Zengmingyu HE

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Education

BEIJING UNIVERSITY OF POSTS AND TELECOMMUNICATIONS (BUPT), BEIJING, CHINA **SEPT 2013-PRESENT**

- B.E. in Telecommunications Engineering with Management
- CS related GPA: **92.6/100**, GPA: **90.7/100 (4.0/4.0),** ranked **3/187** of multimedia track

QUEEN MARY UNIVERSITY OF LANDON (QMUL), LONDON, UK **SEPT 2013-PRESENT**

- B.E. in Telecommunications Engineering with Management, joint degree

Awards and Scholarship

- **National Scholarship (top 0.5%), the highest honor scholarship for undergraduates, China Education Ministry, 2015**
- **First-Prize Scholarship (top 1%), BUPT, 2014**
- Second-Prize Scholarship (top 2%), BUPT, 2016
- **Outstanding Visitor (top 1%), Queen Mary University of London, 2015**
- **First Prize in Start-up Competition (top 0.5%), BUPT, 2014**
- Honorable Mention in MCM/ICM, the Consortium for Mathematics and Its Application (COMAP), 2014
- Second Prize in Star of Outlook English Talent Competition, China Central Television (CCTV), 2014
- Most Likable Volunteer Teacher, Volunteer Association of BUPT, 2014

Internship Experience

IBM, BEIJING CHINA **JULY 2016-PRESENT**

Cloud Managed Services, China Development Laboratory, IBM China System & Development Center
Software Engineering Intern, supervised by Lilong Chen, Architect & IT Advisor

New PaaS Architecture for IBM CMS with Microservice Layer **SEPT 2016-NOV 2016**

- Develop a new architecture of platform as a service (PaaS) based on Kubernetes and Docker, to simplify, visualize, and automate continuous integration and continuous deployment (CI/CD);
- Co-designed the overall architecture and function components of each layer especially microservice layer;
- Designed and implemented API gateway functions, communication method with service discovery and API capsulation;
- Designed and implemented several application widgets (services) with both front-end UI (web-based) and back-end services running on computing cluster (NodeJS server);
- Obtain a web application integrated with a) *yaml* configuration costumed service deployment, b) visualized topology of master and slave nodes and c) no downtime service versions switching.

Graphic Status Monitor of Distributed Computing Cluster **JULY 2016-SEPT 2016**

- A common practice in computing cluster topology monitoring is to frequently call control API which is complicated and not intuitive, and visualized graphics can solve this problem;
- Implemented back-end shell scripts calling parts of control APIs based on function needs;
- Build the front-end UI as Model-view-view model (MVVM) in AngularJS and obliterated the time delay of data refreshing;
- Obtain web application deployed on the container which can show the entire networking topology of computer cluster as well as basic node information such as healthy status.

Research Experience

Configuration Error Diagnosis by Linking Configurations to Runtime Logs **FEB 2016-PRESENT**

High-Performance Computing Institute (HPCI), Computer Science Department, Tsinghua University
Research Assistant; Advisor: Ying Zhao, Associate Professor

- In high-performance computing, massive amounts of run-time logs are the best material and configuration errors are very common. Establishing linkage between these two factors can help give effective solutions to errors;
- Worked out algorithms to link configuration errors identified from run-time log with built-in or external configuration parameters;
- Explored and summarized general rules of configuration parameters reading and cross-referencing in assembled code disassembled from X86 based program;
- Implemented tracing and slicing algorithms via Python with utilizing IDAPython library;
- Obtained executable Python scripts that automatically parses configuration error related logs and rank possible root cause by probability.

Genlog: Accurate Log Template Discovery for Stripped x86 Binaries **FEB 2016-OCT 2016**

High-Performance Computing Institute (HPCI), Computer Science Department, Tsinghua University
Research Assistant; Advisor: Ying Zhao, Associate Professor

- To thoroughly picture status of machines, probes and monitors are deployed, and logs are generated; logs should be structured before any automatic analyzing techniques can be used;
- Discovered the patterns of log-related functions in modern X86 based program like Nginx;

- Worked out the algorithms to trace highlighted variables in assembly code and scale down searching scope;
- Implemented parts of front and back slicing algorithms via python and extracted manually log templates from experiment programs for comparing and evaluation;
- Obtained python script that extracts templates of all given logs of an individual program and log-related functions calling graphics (trees and forests).

