

Zipeng Wang

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EDUCATION

Beihang University

2018.9-2022.6

- Major: Information Management and Information System
- GPA: **89.7/100**

PUBLICATION

- Junhuan Zhang, Zipeng Wang. **A Documents Clustering Method Based On Heterogeneous Graph Structure**. Chinese Science & Technology Resources Review, Submitted
- YunPeng Luan, Jing Zhang, Jun Hu, Zipeng Wang. **A Knowledge Graph Fusion Method Based On Entity Feature Similarity. Patent for Invention, 202120773146.X**

RESEARCH EXPERIENCE

Research on Knowledge Distillation Based on Vision Transformers

The Department of Computer Science and Technology, University of Cambridge

Supervised by Yifan Liu

2021.5-Present

- Applied knowledge distillation techniques to vision transformers like ViT and Swin Transformer, improved the performance of lightweight models by transferring knowledge from larger models to them
- Applied channel-wise distillation loss function to the attention map of each transformer block, achieved better results than existing methods which deployed distillation on the output feature of each block
- Applied gradient decomposition on the gradients of multiple distillation tasks in order to avoid harmful interference between task gradients
- Combined multiple loss functions to simultaneously learn multiple objectives using homoscedastic uncertainty, which allowed the model to adjust the weights of distillation tasks

Research on Knowledge Graph Fusion

Institute of Software, Chinese Academy of Sciences

NLP Intern, led by Jun Hu

2021.4 - 2021.7

- Introduced a knowledge graph fusion method based on entity feature similarity. Applied suitable distance metrics to different kinds of entity features to measure the comprehensive similarity of entities and distinct aligned entities by their similarity
- Extracted knowledge graphs from five data sources, constructed a dataset for entity alignment focusing on the UAV field and conducted experiments using the aforementioned knowledge graph fusion approach, gained more than 90% average F1 value in 10-fold cross validation, proving the effectiveness of the model
- Wrote reviews of knowledge graph fusion and crowdsourcing technologies respectively
- Attended the evaluation task of the China Conference on Knowledge Graph and Semantic Computing (CCKS 2021)

Cross-platform Technology Resource Aggregation and Large-scale Service Space Construction

Research on Document Clustering Analysis Based on Heterogeneous Graph Structure

National Key Research and Development Program, supervised by Junhuan Zhang 2020.6 - 2021.1

- Combined with the heterogeneous graph model and the meta-path based method, proposed a new clustering analysis method for scientific and technological resources literature, which could fully grasp papers' textual information and accurately show the interrelation among papers
- Established a heterogeneous graph network containing four types of entity as nodes, namely paper, author, journal and keyword, and used the meta-path based method to extract key information from heterogeneous graphs into isomorphic graphs involving only the same nodes for analysis
- Took Chinese publications in the field of artificial intelligence from 2000 to 2009 as an example, constructed a document network map with the conceptual entity as the document and a keyword network map with the conceptual entity as the keyword
- Extracted the paper networks including the same author, journal and keyword from the heterogeneous graph network, realized the similar literature recommendation using the node similarity, and conducted literature visualization and clustering with PCA+t-SNE method and k-means algorithm
- Extracted the keyword networks from the heterogeneous graph network, utilized spectral segmentation algorithm for keywords network clustering, found the research in the field of artificial intelligence mainly included the optimization algorithm, expert system, neural network, rough set theory, and agent theory, and obtained the five directions in research period changes of the degree of attention

CONTEST

2020 National University Students Mathematics Modeling Contest

Research on The Optimal Strategy of "Crossing The Desert" Game

2020.9

- Won The First Prize of Beijing
- Considered weather conditions, number of players, map information and other factors to study the optimal strategy of "crossing the desert" game
- Given weather condition and sole contestant: employed dynamic programming method to solve accurately, simplified the diagram, and abstracted the key nodes and key sections, greatly reducing the cost of the algorithm
- Random weather conditions: built the decision-making model based on weather probability, made the maximum expected return as decision-making target, acquired optimal strategy under any weather probability, and considered continuous bad weather condition, introduced an "emergency mechanism" to timely monitor players' probabilities of losing and help them avoid risk
- some probability of players and help them make the right decisions and timely avoid risk
- Two players and known weather: introduced a game model and searched Nash equilibrium to determine the optimal strategy

COMPUTER SKILLS

- Proficient in C, Python, SQL, PyTorch

HONORS AND AWARDS

- University-level Studies Excellent Scholarship (Three Times) 2018, 2019, 2020
- University-level Discipline Competition Scholarship (Three Times) 2018, 2019, 2020
- The National First Prize of "Foreign Graduate Cup" English Reading Contest 2019.12
- Third Prize in National English Competition for College Students 2019.4