Gabin An

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Research Interests

I am currently focusing my research efforts on enhancing the efficiency of debugging large-scale industrial software, aiming to optimise the utilisation of human and machine resources. To accomplish this objective, I am actively exploring the following research areas:

- **BIC Identification**: Finding the Bug Inducing Commit (BIC) responsible for observed failures to efficiently assign and fix bugs in software systems involving numerous developers [1, 4]
- **Failure Clustering**: Clustering failures based on their root causes to support the utilisation of automated debugging techniques developed under the single fault assumption [3, 5]
- **Improving Test Suite Diagnosability**: Augmenting a test suite with additional test cases that can improve the precision of automated fault localisation techniques [2]
- **Flaky Failure Detection**: Automatically detecting flaky failures to expedite the continuous integration process and optimise the utilisation of both human and computational resources

Education

Mar 2020 – Present — **PhD Candidate, Computer Science, KAIST**
- Advisor: Prof. Shin Yoo

Mar 2018 – Feb 2020 — **MSc, Computer Science, KAIST**
- Advisor: Prof. Shin Yoo
- Thesis title: *Localising Software Faults by Learning Patterns of Failing Executions*

Feb 2012 – Feb 2018 — **BSc, Computer Science, KAIST**
- Major GPA: 4.06/4.3
- Minor: Business and Technology Management
- Honor: Summa Cum Laude

Mar 2016 — Aug 2016 — **Exchange Student, Informatik, TUM**

Selected Publications

* indicates equal contributions

[1] **G. An**, J. Hong, N. Kim, and S. Yoo, "Fonte: Finding Bug Inducing Commits from Failures," in *Proceedings of the 45th IEEE/ACM International Conference on Software Engineering*, ser. Technical Track, ICSE, 2023.

[2] **G. An** and S. Yoo, "FDG: A Precise Measurement of Fault Diagnosability Gain of Test Cases," in *Proceedings of the 31st ACM SIGSOFT International Symposium on Software Testing and Analysis*, ser. Technical Track, ISSTA, 2022.

[3] **G. An** *, J. Yoon *, J. Sohn, J. Hong, D. Hwang, and S. Yoo, "Automatically Identifying Shared Root Causes of Test Breakages in SAP HANA," in *Proceedings of the 44th IEEE/ACM International Conference on Software Engineering*, ser. SEIP Track, ICSE, 2022.

[4] **G. An** and S. Yoo, "Reducing the Search Space of Bug Inducing Commits using Failure Coverage," in *Proceedings of the ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ser. Ideas, Visions, and Reflections Track, ESEC/FSE, 2021.

[5] **G. An**, J. Yoon, and S. Yoo, "Searching for Multi-Fault Programs in Defects4J," in *Proceedings of the 13th International Symposium on Search Based Software Engineering*, ser. Challenge Track, SSBSE, 2021.

[6] J. Kim, **G. An**, R. Feldt, and S. Yoo, "Ahead of Time Mutation Based Fault Localisation using Statistical Inference," in *Proceedings of the 32nd International Symposium on Software Reliability Engineering*, ser. Research Track, ISSRE, 2021.

[7] J. Sohn *, **G. An** *, J. Hong, D. Hwang, and S. Yoo, "Assisting Bug Report Assignment Using Automated Fault Localisation: An Industrial Case Study," in *Proceedings of the 14th IEEE International Conference on Software Testing, Verification and Validation*, ser. Industry Track, ICST, 2021.

[8] **G. An**, A. Blot, J. Petke, and S. Yoo, "PyGGI 2.0: Language Independent Genetic Improvement Framework," in *Proceedings of the 2019 27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ser. Tool Demos, ESEC/FSE, 2019.

[9] **G. An**, J. Kim, and S. Yoo, "Comparing Line and AST Granularity Level for Program Repair using PyGGI," in *Proceedings of the 4th Genetic Improvement Workshop*, ser. GI@ICSE, 2018.

