Guanzhong Liu

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SKILLS

Languages: Python, Java, C++, C, Kotlin, Matlab, Shell Script, SQL.
Tools & Framework: Git, Pytorch, Tensorflow, PostgreSQL, Neo4j, Vim, Latex, Pandas, Numpy.
AI Models: Regression, Boosting, Bagging, Decision Tree, SVM, Bayesian Learning, CNN, RNN, LSTM, GAN, Autoencoder, Transformer.

EDUCATION

Carnegie Mellon University, Language Technologies Institute Aug 2022 - Dec 2023
M.S. in Intelligent Information Systems

Tianjin University, College of Intelligence and Computing Sep 2018 - Jun 2022
B.E. in Computer Science and Technology

INTERNSHIP

Machine Learning Engineer Intern. **Tencent, Beijing, China** Apr 2021 - May 2022

- Designed a document based question answering system (DocQA) based on the dense retrieval model (DPR), increased the F1 score and MRR score by 0.152 and 0.145 respectively.
- Leveraged text features (BM25, duplicated keywords and statistical features) to enhance Longformer's modeling ability of language, ranked 5th in the Challenge of AI in law (CAIL2021)'s similar case retrieval competition.
- Worked on document-grounded dialogue and conversational question answering, emphasized the role of grounding in answer generation, ranked 2nd Place in ACL 2022 DialDoc Shared Task (SEEN subtask).
- Leveraged incremental learning to smoothly iterate the model, helped analyze customers' arriving rate and identify potential customers, increasing customer arrival rate by about 3.75x.

Software Development Engineer Intern. **TWT Studio, Tianjin, China** Sep 2018 - Apr 2021

- Participated in the reconstruction of WeiPeiYang, the campus app of Tianjin University, implemented sub-modules as libraries which provided entry points for the main app module and applied them in WeiPeiYang as plug-ins.
- Implemented client-side crawler in order to crawl the curriculum and GPA information from the official curriculum website, and also supported students to customize their course plans.
- Developed basic module commons (network requests, cache, RecyclerViewDSL) to support responsive asynchronous network requests with cache based on LiveData, generic programming and Kotlin coroutines; used Retrofit and reflection to handle network requests and create dynamic proxy, routing all method calls to single handler.

RESEARCH EXPERIENCES

Research Assistant. ML Research with Prof. Liu Yang. Apr 2021 - May 2022

- Designed a federated adversarial data augmentation technique to address the problem of low data resources in federated learning.
- Combined the classifier with GAN's discriminator by the 2k-Loss function, enabling finding the unified decision boundaries of both real and fake samples, improved accuracy in the case of low data regime by 7%+.
- Leveraged knowledge distillation in the global update phase to sync the augmenter with stronger privacy protection, lower communication cost, and acceptable performance loss.

Research Assistant. NLP Research with Prof. Xin Wang. Apr 2020 - Apr 2021

- Worked on the construction of a high-coverage, scalable knowledge graph prototype system of Chinese historical documents.
- Trained BERT model with ancient Chinese corpus, and enabled the model to learn from the special syntactic features and sentence segmentations of ancient Chinese, which improved the F1-score in named entity recognition by 10%+.
- Leveraged boosting method and used multiple recognizers to vote for the prediction, improving the F1-score by 5%+.
- Extracted relation knowledge from unstructured texts using pipeline model, which used the encoded entity types provided by entity recognizers and the entities' word embeddings encoded by BERT, enabling the relation extraction model to learn from the entity relationship between different types.

Research Assistant. CV Research with Prof. Wenyu Qu. Apr 2019 - Apr 2020

- Used one-stage detection based on CNN to achieve high inference speed at about 30 fps with shorter delays for detection.
- Used dimension clusters based on training data as anchor boxes, and increased the number of objects that each grid can predict, which improved the recall by 2%+ with a decrease in mAP metric of 0.5.
- Added CBAM (Convolutional Block Attention Module), which can be seamlessly integrated into CNN architectures with negligible overheads, and improved mAP by 0.8+.

PUBLICATIONS

- DialDoc Workshop at ACL 2022: G4: Grounding-guided Goal-oriented Dialogues Generation with Multiple Documents (Shiwei Zhang, Yiyang Du, Guanzhong Liu, Zhao Yan, Yunbo Cao)
- WISA 2021: Constructing Chinese Historical Literature Knowledge Graph Based on BERT (Qingyan Guo, Yang Sun, Guanzhong Liu, Zijun Wang, Zijing Ji, Yuxin Shen, Xin Wang)