JONG WOOK KIM

SOFTWARE ENGINEER · DATA SCIENTIST · MUSIC INFORMATICIST

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Employment

Pandora Internet Radio
Oakland, CA
RESEARCH SCIENTIST INTERN IN MUSIC INFORMATION RETRIEVAL
Jun 2017 - Aug 2017

- **Developed a recommender system using listener embeddings obtained by aggregating collaborative filtering results** based on the latent embeddings obtained from user interaction data. The model was build in Apache Spark and was capable of modeling multimodal tastes and produce clusters of favorite music genres, yet the algorithm was efficient enough to be able to run on Pandora's entire user base within hours.2

Kakao Corporation
Seongnam, S. Korea
RECOMMENDER SYSTEM ENGINEER & DATA SCIENTIST
Jun 2014 - Aug 2015

- **Developed Apache Spark applications for the company's recommender systems** which were gradually being migrated from Apache Hive, and built a framework around Spark called CueSheet, which helps simplify the development cycle of Spark jobs by automating the application packaging and separating the concerns of the implementation and the configuration.
- **Developed a distributed API server in Scala that delivers personalized recommendations** in various domains, which were pre-computed and stored in the databases such as HBase and Couchbase. The deployment and scaling was managed using Marathon, and the system supported bucket testing for evaluating different recommendation algorithms on-line.
- **Designed and developed a distributed and fault-tolerant stream processing framework** built atop Apache Kafka, providing stream manipulation primitives such as filter, transformer and joiner for the modular implementation of streaming jobs. Joiner, in particular, leveraged in-memory data grids to combine two input streams which may have arbitrarily ordered data in real-time.
- **Made a core utility library in Scala** for the API servers and Spark applications being developed in the team, focusing on the simple and thread-safe usage. In addition to the basic IO and JSON conversion utilities, the library enabled easier nonblocking access to various endpoints that the team was using, including ElasticSearch, ZooKeeper, OpenTSDB, HBase, Couchbase, and HTTP servers.
- **Leveraged OpenTSDB and Grafana to record and visualize the real-time statistics** of the various kinds of applications running in the distributed architecture. Using ring buffers, the systems were able to publish real-time metrics without affecting the performance, and they were reflected in the report within seconds, helping quickly identify the trends as well as any unexpected behaviors.
- Built and maintained a Jenkins cluster that runs mission-critical Hadoop jobs for the company's recommender systems.

NCSOFT Corporation
Seoul & Seongnam, S. Korea
GAME SERVER PLATFORM DEVELOPER
Aug 2012 - Jun 2014

- **Designed and developed a distributed server platform for Lineage Eternal**, the company's upcoming massively multiplayer online role-playing game (MMORPG). The platform was composed of a number of fault-tolerant clusters of Java and C++ servers, built using Netty/RxJava and Boost ASIO for the asynchronous and nonblocking IO. Its goal was to make the game playable without requiring the users to select and be limited to only one among many game servers.
- Built a cross-platform logging library in C++ that resembles SLF4j, to be used in Lineage Eternal's game servers.
- Managed the Perforce source control server, which had millions of files being shared among the team of 100+ members.

NCSOFT Corporation
Seoul, S.Korea
GAME DEVELOPER INTERN
May 2011 - Aug 2011

- Developed the pathfinding engine of Lineage Eternal, used in both the game client and server, built on top of Havok AI.

University of Michigan
Ann Arbor, MI
EDUCATIONAL SOFTWARE DEVELOPER
May 2010 - Aug 2010

- Developed interactive educational software visualizing molecular movements in Processing, for the thermodynamics class.

Techno Press
Daejeon, S. Korea
WEB DEVELOPER & SYSTEM ADMINISTRATOR
Jan 2009 - Jun 2009

- Developed a website for Techno Press, a publisher of international journals in the field of civil engineering.

Education

New York University   New York, NY
Ph.D. (anticipated May 2019) in Music Technology   Sep 2011 - May 2012, Sep 2015 - Present

- Advised by Dr. Juan Pablo Bello, expected graduation in 2019. GPA 3.76/4.00
- Research interests include automatic music transcription using deep generative models and music recommendation.
- Relevant coursework: Probabilistic Graphical Models, Statistical Natural Language Processing, Convex Optimization, Deep Learning

University of Michigan   Ann Arbor, MI
M.S. in Computer Science and Engineering   Sep 2009 - Apr 2011

- Advised by Dr. Georg Essl, focusing on intelligent systems and interactive music environments. GPA 7.76/9.00
- Relevant coursework: Machine Learning, Information Theory, Advanced Compilers, Advanced Computer Network

Korea Advanced Institute of Science and Technology   Daejeon, S. Korea
B.S. in Electrical Engineering with a Minor in Mathematical Sciences   Sep 2006 - May 2009

- GPA 3.83/4.30, with 3.97/4.30 in electrical engineering and 4.03/4.30 in mathematical sciences.

