Yifan **Song**

Doctoral student

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Summary

I am a final 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, control software development, data acquisition/storage/retrieval/visualization/mining, interlocking and alarm for the control system, system redundancy and availability, industrial real-time Ethernet, and so on.

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.E. in Nuclear Safety Engineering — *Sep. 2010 - Jun. 2014*

- GPA: top1 / total 148

Skills

Programming	C, Python, Java, JavaScript, Matlab, Shell, LabWindows/CVI, Scala, PyQt
Web Development	HTML, CSS, Vue.js, Node.js, MongoDB, MySQL, SQLite, Express, jQuery, Element UI
Big Data	Hadoop, HDFS, Spark, Impala, Kafka
Control System	EPICS (V3 & V4 & 7), Control System Studio, Phoebus, Archiver Appliance, BEAST, S7plc, StreamDevice, pyEPICS
Physics	Background knowledge in partical accelerator physics (Synchrotron & Linac), MATLAB Accelerator Toolbox
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 on 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 at present.

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 industrial real-time Ethernet

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

2014-2017 **First Prize,** Academic Scholarship of USTC

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)
- 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)

Conference articles

- **Yifan Song**, Gongfa Liu, et.al., The Configurable Software Interlock System for HLS-II, Proceedings of IPAC2017, Copenhagen, Denmark
- **Yifan Song**, Gongfa Liu, et.al., Design and construction of the data warehouse based on Hadoop ecosystem at HLS-II, Proceedings of PCaPAC 2018, Hsinchu, Taiwan
- **Yifan Song**, Gongfa Liu, et.al., Data Archiving and visualization of IRFEL, et.al, Proceedings of PCaPAC 2018, Hsinchu, Taiwan
- 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
- 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, IPAC2018, Vancouver, BC, Canada, 2018

Academic Activities

12th International Workshop on Personal Computers and Particle Accelerator Controls

THsinchu City, Taiwan, China

Oct. 16 - Oct. 20 in 2018

- made an oral report and a poster report 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