Zhaoning Li

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EDUCATION

Sun Yat-sen University (SYSU) Guangzhou, China
Master of Engineering in Software Engineering 2016.09-2018.07

- Research Interests: Natural Language Processing, Information Extraction
- Awards: Third Class Scholarship (2016, 2017)
- Graduation Thesis: Research on Causal Knowledge Extraction Method based on Deep Learning and Sequence Labeling

Bachelor of Engineering in Information Security 2012.09-2016.07

- Relevant Courses: Computer Programming, Data Structure and Algorithm, Graph Theory and Its Algorithms, Principles and Applications of Artificial Intelligence

PUBLICATIONS

Li, Z., Li, Q., Zou, X., Ren, J. Causality Extraction based on Self-Attentive BiLSTM-CRF with Transferred Embeddings. *Neurocomputing*. 2021 (arXiv version: http://arxiv.org/abs/1904.07629)

Li, Z., Ren, J. Fine-tuning ERNIE for Chest Abnormal Imaging Signs Extraction. *Journal of Biomedical Informatics*. 2020 (arXiv version: https://arxiv.org/abs/2010.13040)

Li, Z., Jiang, Q., Ku, Y. Bot or Not: How Passenger Tells apart AI and Human Drivers in the Turing Test of Automated Driving? In preparation

PATENTS

Li, Z. Causal Knowledge Extractor based on Deep Learning V1.0. China Patent Application 2018SR275268, Certificate No.: 2604363, filed 2018.

RESEARCH EXPERIENCE

Research on Turing Test and Emotional Experience of Passengers in Automated Driving Guangzhou, China
Research Assistant, with Prof. Yixuan Ku, Memory & Emotion Lab at SYSU 2020.09-Present

- Conducted a Turing test on automated driving based on 69 passengers' feedback in a real scenario
- Test results showed that Level 4 autonomous cars could pass the Turing test with accuracy no more than 50%
- Predicted feedback of passengers in the Turing test by proposing a computational model based on signal detection theory, where affective variability is tested by modified DES-IV and transformed by pre-trained language model as the perceptual intensity
- Analyzed the impact of a passenger's emotion given the proposed model on the Turing test regarding their choices on whether the car is driven by an AI agent or a person, and generated a straightforward explanation
- Suggested that future automated driving should improve its performance and stability in complex road segments based on d-prime analysis of passengers

Causality Extraction based on Self-Attentive BiLSTM-CRF with Transferred Embeddings Guangzhou, China
Research Assistant, with Prof. Jiangtao Ren 2018.09-2020.03

- Designed a causality tagging scheme and transformed the causality extraction into a sequence labeling task to handle multiple causal triplets and embedded causal triplets in the same sentence
- Identified cause and effect without extracting candidate causal pairs and identifying their relations separately by proposing SCITE (Self-attentive BiLSTM-CRF with Transferred Embeddings), a neural-based causality extractor with transferred contextual string embeddings trained on a large corpus
- Introduced the multi-head self-attention mechanism into SCITE to capture long-range dependencies between cause and effect
- Proposed a model outperformed BiLSTM-CRF by 7.24% by verifying that the causality tagging scheme achieved an improvement rate of 10.06% over the general tagging scheme

Causality Extraction based on Bi-directional LSTM Networks with Focal Loss Guangzhou, China
Individual Research, with Prof. Jiangtao Ren 2017.09-2018.04

- Formulated causality extraction as a sequence labeling problem based on deep learning models to minimize feature engineering and extract the causal knowledge directly
- Investigated different BiLSTM-based end-to-end models to achieve the best performance
- Addressed the tag class imbalance problem in causal sequence labeling by proposing an end-to-end model with focal loss as the loss function, named BiLSTM-Softmax (FL)
- Evaluated on a public dataset and identified that the proposed model can effectively enhance the association between cause and effect

PROFESSIONAL EXPERIENCE

Fine-tuning ERNIE for Chest Abnormal Imaging Signs Extraction Guangzhou, China
NLP Engineer, Department of Big Data and Artificial Intelligence at Tianpeng Technology Co., Ltd. 2019.04-2020.05

- Formulated chest abnormal imaging sign extraction as a sequence tagging and matching problem
- Alleviated the problem of data insufficiency by proposing a transferred abnormal imaging signs extractor with pre-trained ERNIE as the backbone, named EASON (fine-tuning ERNIE with CRF for Abnormal Signs ExtractiON)
- Designed a tag2relation algorithm based on the nature of chest imaging report text with more than 2,500 training sets
- Evaluated the algorithm with over 450 test sets to serve the matching task
- Proved the effectiveness of the proposed model for chest abnormal imaging signs extraction, which outperformed ERNIE by 1.05 points in abnormal imaging identification, 0.37 points in attributes identification, and 2.15 points in matching in terms of F1-score

Multi-task Learning for Diagnosis Assistance based on Information Extraction and Text Classification Guangzhou, China
NLP Engineer, Department of Biomedical Artificial Intelligence at Tianpeng Technology Co., Ltd. 2019.09-2019.12

- Improved the interpretability of the deep learning-based diagnosis prediction model by proposing a multi-task learning model based on information extraction and text classification
- Programmed with Keras to predict the disease and extract relevant proof from each patient's e-medical records, providing evidence for the prediction
- Reached a hypothesis that diagnosis prediction and interpretability analysis are mutually reinforcing

Rare Disease Diagnosis based on Similarity Measuring and Additive Margin Softmax Guangzhou, China
NLP Engineer, Department of Biomedical Artificial Intelligence at Tianpeng Technology Co., Ltd. 2019.08-2019.12

- Trained the classification model to get the vector representation of each patient by applying the diagnosis prediction model for common diseases as an encoder
- Employed K-nearest neighbor algorithm on the basis of cosine similarity to contrast and sort the vector representations, achieving the results of the prediction
- Applied AM-Softmax in face recognition as the loss function to reduce intra-class variation and increase inter-class difference

LANGUAGES AND SKILLS

Programming Skills: Python, Jupyter Notebook, Keras, LaTeX, Linux
Languages: Chinese (Native), English (Proficient)