How Practitioners Perceive Automated Debugging

Automated debugging tools help developers to pinpoint the location of a software fault (aka. a bug) given a failure (e.g., software crash). Automated debugging has been an active area of research for the past two decades, however, it is not clear if practitioners value them. Your responses will help us better understand the perception of software developers and guide us in developing tools helpful to you and other software practitioners. The survey will take approx. 15-25 minutes. Thank you!

This survey is **anonymous**. No personal information is collected.

Thank you!

Demographics

1. Are you a professional software engineer?

- Yes
- No

2. Are you involved in open source software development efforts?

- Yes
- No

3. Which of the following roles best describe your software engineering experience?

- [ ] Software Development
- [ ] Software Testing
- [ ] Project Management
- [ ] Other

4. How many years of experience do you have in software development/testing/project management (decimals OK)?

5. Please describe your English proficiency level?

Very Good	Good	Mediocre	Poor	Very Poor
○	○	○	○	○

6. What is your current country of residence?

Afghanistan
Albania
Algeria
Andorra
Angola
Antigua and Barbuda
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahamas, The
Bahrain
Bangladesh
Barbados
Belarus
Belgium

Belize
Benin
Bhutan
Bolivia
Bosnia and Herzegovina
Botswana
Brazil
Brunei
Bulgaria
Burkina Faso
Burundi
Cambodia
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
China
Colombia
Comoros
Congo, Democratic Republic of the
Congo, Republic of the
Costa Rica
Cote d'Ivoire
Croatia
Cuba
Curacao
Cyprus
Czech Republic
Denmark
Djibouti
Dominica
Dominican Republic
East Timor (see Timor-Leste)
Ecuador
Egypt
El Salvador
Equatorial Guinea
Eritrea
Estonia
Ethiopia
Fiji

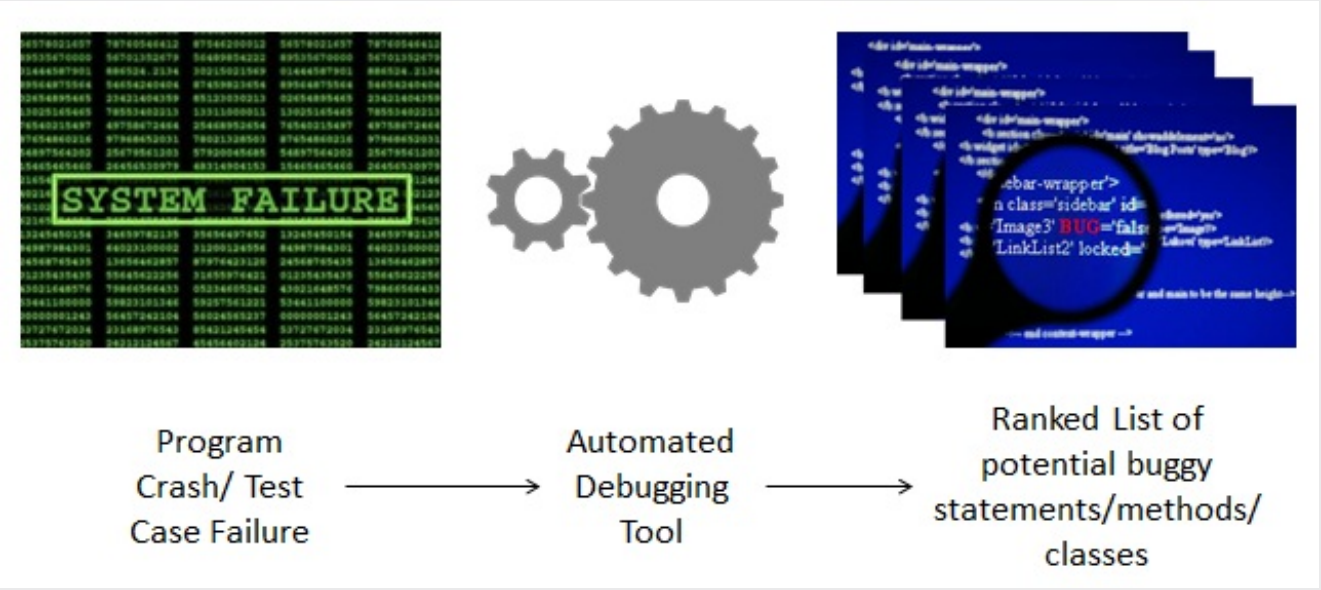
Finland
France
Gabon
Gambia, The
Georgia
Germany
Ghana
Greece
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Holy See
Honduras
Hong Kong
Hungary
Iceland
India
Indonesia
Iran
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Kiribati
Kosovo
Kuwait
Kyrgyzstan
Laos
Latvia
Lebanon
Lesotho
Liberia
Libya
Liechtenstein
Lithuania
Luxembourg

Luxembourg
Macau
Macedonia
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Marshall Islands
Mauritania
Mauritius
Mexico
Micronesia
Moldova
Monaco
Mongolia
Montenegro
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Netherlands
Netherlands Antilles
New Zealand
Nicaragua
Niger
Nigeria
North Korea
Norway
Oman
Pakistan
Palau
Palestinian Territories
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Qatar

Romania
Russia
Rwanda
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Samoa
San Marino
Sao Tome and Principe
Saudi Arabia
Senegal
Serbia
Seychelles
Sierra Leone
Singapore
Slovakia
Slovenia
Solomon Islands
Somalia
South Africa
South Korea
South Sudan
Spain
Sri Lanka
Sudan
Suriname
Swaziland
Sweden
Switzerland
Syria
Taiwan
Tajikistan
Tanzania
Thailand
Timor-Leste
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Tuvalu
Uganda
Ukraine

United Arab Emirates
United Kingdom
United States
Uruguay
Uzbekistan
Vanuatu
Venezuela
Vietnam
Yemen
Zambia
Zimbabwe
Other

Automated Debugging



LOGIC Show/hide trigger exists.

