Kefei Duan

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Research Interests

Natural Language Processing/Understanding, Question Answering System, Knowledge Extraction, Human-Computer Interaction

Education

Peking University, Beijing, China Sep. 2019 - Present

Bachelor of Science in Intelligence Science and Technology
GPA: 3.741/4.0 (Rank: 10/81)
Advised by Prof. Ming Zhang

Publications

Zequn Liu, **Kefei Duan**, Junwei Yang, Hanwen Xu, Ming Zhang, Sheng Wang. MetaFill: Text Infilling for Meta-Path Generation on Heterogeneous Information Networks. EMNLP 2022.

Experience

Research Assistant Aug. 2021 - Jun. 2022

Paul G. Allen School of Computer Science & Engineering, University of Washington, Seattle

* I work on this project under the supervision of Zequn Liu, a Ph.D. student at Peking University. The project is advised by Prof. Sheng Wang at University of Washington and Prof. Ming Zhang at Peking University.
* Key Idea: Formulate meta-path identification problem as a word sequence infilling problem, which can be advanced by Pretrained Language Models.
* Main Contributions: In this project, I do some preliminary research to find potential direction, help initiate the idea, conduct some pre-experiments to test our idea, implement all the baselines to compare with our method, conduct experiments on baselines to see their performance, and process some data for our use.
* Title: *MetaFill: Text Infilling for Meta-Path Generation on Heterogeneous Information Networks*
* Accepted to EMNLP 2022

Research Intern Nov. 2021 - Nov. 2022

Montreal Institute for Learning Algorithms (MILA), University of Montreal

* I work on this project under the supervision of Meng Qu, a Ph.D. student at Quebec Artificial Intelligence Institute. This project is advised by Prof. Jian Tang at Quebec Artificial Intelligence Institute and Prof. Ming Zhang at Peking University.
* Key Idea: To link entities in sentence to entities in Knowledge Graph and utilize the structured information, i.e.relational paths, in KG to facilitate Relation Extraction.
* Main Contributions: I lead the project to do some preliminary research to figure out whether our idea has been proposed and implemented before, initiate the idea and implement our algorithm, implement all the baselines to compare with our method, do experiments to evaluate the effectiveness of our model and write the paper for the submission purpose.
* Title: *Relation Extraction via Joint Reasoning with Texts and Knowledge Graphs*
* Rejected by EMNLP 2022. We have been improving this work based on the suggestions and questions proposed by reviewers, being ready to submit it again.

Research Intern Jul. 2022 - Sep. 2022

Paul G. Allen School of Computer Science & Engineering, University of Washington, Seattle

* I work on this project under the supervision of Prof. Sheng Wang at University of Washington.
* In this work, we mainly want to focus on Biomedical Document-level Relation Extraction, using Knowledge Graphs to facilitate relation extraction.
* Current Progress: For now, we have done some preliminary research and conducted some experiments using some baselines. We have implemented a simple model based on our idea, but more things need to be done. Due to time constraints, this project was temporarily put on hold. We will start working on this project again afterwards and it will become my thesis topic.

Research Intern May. 2021 - Present

Dlib, Peking University, Beijing, China

* Attend weekly group meetings.
* Advised by Prof. Ming Zhang and PhD candidate Zequn Liu.
* Work with other students on some projects.

Teaching Assistant Sep. 2022 - Dec. 2022

Peking University, Beijing, China

* Teaching Assistant of course *Introduction to Computation (C).*
* Work with Prof. Liyan Qian and other three Teaching Assistants.
* Help students with homework and course problems, and make them more familiar with Python.

Awards

China Merchants Securities Scholarship (Beijing, Peking University) Sep. 2022

Merit Student Award (Beijing, Peking University) Sep. 2022

National Inspirational Scholarship (Beijing, Peking University) Oct. 2022

National Scholarship Sep. 2021

* Highest scholarship awarded by the Chinese government, <0.1%

Merit Student Award (Beijing, Peking University) Sep. 2021

Third Class Scholarship (Beijing, Peking University) Sep. 2020

Merit Student Award (Beijing, Peking University) Sep. 2020

Coursework Projects

Artificial Intelligence for Drug Mar. 2022 - Jun. 2022

Project for course *Technology Innovation and Enterpreneurship.* Aim to use artificial intelligence to facilitate the production of drug-relief medicine. My main role in this project is to lead the group and use some existing algorithms to predict the drug activities.

Single Image Reflection Removal Mar. 2022 - Jun. 2022

Project for course C*omputational Photography: Image Formation Theory and Deep Learning Practice.* Work on my own and aim to remove the reflection in a image.

Analysis of the Author of The Story of the Stone Mar. 2022 - Jun. 2022

Project for course *Thinking in programming.* Work in a group of two and aim to use some machine learning technics to analyze whether the first 80 chapters and the last 40 chapters of Dream of the Red Chamber were written by the same person.

Robot Design Dec. 2021 - Jan. 2022

Project for course *Introduction to Intelligent Robots.* Work in a group of four and aim to design a robot in Webots to tidy up the room.

Bitcoin Crime Visualization Dec. 2021 - Jan. 2022

Project for course *Introduction to Visualization and Visual Computing.* Work in a group of four and aim to visualize the famous scam to find out where the bitcoins go.

Detection of Train Tickets Dec. 2021 - Jan. 2022

Project for course *Digital Image Processing.* Work independently and aim to find the area of train tickets in a image and detect the numbers on the tickets.

Machine Learning Translation Mar. 2021 - Jun. 2021

Project for course *Learning Data Science with Python.* Work in a group of two and aim to translate English corpus into Chinese.

Body Posture Detection Mar. 2021 - Jun. 2021

Project for course *Machine Learning.* Work in a group of five and aim to detect the posture of one person and give it to another person.

Medical Concept Generation Mar. 2021 - Jun. 2021

Project for course *Algorithm Design and Analysis*. Work in a group of two and aim to generate the concept description for given medical terms.

Design of Mahjong Bot Mar. 2020 - Jun. 2020

Project for course *Practice of Programming in C&C++*. Work in a group of three and aim to design a Bot to play Mahjong.

Design of Tour Guide Robot Mar. 2020 - Jun. 2020

Project for course *Introduction to Artificial Intelligence*. Work in a group of four and aim to design a tour guide robot in Webots.

Game of the Amazons Nov. 2019 - Jan. 2020

Project for course *Introduction to Computation (A)*. Work independently and aim to implement algorithms to let computer play Game of the Amazons with people.

Technical Skills

Programming Languages: Python, C/C++, Matlab

Softwares/Platforms/Libraries: PyTorch

Research Tools: LaTex