# Shujing Guo

## Personal Information

Shujing Guo
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Website: https://shujingguo.github.io/
TOEFL: prepared

## Education

09/2021 – Present **Master Candidate of Software Engineering**
Dalian University of Technology, Dalian, China
GPA:3.40/4.00 Average score: 84.37/100
Advisor: Prof. Hong Yu

09/2017 – 06/2021 **Bachelor of Engineering in Software Engineering**
Henan University, Kaifeng, China
GPA:3.66/4.00 Average score: 87.39/100

## Research Interest

Deep Learning

Multimodal Learning, Image Captioning

Natural Language Processing, Human-Computer Interaction, Trustworthy AI

## Research Experience

04/2023 – Present **Unsupervised Image Captioning**
**New Idea based on Object-Centric Unsupervised Image Captioning**

- Explored a novel Transformer-based network for Unsupervised Image Captioning which utilizes unpaired images and texts to train the model, and can effectively boost the object coverage of input image features.
- Given a sentence in the text dataset, harvesting objects corresponding to the sentence. Mined images which not only have the higher similarities to the given sentences but also contain certain objects. During training, the Transformer takes the set of object regions mined from the mined images as input. Calculate the Cross Entropy Loss between the predicted sentences and the original given sentences.

- Proposed a *Feature Extension Network* to expand the few object regions mined from the entire image dataset and to mimic complete region features extracted from real images' visual contents.
- The Feature Extension Network has already been trained and is trying to be embedded in the original network.

02/2022 – 01/2023 **Supervised Image Captioning**

**Fusion Transformer for Image Captioning** (02/2022 – 09/2022)

- Explored a novel *Fusion Transformer network* to fuse two types of visual features (region and grid features) considering directional relationships between objects. This network effectively captures both high-level and fine-grained details in the images for purpose of generating more reasonable sentences.
- Proposed a *modified Multi-Head Self-Attention* which simultaneously contains relative directional relations, absolute and relative positional information to enhance the orientation perception between visual features.
- Applied a *Fusion Attention* to thoroughly integrate the two types of visual features with word representations in an interlaced way.
- Employed a *Fusion Gate Operation* module to provide sophisticated control for the forward propagation of multimodal information as well as their back-propagating gradients.

**Further Improvement for Fusion Transformer** (09/2022 - 01/2023)

- Utilized segmentation features to substitute for the original region features as another visual information source. The segmentation features retain the spatial structure information of the original images and are easier to be fused with the grid features.
- The other modules in the network remain unchanged.
- Performed competitively on various evaluation metrics, e.g., **134.7 CIDEr** on COCO Karpathy test split.

01/2021 - 5/2021 **Crawling and Visualization Analysis System for Movie Website Data**

- Designed a crawler and visualization analysis system which takes Douban Top250 Movies' information as research objects.
- Utilized XML Path Language to crawl basic information and short comments of classic movies on the List, and store the information into a database.
- Obtained the target data from the database and filtered the short comments by constructing a stop word dictionary and an emotional dictionary. Then the Naive Bayes model is used to classify the sentiment of short comments.
- Realized the visual statistical display of the basic information and short comments of movies through Apache ECharts.

## Teaching Experience

03/2022 – 04/2022 Dalian University of Technology, Dalian, China
*Teaching Assistant*

- Acted as teaching assistant for **C++ Object-Oriented Programming** class, held office hours each week helping students with programming assignments and questions about the content from the lecture.
- Assisted Professor grade assignments, exams and gave feedback to students.

09/2021 – 10/2021 Dalian University of Technology, Dalian, China
*Teaching Assistant*

- Acted as teaching assistant for **Data Structures** class, held office hours each week helping students with programming assignments.
- Assisted Professor grade assignments, exams and gave feedback to students.

## Honors, Awards & Scholarships

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| 2021 – 2022 | Postgraduate Scholarship (full tuition fee, 2 times), School level |
| 2021 | Outstanding graduates, School level |
| 2017 - 2021 | Henan University Scholarship (4 times), School level |
| 2017 - 2021 | Outstanding Student Scholarship (4 times), School level |
| 2020 | 1st Prize of Henan University in the 13th Chinese Collegiate Computing Competition, School level |
| 2020 | 1st Prize of the women's group Jumping Jacks at Henan University Sports Meet, School level |
| 2018 | 3rd Price in Mathematics Competition (Non-Mathematics Majors), School level |
| 2018 | ACAA China Digital Arts Designer Professional certificate, National level |
| 2017 | Excellent Award of the 1st Oracle Cup Web Design Competition of School of Software, College level |

## Languages and Skills

- **Languages**: Mandarin (Native), English (TOEFL: prepared; CET6: 523, CET4: 602).
- **Skills**: Python, Pytorch, Deep Learning, Java, C++, JavaScript, Bootstrap, HTML, CSS, SQL, Linux command, Typescript, UI design, Adobe Photoshop, Microsoft Office (Word, Excel, and PowerPoint), EndNote, and so on.