7. Automated debugging has been an active area of research. An automated debugging approach takes as input a crash or a test case failure and generates a ranked list of suspicious program locations that may contain the root cause of the crash/failure. In your opinion, how important is this piece of research?

- Essential
- Worthwhile
- Unimportant
- Unwise
- I don't understand

LOGIC Hidden unless: Question "Automated debugging has been an active area of research. An automated debugging approach takes as input a crash or a test case failure and generates a ranked list of suspicious program locations that may contain the root cause of the crash/failure. In your opinion, how important is this piece of research?" #7 is one of the following answers ("Unimportant","Unwise")

8. Why do you think this research is unimportant or unwise?

9. When you start debugging, are the following resources available at your disposal?

	All the time	Sometimes	Rarely	Never
Mathematical specification (e.g., temporal logic, Z) of a program	○	○	○	○
Textual specification of a program	○	○	○	○
One test case/scenario that causes a failure/crash	○	○	○	○
Multiple test cases/scenarios that cause a failure/crash	○	○	○	○
A set of successful test cases that do not cause any failure	○	○	○	○
A textual description of a defect (e.g., a bug report)	○	○	○	○

10. An automated debugging tool pinpoints suspicious program elements. Which of the following **granularity levels** do you prefer?

- ☐ Pinpoint buggy component
- ☐ Pinpoint buggy class
- ☐ Pinpoint buggy method
- ☐ Pinpoint buggy basic block
- ☐ Pinpoint buggy statement

11. An automated debugging tool returns a ranked list of suspicious program locations (at your preferred granularity level) and one of them may contain the bug location. What is the **minimum acceptable level** before you consider the tool to **successfully locate** buggy code? E.g., if you only consider the tool to be successful only if a bug appears in the top 5 elements, please select "Top 5".

- Top 1
- Top 5
- Top 10
- Top 20
- Top 50
- Other

12. How **trustworthy** an automated debugging tool must be before you will consider adoption? E.g., if you want the tool to **successfully locate** bugs (based on your success criterion defined in the previous question) at least 50% of the time, please select "At least 50%".

- At least 5%
- At least 20%
- At least 50%
- At least 75%
- At least 90%
- Other

13. How **scalable** a trustworthy automated debugging tool must be before you will consider adoption?

It should work **at least** for programs of size:

- 1 - 100 Lines of Code
- 1 - 1000 Lines of Code
- 1 - 10,000 Lines of Code
- 1 - 100,000 Lines of Code
- 1 - 1000,000 Lines of Code
- Other

14. How **efficient** a trustworthy and scalable automated debugging tool must be before you will consider adoption? E.g., if you want the tool to produce results **at most** within 1 minute, select "<1 minute".

- Within a fraction of a second
- < 1 minute
- < 30 minutes
- < 1 hour
- < a day
- Other

LOGIC Show/hide trigger exists.

15. Assume you have an **efficient**, **scalable**, and **trustworthy** automated debugging tool, will you adopt it?

- Yes
- No

LOGIC Hidden unless: Question "Assume you have an **efficient**, **scalable**, and **trustworthy** automated debugging tool, will you adopt it?" #15 is one of the following answers ("No")

16. Why won't you adopt an efficient, scalable, and trustworthy automated debugging tool?

17. How agreeable are you with the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
An automated debugging tool must provide a rationale why some program locations are marked as suspicious.	○	○	○	○	○
I will *still adopt* an efficient, scalable, and trustworthy automated debugging tool, even if it cannot provide rationales	○	○	○	○	○
An automated debugging tool must be integrated well to my favourite IDE.	○	○	○	○	○
I will *still adopt* a an efficient, scalable, and trustworthy automated debugging tool, even if it is not integrated well to my favorite IDE.	○	○	○	○	○

LOGIC Hidden unless: Question "I will *still adopt* an efficient, scalable, and trustworthy automated debugging tool, even if it cannot provide rationales" is one of the following answers ("Disagree","Strongly Disagree")

18. Why the ability to provide rationales is very important in your decision to adopt an automated debugging tool?

LOGIC Hidden unless: Question "I will *still adopt* a an efficient, scalable, and trustworthy automated debugging tool, even if it is not integrated well to my favorite IDE. " is one of the following answers ("Disagree","Strongly Disagree")

19. Why integration to your favourite IDE is very important in your decision to adopt an automated debugging tool?

20. Do you have final suggestions/comments/opinions about automated debugging or this survey?

Thank You!

Thank you for taking our survey. Your response is very important to us.