SUMMARY OF THE FORWARD SNOWBALLING PROCESS.

Analysis of studies per criterion.

#	Criterion	Year	Title	R1	R2	R3	R4	R5	R7	R8	R9	R10	R11	R12	R13	R14	R6
1	EC1	2011	Bug signature minimization and fusion	X													
2	EC1	2012	Practical isolation of failure-inducing changes for debugging regression faults	X													
3	EC1	2013	Automatic recovery of root causes from bug-fixing changes	X													
4	EC1	2013	Will fault localization work for these failures? an automated approach to predict effectiveness of fault localization tools	X													
5	EC1	2014	Ask the mutants: Mutating faulty programs for fault localization		X												
6	EC1	2014	Fault-localization techniques for software systems: A literature review		X												
7	EC1	2014	Fusion fault localizers		X												
8	EC1	2014	Identifying recurring faulty functions in field traces of a large industrial software system	X													
9	EC1	2014	Learning to combine multiple ranking metrics for fault localization	X	X												
10	EC1	2014	Toolset and program repository for code coverage-based test suite analysis and manipulation		X												
11	EC1	2015	A revisit of a theoretical analysis on spectrum-based fault localization		X												
12	EC1	2015	Information retrieval and spectrum based bug localization: better together		X												
13	EC1	2015	Should I follow this fault localization tool's output?	X													
14	EC1	2016	“Automated Debugging Considered Harmful” Considered Harmful: A User Study Revisiting the Usefulness of Spectra-Based Fault Localization Techniques with Professionals Using Real Bugs from Large Systems	X													
15	EC1	2016	A learning-to-rank based fault localization approach using likely invariants		X												
16	EC1	2016	A survey on software fault localization	X													
17	EC1	2016	DFL: Dual-service fault localization	X													
18	EC1	2016	Enhanced fault localization by weighting test cases with multiple faults		X												
19	EC1	2016	Probabilistic fault localisation		X												
20	EC1	2016	Towards more accurate fault localization: An approach based on feature selection using branching execution probability		X												
21	EC1	2017	Accuracy graphs of spectrum-based fault localization formulas	X													
22	EC1	2017	An In-Depth Study of the Efficiency of Risk Evaluation Formulas for Multi-Fault Localization		X												
23	EC1	2017	Boosting spectrum-based fault localization using PageRank		X												
24	EC1	2017	Fault Localization Using a Failed Execution Slice		X												

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25	EC1	2017	How does execution information help with information-retrieval based bug localization?		X												
26	EC1	2017	Improving spectral-based fault localization using static analysis			X											
27	EC1	2017	Will this localization tool be effective for this bug? Mitigating the impact of unreliability of information retrieval based bug localization tools		X												
28	EC1	2018	A combinatorial testing-based approach to fault localization					X									
29	EC1	2018	A novel variable-centric fault localization technique		X												
30	EC1	2018	A Theoretical Analysis on the Impacts of Misestimated Test Cases						X								
31	EC1	2018	Comparing spectrum based fault localisation against test-to-code traceability links		X			X									
32	EC1	2018	FTMES: A Failed-Test-Oriented Mutant Execution Strategy for Mutation-Based Fault Localization					X		X				X			
33	EC1	2018	FTScMES: A New Mutation Execution Strategy Based on Failed Tests' Mutation Score for Fault Localization					X									
34	EC1	2018	Network-clustered multi-modal bug localization		X			X									
35	EC1	2018	On the use of sequence mining within spectrum based fault localisation		X												
36	EC1	2018	Simultaneous localization of software faults based on complex network theory			X											
37	EC1	2018	Software fault localisation: a systematic mapping study					X									
38	EC1	2018	Spectrum-Based Fault Localization in Model Transformations		X	X											
39	EC1	2019	A Community-Based Fault Isolation Approach for Effective Simultaneous Localization of Faults										X				
40	EC1	2019	A Multiple Fault Localization Approach based on Multicriteria Analytical Hierarchy Process		X												
41	EC1	2019	A New Interactive Fault Localization Method with Context Aware User Feedback					X	X								
42	EC1	2019	ABFL: An Autoencoder Based Practical Approach for Software Fault Localization		X			X									
43	EC1	2019	An empirical study of fault localization families and their combinations		X			X									
44	EC1	2019	An evaluation of pure spectrum-based fault localization techniques for large-scale software systems	X	X			X	X						X		
45	EC1	2019	Deep Transfer Bug Localization					X									
46	EC1	2019	DeepFault: Fault Localization for Deep Neural Networks						X								
47	EC1	2019	DeepFL: integrating multiple fault diagnosis dimensions for deep fault localization					X									

