Yifan **Song**

Doctoral student

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Summary

I am a 4th-year Doctoral student at NSRL@USTC on the distributed control system for large scientific facilities, especially the particle accelerator. My Ph.D research work covers a range of issues: Large distributed control system, Data acquisition, storage, retrieval, visualization and mining, Interlocking and alarm for the control system, System redundancy and availability, Industrial real-time Ethernet.

Education

University of Science and Technology of China

Ph.D. in Nuclear Science and Technology — *Sep. 2010 - Jun. 2019 [anticipated]*

- GPA: top1 / total 60, supervisor: Prof. Gongfa Liu

University of South China

B.S. in Nuclear Security Engineering — *Sep. 2010 - Jun. 2014*

- GPA: top1 / total 148

Skills

Programming	C, Python, Java, Matlab, Shell, LabWindows/CVI, JavaScript, Scala, PyQt
Web Development	Vue.js, Node.js, MongoDB, MySQL, SQLite, Express, jQuery
Big Data	Hadoop, Spark, Impala, Kafka
Control System	EPICS (V3 & V4), Control System Studio, Phoebus, Archiver Appliance, BEAST, S7plc, pyEPICS
Physics	Background knowledge in partical accelerator physics(Storage Ring & Linac)
Misc.	Linux, Mac OS, Virtualization, Docker, openPOWERLINK, Git, LaTeX.

Projects

Automatic data archiving and analysis system at Hefei Light Source (HLS-II)

Core Member — *Nov. 2017 - PRESENT*

- Local updated and deployed the Data archiving system based the EPICS Archiver Appliance (AA) at HLS-II;
- Developed the Auto Configurator using C and Python to realize the automatic configuration of the archiving parameters;
- Developed the Single-Page-Application (SPA) based on Vue.js and Highcharts to realize the visualization of historical and real-time data;
- Constructed the Hadoop big-data platform using Cloudera CDH;
- Developed the ETL program from AA and RDB Channel Archiver using Sqoop and Spark.

Interlocking and alarm system at HLS-II

Core Member — *May. 2015 - PRESENT*

- Designed, developed and deployed the Configurable Software Interlock System for HLS-II
- Local updated and deployed the alarm system based on BEAST at HLS-II;
- Developed the alarm message push program via email & SMS using Java;
- Upgraded the alarm system using Phoebus this year;
- Developing the new message push programs via WeChat using Python.

Control system design and construction for front-end devices of IRFEL

Member — *Sep. 2017 - PRESENT*

- Developed the IOC Applications for front-end devices of Infrared Free Electron Laser Light (IRFEL);
- Completed the controls of vacuum gauge, power supply, motor, etc;
- Designed and developed the operation interface using Phoebus and Display Builder;
- Constructed the server system based on VMware vSphere.

High level control system for a coating equipment

Core Member *Jun. 2015 - May. 2016*

- Developed the high level control system for a vacuum coating equipment using NI LabWindows/CVI;
- The control system includes the following functions: user rights division, rapid pumping and security protection for the vacuum system, flexible configuration for the complex process control, comprehensive process monitoring, comprehensive and detailed log system, an so on.;
- Developed the driver program for PCI-6221 card to realize wide range scanning of ion beam.

Research about the Redundant EPICS IOC and Control System

Core Member *Feb. 2014 - Oct. 2016*

- Designed and built a redundant platform in embedded Linux OS on both NI cRIO-9068 using the EPICS iocRedundancy toolkit;
- Designed and built a multilayer redundant control prototype system based on Profinet;
- Built the prototype system of openPOWERLINK and tested its real-time performance;
- Developed the EPICS driver to integrate openPOWERLINK into EPICS environment.

Honors & Awards

2017 **Award,** Shunde scholarship
2013 **National first prize,** China Undergraduate Mathematical Contest in Modeling
2013 **Award,** National Scholarship
2011 **Award,** National Scholarship for Encouragement

Publications

Journal articles

- **Yifan Song**, Gongfa Liu. et.al, Automatic data archiving and visualization at HLS-II, Nuclear Science and Techniques, 2018, 29(9): 129
- Peng-quan Wen, **Yifan Song**, Bing Li, et al. Beam cleaning status in HLS-II storage ring. Nuclear Techniques, 2015,10:10-14 (in Chinese)
- Hao Kang, **Yifan Song**, Ke Xuan, Gong-fa Liu, Development of Control System for Vacuum Coating Equipment Based on Lab Windows/CVI, Vacuum, 2016 (in Chinese)
- Zi-yu Huang, **Yifan Song**, Gongfa Liu, et. al, Design of Interlock System of FELiChEM, Atomic Energy Science and Technology,2017,51(09):1724-1728 (in Chinese)

Conference articles

- **Yifan Song**, Gongfa Liu, et.al, The Configurable Software Interlock System for HLS-II, Proceedings of IPAC2017, Copenhagen, Denmark
- Shuang Xu, **Yifan Song**, et.al, Control system design for front end devices of IRFEL, Proceedings of IPAC2018, Vancouver, British Columbia, Canada, 2018
- X.K. Sun, **Yifan. Song**, G. Liu, Distributed I/O System Based on Ethernet POWERLINK Under the EPICS Architecture,Vancouver, British Columbia, Canada, 2018
- X.K. Sun, **Yifan Song**, Gongfa Liu, et. al, Design and Implementation of HLS-II Constant Temperature Cooling Water Control System, 2018(06):1139-1143 (in Chinese)
- Zi-yu Huang,**Yifan Song**, et. al, A Redundant EPICS Control System Based on PROFINET, Proceedings of ICALEPCS2015, Melbourne, Australia, 2015
- Zi-yu Huang, **Yifan Song**, et al. The Interlock System of FELiChEM, Proceedings of ICALEPCS2017, Barcelona, Spain, 2017
- Zi-yu Huang, **Yifan Song**, G. Liu, EPICS Driver for Siemens CP1616 Communication Module, Vancouver, British Columbia, Canada, 2018

Papers in Preparation

- Yifan Song, Gongfa Liu, Design and construction of the data warehouse based on Hadoop ecosystem at HLS-II
- Yifan Song, Gongfa Liu, Data Archiving and visualization of IRFEL

Academic Activities

12th International Workshop on Personal Computers and Particle Accelerator Controls

THsinchu City, Taiwan, China
Oct. 16 - Oct. 20 in 2018

- Will made an oral reports and a poster reports at PCaPAC 2018

8th International Particle Accelerator Conference

Copenhagen, Denmark
May. 14 - May. 19 in 2017

- Successfully achieved the student grant and made a poster report at IPAC 2017

the 9th OCPA Accelerator School

Shanghai, China
Jul. 26 - Aug. 4 in 2016

- Finished the courses of the ninth OCPA (the International Organization of Chinese Physicists and Astronomers) Accelerator School

SAKURA Exchange Program in Science

Tsukuba, Ibaraki Prefecture, Japan
Jul. 5 - Jul. 14 in 2016

- Finished the courses of Japan-Asia Youth Exchange program in Science (SAKURA Exchange Program in Science) administered by KEK