

ZIHUA LIU

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EDUCATION

Peking University
B.S. in Computer Science
GPA: 3.58/4.0

September 2014 - July 2018

RESEARCH AND INTERNSHIP EXPERIENCES

Microsoft Research Asia, Beijing
Research Intern, Software Analytics Group

April 2017 - Present
Supervised by Lead Researcher Dr.Zhouyu Fu

- Auto Insights for Power BI and Excel

- * Auto Insights is a research framework for automatic mining and recommendation of various insights from multi-dimensional data.
- * This framework automatically reports regular patterns and interesting insights in a worksheet to the user, thereby saving time to analyze the data sheet by themselves.
- * I implemented time series insights, including univariate and multivariate time series insights, as well as sequential data insight and pivot table insight recommendation with C#.
- * Quick Insights of Microsofts Power BI is powered by this project and the project has been embedded into the new versions of Excel owned by over 30 million users globally.

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- Robust Data Forecasting In Excel

- * The goal of this project is to optimize the series prediction algorithm in Excel given that the current prediction result in Excel is inaccurate when data are noisy or the prediction length is relatively long compared with the known data.
- * This project proposed a novel algorithm, which can significantly improve the performance of data prediction task even when historical data contain extensive noise.
- * I independently designed and implemented the new algorithm. I introduced a novel generative model to cooperate with the traditional prediction algorithm and increase the accuracy of 50% compared with the current prediction algorithm in Excel.
- * The project has been submitted to Microsoft's Excel Product Team and received positive feedback. The research achievement of this project has been summarized in a paper submitted to IJCAI 2018.

Software Engineering Institute, Peking University
Undergraduate Research Intern

June 2016 - March 2017
Supervised by Prof.Ge Li

- Program Generation by Deep Neural Network with Variable Status Table

- * This project aims to eliminate the interference that self-defined variables bring to the automatic code-generation process and produce executable code fragments or complete programs that meet the needs of developers.
- * Users can express their intention in the natural language and RNN will automatically generate the corresponding code in a character-by-character manner.
- * I introduced a variable status table to a traditional character-based RNN to deal with the issue of self-defined variables. The network successfully generated executable and functionally coherent source code.

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SELECTED COURSE PROJECTS

Chinese Automatic Question-Answering System
Supervised by Dr.Xiaojun Wan

September 2016 - December 2016

- * The system takes users Chinese natural language question as input and return the answer of the question to the user.

- * The system comprises sentence segmentation, keyword extraction, question classification, paragraph search, template matching and some other modules.
- * I implemented Chinese tokenizer with Python to process the input question, a Deep Neural Network with Tensorflow, to classify the input question and a web crawler with Java to search for answers on the Internet.

RISC-V Instruction Set Architecture Simulator

October 2016 - January 2017

Supervised by Prof. Guangyu Sun

- * The simulator aims to simulate the execution process of an ELF file based on RISC-V instruction set architecture.
- * The simulator simulates the executing steps, such as analyzing, fetching, and decoding, for a given ELF RISC-V file and implements most of the system calls, such as standard input and output.
- * I developed the simulator with C++ and constructed the relative data structure to simulate the hardware, such as registers, memory, and program counter, among others. I translated each instruction in RISC-V ISA to the execution of the simulative hardware.
- * The simulator is capable of completing the execution of complex real-world benchmark program, such as Dhrystone.

AQI Detector Application

April 2017 - June 2017

Supervised by Prof. Kaigui Bian

- * AQI Detector is a practical IOS application that helps users know the real-time air quality index (AQI) in the users respective locations.
- * Users simply need to take a picture of the sky with their IOS device, upload the picture to the server, and the server will calculate the AQI based on the picture and return the result to the users device.
- * I collected a training data set with over 1000 pictures and trained a convolution neural network (CNN) on the server side to calculate the AQI with the uploaded picture as input. I developed the relative IOS application with swift3, which assured the compatibility with the latest iPhone and IOS11.
- * The application shows steady performance on IOS and the average error between the CNN-produced result and the real-world AQI is under 10%.

PUBLICATIONS

- **Zihua Liu**, Zhouyu Fu, "Robust Time Series Prediction with Combined Discriminative and Generative Learning", IJCAI 2018 (Submitted)

PROFICIENCIES

English Proficiency	GRE: 157(V) + 170(Q) + 3.0(AW), TOEFL: 28(R) + 26(L) + 26(S) + 26(W) = 106
Programming Languages	C/C++, C#, Python, Java, Swift, Assembly, HTML/CSS, JavaScript, Matlab, SQL
Technical Strengths	Data Structures, Algorithm Design and Analysis, Data Mining, Data Visualization, Machine Learning/Deep Learning, Pattern Recognition, Graph Theory
Open-source Framework	Tensorflow, Theano, Keras, Torch, Django

AWARDS AND HONORS

Excellent Award of Stars of Tomorrow Internship Program, Microsoft Research	2017
Learning Excellence Award, Peking University	2015
Kwang-Hua Scholarship, Peking University	2015
Third Prize, Programming Contest of Peking University	2015
MVP, Peking University Basketball Association	2014