Awards and Achievements

2022 Korea Software Congress (KSC 2022)
- **Best Paper Award**
- Paper: An, G., Kwon, M., Choi, K. and Yoo, S., "A Collection of Reproducible Bugs in C/C++ Programs"

Microsoft Research Asia PhD Fellowship
- **Nomination Award**

2019 Korea Conference on Software Engineering (KCSE 2019)
- **Best Short Paper Award**
- Paper: An, G., Yoo, S., "Search Space Reduction for Automated Program Repair Using Lexical Features"

2018 CodRep'18: A machine learning competition on source code data
- **Rank: 2nd (official track)**
- Organised by KTH Royal Institute of Technology, Stockholm, Sweden
- Web: `https://github.com/KTH/CodRep-competition`

2017 Korea Software Congress (KSC 2017)
- **Best Presentation Award**
- Paper: An, G., Kim, J., Lee, S. and Yoo, S., "PyGGI: Python General framework for Genetic Improvement"

Research Experience as Research Assistant

Industry-Funded Projects

2022 – Present **Identifying Test Flakiness and Predicting Actionable Test Failures**
w/ SAP and SAP Labs Korea

2021 **Identifying Shared Root Causes between Test Breakages**
w/ SAP Labs Korea

2020 **Assisting Bug Report Assignment using Automated Fault Localisation**
w/ SAP Labs Korea

2019 **Assessing the Quality of Test Suite using Mutation Testing**
w/ Samsung Research

Government-Funded Projects

2021 – Present **Development of Automatic Software Error Repair Technology that Combines Code Analysis and Error Mining**
Funded by Institute for Information & Communication Technology Planning & Evaluation (IITP)

Miscellaneous Experience

Academic Services

2023 **Program Committee Member**, Artifact Evaluation Track, the 39th International Conference on Software Maintenance and Evolution (ICSME 2023)

Organising Committee Member, the 12th Genetic Improvement Workshop @ ICSE 2023

Miscellaneous Experience (continued)

2022
- **Web Chair**, the 14th Symposium on Search Based Software Engineering (SSBSE 2022)
- **Program Committee Member**, the 11th Genetic Improvement Workshop @ GECCO 2022
- **Program Committee Member**, Artifact Evaluation Track, the 38th International Conference on Software Maintenance and Evolution (ICSME 2022)

2021
- **Program Committee Member**, the 10th Genetic Improvement Workshop @ ICSE 2021
- **Program Committee Member**, Artifact Evaluation Track, the 37th International Conference on Software Maintenance and Evolution (ICSME 2021)

2020
- **Web Chair**, the 8th Genetic Improvement Workshop @ ICSE 2020

Invited Talks

2023
- Korea Computer Congress (Jun, KCC 2023)
  - *Fonte: Finding Bug Inducing Commits from Failures*
- Korea Conference on Software Engineering (Feb, KCSE 2023)
  - *Fonte: Finding Bug Inducing Commits from Failures*

2022
- Korea Software Congress (Dec, KSC 2022)
  - *FDG: A Precise Measurement of Fault Diagnosability Gain of Test Cases*

Teaching & Counselling Experience

2023
- TA, Introduction to Software Engineering (CS350), School of Computing, KAIST, Spring 2023

2021
- TA, Computer Ethics and Social Issues (CS489), School of Computing, KAIST, Autumn 2021
- TA, Operating Systems and Lab (CS330), School of Computing, KAIST, Spring 2021

2020
- TA, Computer Ethics and Social Issues (CS489), School of Computing, KAIST, Autumn 2020
- TA, Automated Software Testing (CS453), School of Computing, KAIST, Spring 2020

2019
- Head CA (Academic Counseling Assistant), School of Computing, KAIST, Spring 2019

2018
- CA (Academic Counseling Assistant), School of Computing, KAIST, Fall 2018
- TA, Programming Practice (CS109), KAIST, Spring 2018

2017
- Undergraduate TA, Programming Practice (CS109), KAIST, Spring 2017

Employment History

2015
- **Developer**, Jobplanet, Seoul, Republic of Korea
  - Web development (Ruby on Rails)
  - API design

References

Available on Request