Imperial College London   London, UK
Undergraduate Research Opportunity Program in the Deparment of Mechanical Engineering   Jul 2006

- Developed tools for preprocessing data to be used in finite element method software

Korea Science Academy of KAIST   Busan, S. Korea
                                                                                  Mar 2004 - Aug 2006

Publications

CREPE: A Convolutional Representation for Pitch Estimation
J. W. Kim, J. Salamon, P. Li & J. P. Bello, in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing*   April 2018

Fast Music and Audio Processing Using the Julia Language
J. W. Kim, S. Russell, & J. P. Bello, in *Proceedings of the AES Conference on Semantic Audio*   June 2017

Concepts and practical considerations of platform-independent design of mobile music environments
J. W. Kim & G. Essl, in *Proceedings of the International Computer Music Conference*   Jul 2011

Teaching

New York University   New York, NY
Instructor - MPATE-GE 2634 Advanced Topics in Music Technology: Applications on iOS Platform   Sep 2017 - Dec 2017

- Will teach a lecture focusing on mobile audio application development on iOS, using the Swift programming language

New York University   New York, NY
Lab Instructor - MPATE-GE 2617 C Programming for Music Technology Lab   Jan 2017 - May 2017

- Taught a lab class accompanying C programming lecture, covering the language basics and real-time audio programming in C.

New York University   New York, NY
Teaching Assistant - MPATE-GE 2623 Music Information Retrieval, EL9173 Audio Content Analysis   Sep 2015 - May 2016

- Assited in teaching the ceoncepts of music informatics, held office hours, and graded written and programming assignments.

University of Michigan   Ann Arbor, MI
Grader - EECS492 Introduction to Artificial Intelligence   Jan 2011 - Apr 2011

- Graded written and programming assignments.

Korea Advanced Institute of Science and Technology   Daejeon, S. Korea
Teaching Assistant - CS101 Introduction to Programming   Sep 2008 - May 2009

- Taught the basic concepts of object-oriented programming in Java and graded programming assignments.

KAIST Global Institute for Talented Education   Daejeon, S. Korea
Head Teaching Assistant - Information Classes   Dec 2006 - Jan 2008

- Developed materials and taught college-level computer science and electrical engineering to high school students.

Presentations

No More "sbt assembly": Rethinking spark-submit using CueSheet   Boston, MA
Spark Summit East 2017   Feb 2017

MusicProcessing.jl: Music Information Retrieval in Julia   Cambridge, MA
JuliaCon 2016   Jun 2016

Functional Reactive Programing with dart:async   Seoul, S. Korea
GDG DevFest Korea 2014   May 2014

Building High Performance Servers with Rx and Functional Reactive Programming   Seongnam, S. Korea
Nexon Developer Conference 2014   May 2014

Honors & Awards

2010   **Samsung Scholarship** USD 50,000 per year, for 5 years of the Ph.D. program
2009   **Kwanjeong Scholarship** USD 50,000 per year, for 2 years of the M.S. program
2008   **Meritorious Winner** in the COMAP Mathematical Contest in Modeling 2008
2006   **Korea Presidential Scholarship** KRW 10,000,000 per year, for 4 years of the B.S. program

Software Projects

Apache S2Graph   Contributing to the Apache Incubator project, a distributed OLTP graph database.
MusicProcessing.jl   A Julia library for music and audio processing.
spark-ranking-metrics   Spark implementations of common evaluation metrics for ranking algorithms.
eval-archiver-loader   A simple utility for compiling Scala code on-the-fly into a byte array and loading it dynamically.
lyomiTerm   A MacOS telnet client and VT100 emulator for legacy Korean bulletin board services (BBS).
Pie   An iOS telnet client and VT100 emulator for legacy Korean bulletin board services (BBS).

Online Courses

An Introduction to Functional Analysis with distinction   Coursera
École Centrale Paris   Mar 2014 - May 2014

Principles of Reactive Programming with distinction   Coursera
École Polytechnique Fédérale de Lausanne   Nov 2013 - Jan 2014

Functional Programming Principles in Scala with distinction   Coursera
École Polytechnique Fédérale de Lausanne   Mar 2013 - May 2013

Skills

Programming   Contributed to Apache S2Graph, Hazelcast, LightFM, and other open source projects
                  Scala, Python, Java, C/C++ professionally, and Julia, ObjC, PHP, JS, TS, Matlab for personal/research projects
Music   Have played the oboe in many orchestras and the piano in bands; also have played the viola and taepyeongso
Languages   English, Korean (native), Japanese (limited working proficiency)