Ahrim Han

Home: 913 Piccolo Irvine CA 92620
Cell: +1-949-910-8751

Email: ahrimhan@gmail.com
Homepage: https://ahrimhan.github.io/
Linkedin: www.linkedin.com/in/ahrimhan

RESEARCH INTERESTS

I worked as a research professor in the Next-generation Game Research Center at the Computer Science Department at Korea University. My main research area has been Software Engineering, and I have been working on assessing and improving software design quality using statistical, data mining and automated software analysis techniques. From now on, I would like to work in companies as a data scientist for solving real-world problems. I have the special interest in finding business insights by leveraging big data intelligence.

EDUCATION

Korea Advanced Institute of Science and Technology(KAIST), Daejon, Korea
Ph.D., Computer Science, 2007.2 - 2013.8
Thesis: *Identification and Selection of Refactorings for Improving Maintainability of Object-Oriented Software* (Advisor: Doo-Hwan Bae)

Korea Advanced Institute of Science and Technology(KAIST), Daejon, Korea
M.S., Computer Science, 2004.9 - 2007.2
Thesis: *Behavioral Dependency Measurement in UML 2.0 Sequence Diagrams for Change-proneness Prediction* (Advisor: Doo-Hwan Bae)

Sogang University, Seoul, Korea
B.E., Computer Science, 2000.2 - 2004.2 (**Magna Cum Laude**)

WORK AND RESEARCH PROJECT EXPERIENCE

Korea University, Institute of Convergence IT & Next-generation Game Research Center at Computer Science Department, Seoul, Korea Sep. 2013 - Apr. 2018
Position: Research Professor

- Led the research projects for automating the refactoring identification process as a sole Principal Investigator
- Advised graduate students to develop research topics and conduct the experiments
- Published the research results to the top tier Software Engineering journal, IEEE Transactions on Software Engineering

Research Projects

- "Efficient refactoring candidate identification", Mar. 2005 - Aug. 2013
  Provided the several new methods to improve the efficiency of the refactoring identification process
  - **Dynamic profiling-based refactoring identification**: Used the dynamic profiling technique for finding the candidates in classes where real changes have occurred
  - **Multiple and independent refactoring identification**: Used the concept of maximal independent set to select multiple refactorings having no dependencies each other and can be applied simultaneously
  - **Two-phased search-based refactoring identification**: To reduce the search space of candidates to be examined, the refactoring candidates that are more likely to improve maintainability are selected, then only the chosen refactoring candidates are evaluated using a more precise fitness function

Funded Projects

- "An Approach to Automating Refactoring for Evolvable Software", Funded by *National Research Foundation of Korea (NRF) in Korea*, Nov. 2014 - Apr. 2017 (sole PI)
- "Research on Automated Software Maintainability Improvement", Funded by *National Research Foundation of Korea (NRF), Daejeon, Korea*, Nov. 2013 - Oct. 2014 (sole PI)

KAIST, Department of Computer Science, Daejeon, Korea Mar. 2005 - Aug. 2013
Position: Graduate student (research assistant)

- Played an active role in setting up assignments and taught a few classes for several computer science subjects, Introduction to Programming (CS101), Advanced Software Engineering (CS650), Computer Science Project (CS408), and Principles of Software Engineering (SEP521)
- Developed the method to improve the efficiency of refactoring identification process by devising an efficient algorithm for calculating the impacts of the application for a large number of refactoring candidates
- Developed the tool for automated refactoring identification with Java and Python

Research Projects

- "Fast refactoring candidate assessment metric", Mar. 2011 - Dec. 2014
  - Developed a fast refactoring candidate assessment metric, Delta Table, that is calculated based on matrix computation
- "Improvement of change-proneness prediction", Mar. 2006 - Feb. 2009
  - Developed the new behavioral dependency metrics that capture the dynamic aspects of the program and proposed a more accurate change-proneness prediction model using these metrics in conjunction with existing structural metrics

Funded Projects

- "Software Process Improvement and Capability Analysis based on K-Model", Funded by *National IT Industry Promotion Agency (NIPA) in Korea*, Jul. 2008 - Dec. 2008
  - Provided guidelines for collecting data and developed metrics for analyzing improvement and capability of the software processes according to the characteristics of the projects, organizations, and companies
- "Power Consumption Estimation Framework for UML-based Embedded Software Models", *KAIST in Korea*, Jan. 2007 - Oct. 2008
  - Developed the power consumption estimation technique that can be used at the early stage of software development (e.g., approximate power consumption estimation for model elements such as functions and components in UML-based models) and developed the method for visualizing the obtained results
- "Process Tailoring Techniques for Defense Software", Funded by *Agency for Defense Development (ADD) in Korea*, Mar. 2006 - Feb. 2011
  - Developed the systematic method of process tailoring by providing the methods for making process knowledge as assets and managing process knowledge repository

- "Embedded Software Design and Verification Techniques for Multiprocessor System-on-Chip (MPSoC)", Funded by *Ministry of Information and Communication in Korea*, Mar. 2005 - Jan. 2007
  - Developed the static analysis and functional simulation techniques for embedded software models

