

Lab. Name	Washizaki lab. - Reliable Software Engineering (63-5F-0503, 0523)
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	Please visit to our laboratory after the lab. assignment is completed.

Research Areas: Smart Systems and Software Engineering for Business and Society

Big challenge with industry and international collaborators

- Targeting actual industrial code such as program embedded in KOMATSU loading shovels and FUJITSU smartphones
- Contributing to actual services and businesses such as Yahoo Japan crowd sourcing service



State-of-the-art AI&IoT and software engineering research

- Cooperation between developers and AI such as Program Repair by Machine Learning
- Research projects based on various platforms including Cloud and IoT such as cloud security and privacy metamodel



Team with Fukazawa&Honiden lab.

- Broad topics and large network of alumni
- Students from various countries including China, Myanmar and India



Good careers after graduation

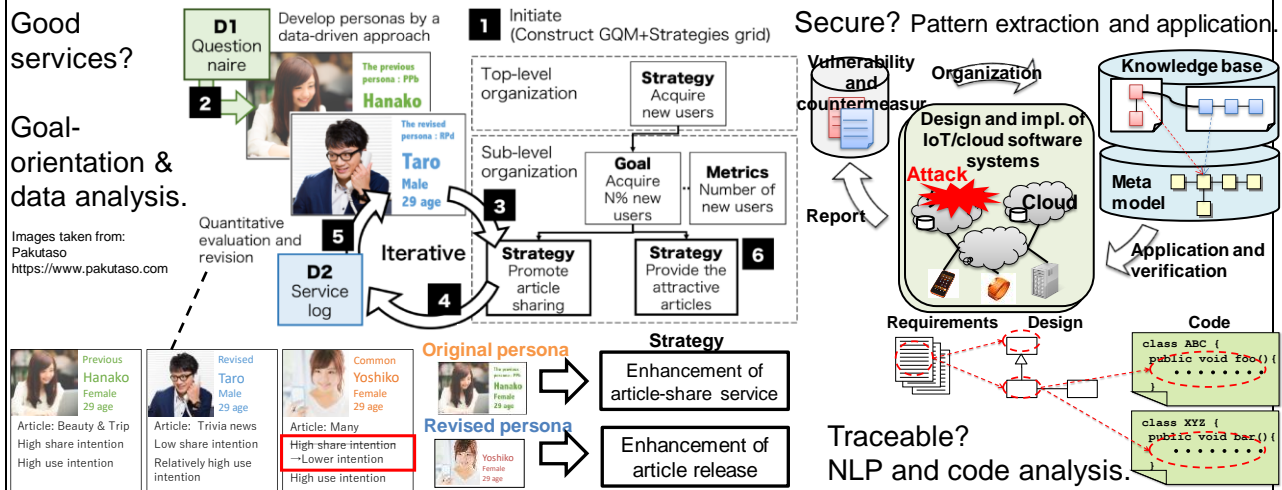
- Job offers dedicated to lab graduates
- Practical research topics useful for the future career



Research Topics

We are conducting “actionable” researches with 10+ industrial and academic partners in the field of systems and software engineering. Research topics include (a) new software engineering with AI and IoT, (b) alignment of business goals, strategies and data, (c) software design and reuse, (d) software quality management, and (e) empirical studies on agile processes and programming education. Major projects funded by government and industry include:

- **Machine Learning and Software Engineering with Big Data Analysis** (funded by JST and industry): ML for software planning and requirements, software architecture, bug reports and quality, software engineering ML architecture and design patterns
- **IoT and Software Engineering** (funded by TTC): IoT design patterns and security patterns
- **Goal-oriented Quantitative Measurement and Management Research** (supported by industry): Alignment of organizational goals, strategies and requirements
- **TraceANY** (funded by JSPS KAKENHI: Grants-in-Aid for Scientific Research (B)): Tracing any software artifacts at any abstraction levels based on common metamodels
- **Cloud and IoT Security and Privacy Metamodel** (funded by SCAT): Developing metamodel for organizing knowledge of security and privacy
- **G7 Programming Learning Summit and ICT Club** (funded by MIC): Quantitative and Qualitative Study Guide of Programming for kids



Where is a bug? Fault-localization.

```
int max(int a,int b){
  int max=0;
  if(b<a)
    max=a;
  if(a<=b)
    max=b;
  return max;
}
```

Testcases	(3,2)	(4,4)	(0,1)
int max=0;	✓	✓	✓
if(b<a)	✓	✓	✓
max=a;	✓	✓	✓
if(a<=b)	✓	✓	✓
max=b;	✓	✓	✓
return max;	✓	✓	✓
	Pass	Fail	Fail

Where/how to fix? ML-based improvement. Good team? ML-based formation.

Review → Machine learning → Quality measurement → Identifying parts that are hard to maintain... → Goal → Improvement

Management (M) Good at improving the present situation

Leadership (L) Good at changing

Anchor (A) Good at maintain the present situation

Tugboat (T) Good at realizing ideas

Diffusible

Receptive

Preservative

Condensable

Testcase prioritization? Ant colony optimization. Reliability model.

How large? Question → Measurement

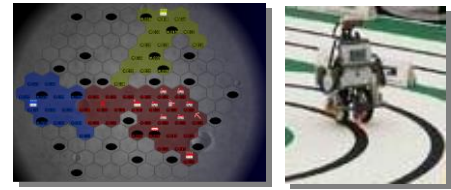
ELOC

N. functions

Learning tools investigation.

Lab. Members: 1 Professor, 1 Guest Associate Professor, 2 Lecturers, 1 Doctor Student, 9 Master Students incl. students from China and Myanmar

Lab. Meetings: There are weekly lab meetings together with Fukazawa lab. and weekly group meetings. Moreover, students often form teams to conduct projects such as participation in robotic software design contest and developing AI programming contest platform.



Events: [Apr] Welcome Party, [Aug-Sep] Summer Camp incl. Thesis Intermediate Presentation, [Dec-Jan] Year-end and New Year's party, [Feb] Thesis Defense, [Mar] Farewell Party



Open House: Mar 20th 15:00-18:30, Mar 23rd & 24th 10:00-18:00

Job Opportunity:

Since most of our projects are funded, [students are basically eligible to get hired as Research Support Staffs](#) in the laboratory by conducting research in the project room.

Vision 2020

Having the vision [“Smart systems and software engineering for business and society by connecting AI, IoT and software engineering”](#), we push forward with research on novel and actionable systems and software engineering methods to contribute to software and systems engineering industry and academia in collaboration with 10+ local and global partners including [Fujitsu, Hitachi, Komatsu, NEC, Toshiba, e-Seikatsu, GAIO, Toshiba, Concordia University, Polytechnique de Montreal and Florida Atlantic University](#).

We contribute to organizing [IPJSJ SamurAI Coding](#) 2019-20 (AI Game Programming Contest), [IPJSJ National Convention](#), [IEEE SISA/COMPSAC](#) 2020 (Symposium on IoT Systems and Applications / Conference on Computers, Software and Applications) and [AsianPLOP](#) 2020 (Pattern Language Conference). These events give us good opportunities to contribute to the outer world and expand our network.



Like previous years, we expect many new students coming from various countries. Our team is growing and having more diversity in national origins, backgrounds and mindsets. Such diversity contributes to our team in various aspects such as creativity to advance the above-mentioned projects and professional contributions. [We welcome your joining of our team!](#)

Hironori Washizaki

