Quanyu Long

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EDUCATION

Shanghai Jiao Tong University (SJTU) Sept. 2016 - Jun. 2020 (expected)

B.S. in Computer Science

- **Overall GPA: 88.9/100, Major GPA: 88.5/100, Ranking: 15/93**
- **Admitted to IEEE honor class -** ninety students selected from all admitted students entering 2016
- **Admitted to Zhiyuan Honors Program of Engineering -** an elite program for top 5% students
- **Core Coursework:** Linear Algebra / Mathematical Analysis (Honor) (1) (2) / Discrete Mathematics / Probability and Stochastic Process / Design and Analysis of Algorithms / Data Structure **/** Artificial Intelligence / Machine Learning / Reinforcement Learning / Information Theory

RESEARCH EXPERIENCES

Analyze and Improve the Robustness of Pre-trained Encoder against Grammatical Errors

Advisor: Prof. Kai-Wei Chang, Computer Science Department, UCLA Jul. 2019 - Dec. 2019

- Analyzed the behavior of pre-trained language models when confronting with ungrammatical input texts.
- Derived token-level confusion matrix from existing Grammar Error Correction (GEC) dataset, then introduced errors based on the learned matrix in two manners, random-case transformation and worst-case transformation.
- Designed a novel attacking framework for worst-case transformation, which combines techniques from non-target black -box adversarial attack with grammatical errors.
- Proposed a simple but effective method, Data Augmentation, to defend the attack from adversarial samples.
- Adjusted the Masked Language Model training objective and learned BERT to produce more robust embeddings. The newly trained BERT shows grammar error correction ability on GEC task.

Compare Contextualized Embedding Alignment Methods with Multi-lingual BERT on Cross-lingual Tasks

Advisor: Prof. Yong Yu, Prof. Weinan Zhang, Computer Science Department, SJTU Jan. 2019 - Apr. 2019

- Studied two approaches in cross-lingual transfer: word embedding alignment and multilingual BERT.
- Leveraged contextual pre-trained language models to produce context-dependent embeddings, then aligned two mono-lingual embedding spaces for each language pair in an unsupervised way.
- Compared those two approaches on Name Entity Recognition (NER) and Dependency Parsing in a zero-shot learning setting and found that even without explicit cross-lingual signal, the latter one achieved higher scores.
- Discovered BERT effectiveness in zero-shot cross-lingual transfer, and one explanation is that word-piece encoding allows BERT to share embeddings across languages.

QA4IE+: A Question Answering based System for Document Level Information Extraction

Advisor: Prof. Yong Yu, Prof. Weinan Zhang, Computer Science Department, SJTU Aug. 2018 - Dec. 2018

- Studied how to improve the Information Extraction (IE) performance by leveraging Question Answering (QA) methods. Developed a real-time IE system to extract relation triples throughout the document.
- Implemented the state-of-the-art NER and Named Entity Linking (NEL) models which are important components within QA4IE+ system.
- Created a wiki-style NER training set automatically to learn a better NER model, which increases the Main Entity Recall and improves the overall performance of QA4IE+ system.

Web Traffic Anomaly Detection via Generative Adversarial Network and Reinforcement Learning

Advisor: Prof. Li Jiang, Computer Science Department, SJTU Dec. 2018 - Jan. 2019

- Formulated the task of web traffic anomaly detection as a univariate time-series classification problem.
- Proposed a CNN-LSTM classifier, which captures spatial and temporal information in traffic windows and achieves state-of-the art performance on Yahoo S5 webscope dataset.
- Proposed a novel Generative Adversarial Network (GAN) plus Reinforcement Learning (RL) network, which can learn the distribution of normal status via policy gradient.
- Detected the anomalies by performing anomaly assessment, which is designed to judge how large the discrepancy between the learned distribution and test data.

PROJECT EXPERIENCE

Human Face Classification and Detection

Advisor: Prof. Quanshi Zhang, Computer Science Department, SJTU Feb.2019 - Apr. 2019

- Created a face classification dataset by extracting human faces from a more general image dataset, Face Detection Dataset and Benchmark (FDDB).
- Extracted Histogram Oriented Gradient (HOG) feature vector for each sample and implemented different classifiers which take the HOG feature vectors as input, such as: Logistic, SGD, Langevin Dynamics, Fisher, SVM and CNN.
- Detected faces by applying the CNN classifier in each sliding window.

Reinforcement Learning for Cloud Resource Allocation

Advisor: Prof. Na Ruan, Computer Science Department, SJTU Mar. 2019 - May. 2019

- Made the cloud cluster learn a global allocation policy for Jobs Broker to dispatch incoming jobs and a local controlling policy for a server to determine a timeout turning itself off when it's idle.
- Designed RL frameworks for both local and global tiers. And proposed a novel method to incorporate local tier into global tier, based on this approach, two tiers can help each other to choose better actions.
- Simulated the cloud cluster environment and performed experiments via Google cloud traces datasets.

Online One-stop Service of Travel Planning and Searching

Advisor: Prof. Ya Zhang, Computer Science Department, SJTU Nov. 2017 - Dec. 2017

- Crawled the tourist spots, hotels and restaurants, then saved the data in an inverted index format.
- Developed services including route planning, time arrangement and searching, saving users from dull planning.
- Implemented website interface by utilizing web.py and Baidu maps API to display locations and routes.

Augmented Reality on Smart Glasses

Advisor: Prof. Qixin Cao, School of Mechanic Engineering, SJTU Sep. 2016 - Sep. 2017

- Proposed 3D-object static recognition algorithm to quickly recognize the marker object. Applied camera calibration method to map the world coordinate to camera coordinate, then to pixel coordinate
- Designed modules to place virtual 3D objects when the marker object is recognized. And proposed a tracking algorithm to track marker movements.
- Developed a real-time AR software based on those algorithms and modules, then deployed it to smart glasses.

SELECTED AWARDS

Shanghai Scholarship (Top 3%)	2018
Matsushita Electric Education Scholarship (Top 5%)	2017
Zhiyuan College Honors Scholarship	2016 & 2017 & 2018 & 2019
Second Prize in China Undergraduate Mathematical Contest in Modeling	2017

LEADERSHIP AND ACTIVITY

Student Union | SEIEE | Vice Minister of the Office Mar. 2017 - Mar. 2019

- Organized the New Members in Student Union Eve.
- Wrote a handbook for freshmen to choose the majors.
- Chaired monthly meetings to collect feedback from ministers from other departments in the student union.

Youth Volunteer Association | School of Electronic Information and Electrical Engineering Mar. 2017 - Present

- Organized voluntary activities and managed volunteers.

SKILLS

- Programming Languages: Python, C/C++, Java, MATLAB;
- Computer Skills: HTML/CSS/JavaScript, LaTex, PhotoShop;
- Deep Learning Platform: PyTorch, TensorFlow.