Teaching Experience

- CS101 "Introduction to Programming", Teaching Assistant, for non-major undergraduate students, in JAVA, Fall 2005, Spring 2006
- CS650 "Advanced Software Engineering", Teaching Assistant, for graduate students, Spring 2007
- CS408 "Computer Science Project", Teaching Assistant, for senior undergraduate students, Fall 2009
- SEP521 "Principles of Software Engineering", Teaching Assistant, for graduate students under software expert program, Spring 2011, Fall 2011, Spring 2012, Fall 2012
- "Intel International Science and Engineering Fair (ISEF)", Mentor, 2008
  The student that I mentored won the best of category award in computer science for top first place winner and the Seaborg SIYSS award and attended the Nobel Prize ceremonies
- "Design and Implementation for High Quality Software", Lecturer, for college professors, 2005.
  Presented UML 2.0, refactoring, testing strategies, requirement engineering, software quality metrics

Peace Corps (Headquarters), Washington, D.C., USA Aug. 2004 - Oct. 2004
Position: Intern
- Served in organizing and populating the intranet web pages in the Technical Infrastructure and Support Team under the Office of the Chief Information Officer (The Washington Center (TWC) program funded by Human Resources Development Service of Korea)

Zio Interactive, Seoul, Korea Feb. 2004 - Apr. 2004
Position: Intern
- Worked in the mobile game company and contributed solely to porting an existing soccer game to a new game development environment (SDK from Qualcomm BREW (KT) to SK-VM (SKT))

GRANTS

Individual Basic Science & Engineering Research Program, National Research Foundation of Korea (NRF), $125,000, sole PI, Nov. 2014 - Apr. 2017.
Post-Doctoral Fellowship Grant, National Research Foundation of Korea (NRF), $33,000, sole PI, Nov. 2013 - Oct. 2014.

HONORS AND AWARDS

Best Paper Award, Software Engineering Society of Korean Institute of Information Scientists and Engineers (KIISE), Prize: $1,000, 2016
Best Paper Award, 2015 Korea Conference on Software Engineering, 2015
SAMSUNG Scholarship Program, SAMSUNG Electronics by Video Display Division, 2011 to 2012
Invitation to the Special Issue for Journal of Systems and Software, Top-quality papers of the IEEE International Conference on Computer Software and Applications, 2008

Korean Government Scholarship Program for Graduate Students, KAIST, 2005 to 2010
Magna Cum Laude, Bachelor of Science, Sogang University, 2004
Academic Excellence Scholarship, Sogang University, 2000 to 2002
Admission Excellence Scholarship, Sogang University, 2000

JOURNAL PUBLICATIONS

Ah-Rim Han, Sungdeok Cha, "Two-phase Assessment Approach to Improve the Efficiency of Refactoring Identification", ***IEEE Transactions on Software Engineering*** **(TSE)**, Accepted, Online Published at July 25 2017. (http://dx.doi.org/10.1109/TSE.2017.2731853) (Impact Factor: 3.272)

Kwangsik Song, **Ah-Rim Han**, Sehun Jeong, Sungdeok Cha, "Testing Android Applications Considering Various Contexts Inferred from Permissions", *Journal of the Korean Institute of Information Scientists and Engineers: Software and Applications* **(KIISE)**, Vol. 42, No. 8, pp. 1021 - 1030, Aug. 2015. (**corresponding author**) (http://dx.doi.org/10.5626/JOK.2015.42.8.1022)

Ah-Rim Han, Doo-Hwan Bae, Sungdeok Cha, "An efficient approach to identify multiple and independent Move Method refactoring candidates", ***Information and Software Technology*** **(IST)**, Vol. 59, pp. 53-66, Mar. 2015. (http://dx.doi.org/10.1016/j.infsof.2014.10.007) (Impact Factor: 1.522)

Ah-Rim Han, Doo-Hwan Bae, "Dynamic profiling-based approach to identifying cost-effective refactorings", ***Information and Software Technology*** **(IST)**, Vol. 55, No. 6, pp. 966-985, Jun. 2013. (http://dx.doi.org/10.1016/j.infsof.2012.12.002) (Impact Factor: 1.522)

In-Gwon Song, Sang-Uk Jeon, **Ah-Rim Han**, Doo-Hwan Bae, "An approach to identifying causes of implied scenarios using unenforceable orders", ***Information and Software Technology*** **(IST)**, Vol. 53, No. 6, pp. 666-681, Jun. 2011. (http://dx.doi.org/10.1016/j.infsof.2010.11.007) (Impact Factor: 1.522)

Ah-Rim Han, Sang-Uk Jeon, Doo-Hwan Bae, Jang-Eui Hong, "Measuring behavioral dependency for improving change-proneness prediction in UML-based design models", ***Journal of Systems and Software*** **(JSS)**, Vol. 83, No. 2, pp. 222-234, Feb. 2010. (http://dx.doi.org/10.1016/j.jss.2009.09.038) (Impact Factor: 1.245)

