheng (HKU) 2021-02 - 2022-03

- Proposed a causal interference-based model denoted as the causal filter (CF) using clustering methods to reduce the spurious entity relations and missing link problems in Knowledge

Graph-based Question Answering (KGQA) task
- Devised a new mechanism based on their causal correlations produced by CF; The performance of this model achieves the SOTA on MetaQA (1-hop and 3-hop), Webqsp and OpenbookQA in 2021.
- One first authored paper under reviewed by CIKM 2022 (Core-ranking: A, CCF-B); one first authored paper being published by Knowledge-Based Systems (SCI-1, IF:8.139)

Semantic Parsing for Knowledge Graph-based Question Answering
Advisors: Dr. Shu-Hui Wang & Xinzhe Han (ICT, VIPL) 2022-03 - 2022-07
- Proposed a straight-forward semantic parsing method for Knowledge graph-based question answering to alleviate the semantic hierarchy challenges; Build a seq2seq model using Huggingface to realize the transformation from query to logic chain; Design relevant experiments to verify the effectiveness and efficiency of the method;

Trigger-GNN: A Trigger-Based Graph Neural Network for Nested Named Entity Recognition
Advisors: Dr. Wei Yan (SDNU) & Dr. Liang Zhang (SDU) 2021-05 - 2022-02
- Developed a trigger-based graph neural network (GNN) using recursively aggregation mechanism to tackle the uncertain rules for discontinuous token sequences and the confusing error aroused from multiple rules applying to an input instance at the same time in nested NER task
- Using the prompt-based method (entity-trigger) to bring the complementary annotation to the GNN model, and thus help the nested-NER models to learn and generalize more efficiently and cost-effectively
- One first authored paper has been accepted by IJCNN 2022 (Core ranking: B, CCF-C; Selected as oral)

Contributions of Transformer Attention Heads in Multi- and Cross-lingual Tasks
Advisors: Dr. Soroush vosoughi & Weicheng Ma (Dartmouth College) 2022-06 - Present
- Investigate the implementation of probing task; Build an eval-probing model using Huggingface to realize the evaluation of the how much linguistic property does the model learned; Design relevant experiments (head-wise & layer-wise) to verify the effectiveness and efficiency of the method
- Illustrate that pruning a number of attention heads in a multi-lingual Transformer-based model has, in general, positive effects on its performance in cross-lingual and multi-lingual tasks; and the attention heads to be pruned can be ranked using gradients and identified with a few trial experiments
- One first-authored paper under reviewed by EMNLP ’22 (Core-ranking:A, CCF-B)

Intelligent Predictive Maintenance of Hydraulic Systems based on Virtual Knowledge Graph
Advisors: Dr. Wei Yan (SDNU), Dr. Qiushi Cao (Swansea University) 2021-08 - 2022-03
- Assisted in proposing a virtual knowledge graph-based approach for the digital modeling and intelligent predictive analytics of hydraulic systems; Evaluated the functionality and effectiveness of the approach on predictive maintenance takes under real-world industrial contexts; Proved the capability and feasibility of the approach in the implementation of digital modeling, data access, data integration, and predictive analytics
- One third authored paper under review by Robotics and Computer-Integrated Manufacturing (SCI-1, IF:10.103)

Reflow Soldering Optimization Simulation based on Zone Center Temperature Prediction
Advisor: Dr. Wei Yan (SDNU, CAD&VC Group) 2021-08 - 2022-03
- Designed a set of reflow optimization strategies for reflow soldering of integrated electronic products and obtained a set of optimal process s parameters for a real-production scenario; Simulated the process using a first-order ordinary differential equation of the central temperature curve in the welding area
- One first authored paper has been accepted by Computer Simulation (Peking University Core Journals)

IngeniousMatch: Automatic Entity Matching for TRIZ knowledge
Advisor: Dr. Wei Yan (SDNU, CAD&VC Group) 2020-10 - 2022-06

- Reviewed and reproduced some of the SOTA methods of semantic matching; Designed a set of regression strategies for performance estimation to evaluate and quantify without groundtruth; Identified the matchers and their common correspondences which are instantiated automatically in the TRIZ knowledge graph; Experiments on multiple real data sets verify the accuracy and effectiveness of the proposed matching mechanism
- One second authored paper under-reviewed by Knowledge-based Systems (SCI-1, IF:8.139)

Working Experience

Microsoft Research Asia (MSRA), Beijing, China Expected Aug 2022 – Dec 2022
Visiting fellow @ Software Analytics Group, DKI
Mentor: Dr. Mingyu Zhou

- Supposed to focus on the deep model & training designs for structured prediction and combinatorial generalization on semi-structed data (tables and forms)

Dartmouth College, Hanover, United States June 2022 – present
Research Internship @ Minds, Machines and Society Lab
Mentors: Dr. Soroush vosoughi & Ph.D. candidate Weicheng Ma

- Investigate the implementation of probing task; Build an eval-probing model using Huggingface to realize the evaluation of the how much linguistic property does the model learned; Design relevant experiments (head-wise & layer-wise) to verify the effectiveness and efficiency of the method

ICT, Chinese Academy of Sciences, Beijing, China Mar 2022 – June 2022
Research Internship @ VIPL Group
Mentors: Dr. Shuhui Wang & Ph.D. candidate Xinzhe Han

- Investigate the implementation of Knowledge graph-based question answering based on semantic parsing method; Build a seq2seq model using Huggingface to realize the transformation from query to logic chain; Design relevant experiments to verify the effectiveness and efficiency of the method

Shandong Normal University (SDNU), Jinan, China Oct 2019 – Mar 2021
Research Assistant @ CAD&VC Group
Mentors: Dr. Wei Yan & Dr. Liang Zhang (SDU)

- Designed a named entity recognition model for tourism based on Bert-BiLSTM-CRF and built a tourism knowledge graph based on neo4j and protege; Implemented the whole project using 4000 lines of code, including syntax analysis, semantic analysis, intermediate code generation, and GUI for visualization

Activity

Founder & Leader, Robotics Lab, SDNU, Jinan, China Mar 2020 – June 2021

- Founded the school-level robotics lab and recruited 50 lab members; Organized an ”Openday,” invited approx 20 primary school students to the lab, and illustrated to the basic knowledge of robotics; Hosted a reading festival at the school library open to the whole campus and recommended books about robotics to the participants

Skills and Others

- Software & Programming Languages: C++, C, Java, Python & Protégé, Neo4j, Visio, Origin, Latex
- Deep learning framework: PyTorch, Tensorflow, Huggingface