Load Prediction-based Automatic Scaling Cloud Computing **MARCH 2015-SEPT 2015**

State Key Laboratory of Networking and Switching Technology, Beijing University of Posts and Telecommunications, Beijing
Research Assistant; Advisor: Jingyu Wang, Associate Professor

- Existing elastic scaling in cloud computing cannot avoid time delay or guarantee precision on resources re-allocation;
- Discovered shortcomings including shortage and waste in computing resources on existing popular virtual computing software like Xen and VMware;
- Improved KMP string matching algorithm to slacken matching constraint so that similar load sequences can be included.
- Obtained an algorithm predicts next moment load and complete horizontal and vertical extension accordingly, helping improve cumulative resource usage and reduce cost.

Publication

Maosheng Zhang, Ying Zhao, **Zengmingyu He**, *"GenLog: Accurate Log Template Discovery for Stripped X86 Binaries"*, to be submitted to COMPSAC, January 2017;

Selected Course Projects

Innovation Project: Medicine Searching Web Application based on Image Recognition **JUNE 2015-JUNE 2016**

Team Leader; Advisor: Guoshi Wu, Professor at the School of Software, BUPT

- Designed a web-based application helping elderly customers find products-especially medicine-by simply uploading or taking photos of aimed targets;
- Utilized algorithms such as shift invariance feature detection (SIFT), Corner Feature Detection and Optical Character Recognition to match request to target in database, which is obtained by web crawler in Python;
- Implemented the whole system with Bootstrap, JQuery and JCorp in front-end and Django in server-end;
- Certified as a National Innovation Project (awarded to 1%).

Software Engineering: Trip Trains Management System **OCT 2015-DEC 2015**

Team Leader; Advisor: Dr. Ling Ma, Lecturer at EECS School, Queen Mary, University of London

- Designed an information management system for trains, drivers, stations and travel lines within a given scenic area;
- Designed graphic user interface (GUI) consisting of three main function components including timetable, travel line control and trains and drivers scheduling;
- Implemented the whole system integrated with visualized graphics in Java (over 5K lines of Java code).

Internet Application: FTP Proxy with File Cache **SEPT 2015-NOV 2015**

Team Leader; Advisor: Dr. Yan Shi, Lecturer at Computer Science Department, BUPT

- Designed and implemented an FTP service proxy via C programming language;
- Positive and negative mode selection supported;
- Downloaded file cache featured that can significantly increase response speed;

Android App: Remote Controller of Intelligent Lamp based on Bluetooth and Arduino **JUNE 2015-SEPT 2015**

Team Leader; Advisor: Andy Watson, Lecturer at EECS School, Queen Mary, University of London

- Designed and assembled an intelligent lamp that automatically collects data from environment such as temperature, humidity, air pressure, and brightness;
- Designed and implemented an algorithm to utilize these factors so that the lamp could automatically satisfy the need for lights in different situation including day, evening, and early morning;
- Developed an Android-based app to control the lamp via Bluetooth protocol carried out with HC-06 module. (2K lines of Java code)

Entrepreneurship Experience

iOuting Club (LLC.), Beijing, China **DEC 2013-MAY 2015**

- Co-founder of iOuting Club, aiming at creating opportunities for foreign and native university students to communicate, and the drafter of the business plan for financing and start-up competitions.
- Designer and carrier of the company website, the WeChat official account with online paying methods supporting API, and the automated FAQ assistant based on a decision tree.
- Wrote the business plan, won a prize in the start-up competition of BUPT and contributed to angel round financing.

Skills

- Computer Skills: Assembly, C, Java, Python, HTML, CSS, JavaScript, NodeJS, Swift, Objective-C, Shell, Apple Script, MATLAB, Gnuplot, LaTeX, Arduino, Linux
- Languages Skills: Chinese (Native), and English (Fluent, TOFEL 106 & GRE 320)