CONFERENCE PAPERS

Kwangsik Song, **Ah-Rim Han**, Sehun Jeong, Sungdeok Cha, "Generating various contexts from permissions for testing Android applications", **SEKE 15**: Proceedings of 27^{th} International Conference on Software Engineering and Knowledge Engineering, pp. 87-92, Jul. 2015. (http://dx.doi.org/10.18293/SEKE2015-118)

Ah-Rim Han, Doo-Hwan Bae, "An efficient method for assessing the impact of refactoring candidates on maintainability based on matrix computation", **APSEC 14**: Proceedings of 21^{st} Asia-Pacific Software Engineering Conference, pp. 453-460, Dec. 2014. (27% acceptance ratio, 55/202) (http://dx.doi.org/10.1109/APSEC.2014.69)

Ah-Rim Han, Sang-Uk Jeon, Doo-Hwan Bae, Jang-Eui Hong, "Behavioral Dependency Measurement for Change-proneness Prediction in UML 2.0 Design Models", **COMPSAC 08**: Proceedings of 32^{nd} Annual IEEE International Conference on Computer Software and Applications, pp. 76-83, Jul. 2008. (19.5% acceptance ratio, 46/236) **(Selected by program committee for recommendation to JSS)**

Referred to as Domestic Papers (Written in Korean)

Kwangsik Song, **Ah-Rim Han**, Sehun Jeong, Sungdeok Cha, "Permission-based Test Condition Generation in Android Application Development", **KCSE 15**: Proceedings of 2015 Korea Conference on Software Engineering, Vol. 17, No. 1, pp. 289-290, Feb. 2015. [**best paper**]

Ah-Rim Han, Dong-Won Kang, Hyeon-Jeong Kim, Doo-Hwan Bae, "An Approach to Retrieving Similar Processes for Knowledge-based Software Process Tailoring", **JWKSE 07**: Proceedings of 2007 Joint Workshop on Korea Software Engineering Technology, Vol. 5, No. 1, pp. 42-52, Aug. 2007.

Ah-Rim Han, Sang-Uk Jeon, Jang-Eui Hong, Doo-Hwan Bae, "Time Consistency Checking on UML 2.0 Behavioral Models using OCL", **KCC 06**: Proceedings of 2006 Korea Computer Congress, Vol. 33, No. 1, pp. 181-183, Jun. 2006.

PROFESSIONAL ACTIVITIES

Reviewers

2017, 2 papers, Journal of Systems and Software (JSS) (Invited from Editor)
2016, International Journal of Software Engineering and Knowledge Engineering (IJSEKE)
2015, The 37th International Conference on Software Engineering (ICSE), Demonstrations Track (ICSE 2015) (External Reviewer)
2013, Expert Systems With Application (ESWA) (Invited from Editor)
2013, Information and Software Technology (IST) (Invited from Editor)
2013, The 29th IEEE International Conference on Software Maintenance (ICSM 2013)
2013, The 25th International Conference on Software Engineering and Knowledge Engineering (SEKE 2013)
2012, Journal of Systems and Software (JSS) (Invited from Editor)
2012, The 19th Asia Pacific Software Engineering Conference (APSEC)
2012, The 27th IEEE/ACM International Conference on Automated Software Engineering (ASE)
2012, International Conference on Advanced Software Engineering & Its Applications (ASEA 2012)
2010, The fourth IEEE International Conference on Secure Software Integration and Reliability Improvement (SSIRI)
2010, The 25th Symposium on Applied Computing (SAC)
2009, The 16th Asia Pacific Software Engineering Conference (APSEC)
2009, IEEE Software

Societies

2008 - Present, Member, Institute of Electrical and Electronics Engineers (IEEE)
2007 - Present, Member, Korea Institute of Information Scientists and Engineers (KIISE)

SKILLS

Research Area: Software Engineering, Refactoring, Performance-Driven Architecture, Software Design, Software Quality Assessment, Software Quality Measurement, Software Defect Prediction, Maintainability Improvement, Data Analysis
Programming Languages and Tools: Java, Python, SQL, Markdown, Latex, C++, Fortran, R, SPSS, Eclipse, Microsoft Office
Modeling Languages: Unified Modeling Language, Specification and Description Language, System Dynamics
Machine Learning and Statistical Modeling Techniques: K-means Clustering Algorithm, Linear Regression, Logistic Regression, Decision Trees, Principal Component Analysis, Genetic Algorithm, Search and Optimization

Language: English and Korean

REFERNCES

Doo-Hwan Bae
Professor
ICSE 2020 General Chair, served as a director of ITRC Software Process Improvement Center and the first president of Software Engineering Society
Department of Computer Science, KAIST,
291 Daehak-ro, Yuseong-gu, Daejeon, 34141, Korea
Tel: +82-42-350-3539
Email: bae@se.kaist.ac.kr

Sungdeok (Steve) Cha
Professor
Served as a director of Center for Engineering and Education of Dependable Software
Department of Computer Science, Korea University,
145 Anam-ro, Seoungbuk-gu, Seoul, 02841, Korea
Tel: +82-2-3290-4844
Email: scha@korea.ac.kr