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48	EC1	2019	Effectiveness of Weighted Neural Network on Accuracy of Software Fault Localization						X								
49	EC1	2019	Exploring and exploiting the correlations between bug-inducing and bug-fixing commits					X									
50	EC1	2019	Graph-Based Fault Localization					X									
51	EC1	2019	Inference: effective fault localization based on information-theoretic analysis and statistical causal inference		X												
52	EC1	2019	Mining historical test logs to predict bugs and localize faults in the test logs								X						
53	EC1	2019	On the analysis of spectrum based fault localization using hitting sets		X				X								
54	EC1	2019	Robustness of spectrum-based fault localisation in environments with labelling perturbations						X						X		
55	EC1	2019	VFL: Variable-based fault localization		X			X									
56	EC1	2018	Optimising Spectrum Based Fault Localisation for Single Fault Programs Using Specifications		X												
57	EC1, EC2	2018	Crashing simulated planes is cheap: Can simulation detect robotics bugs early?		X												
58	EC1, EC2	2019	Compiler bug isolation via effective witness test program generation	X				X									
59	EC1, EC8	2016	Test Case Grouping and Filtering for Better Performance of Spectrum-based Fault Localization		X												
60	EC1, EC9	2013	Comparing Ochiai and Relief for Spectrum-based Fault Localization		X												
61	EC1, EC9	2014	Hybrid-MUSE: mutating faulty programs for precise fault localization		X												
62	EC1, EC9	2014	No pot of gold at the end of program spectrum rainbow: Greatest risk evaluation formula does not exist		X												
63	EC1, EC9	2014	Ranking-based approaches for localizing faults		X												
64	EC1, EC9	2016	Methods and measures for statistical fault localisation		X												
65	EC1, EC9	2016	Spectrum-based software fault localization: A survey of techniques, advances, and challenges		X			X									
66	EC1, EC9	2017	Hybrid based approaches for software fault localization and specification mining		X												
67	EC1, EC9	2017	Improving automated fault localization using PageRank	X	X												
68	EC1, EC9	2018	Assessment of spectrum-based fault localization for practical use					X									
69	EC1, EC9	2018	Doric: Foundations for Statistical Fault Localisation		X												
70	EC1, EC9	2018	How to Evaluate Statistical Fault Localization										X				

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Analysis of studies per criterion.

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71	EC1, EC9	2018	Optimising and assessing the effectiveness of spectrum based fault localisation		X			X									
72	EC1, EC9	2018	Spectrum-based Diagnosis: Measurements, Improvements and Applications					X									
73	EC1, EC9	2019	Amortising the Cost of Mutation Based Fault Localisation using Statistical Inference		X			X	X								
74	EC1, EC9	2019	Enhancing Fault Localization with Cost Awareness					X									
75	EC1, EC9	2019	Explaining Deep Neural Networks Using Spectrum-Based Fault Localization					X			X						
76	EC1,EC2	2019	Automatically Patching Vulnerabilities of Binary Programs via Code Transfer From Correct Versions					X									
77	EC1,EC4	2018	Assessing Technical Debt in Automated Tests with CodeScene					X									
78	EC4	2014	Search-based inference of polynomial metamorphic relations	X													
79	EC5, EC9	2018	DroidBugs: An Android Benchmark for Automatic Program Repair					X									
80	EC5. EC9	2017	Advanced techniques for search-based program repair		X												
81	EC6,EC4	2013	Predicting regression test failures using genetic algorithm-selected dynamic performance analysis metrics		X												
82	EC7	2015	Genetic improvement of software for multiple objectives		X												
83	EC7	2015	Learning diagnosis models using variable-fidelity component model libraries	X													
84	EC7	2016	Similarity to a single set		X	X											
85	EC7	2017	Embedding genetic improvement into programming languages		X												
86	EC7	2017	GPGPGPU: evaluation of parallelisation of genetic programming using GPGPU		X			X	X								
87	EC7	2018	A Preliminary Systematic Mapping Study of Human Competitiveness of SBSE		X												
88	EC7	2018	Aggregating association rules to improve change recommendation	X													
89	EC7	2018	From start-ups to scale-ups: Opportunities and open problems for static and dynamic program analysis						X								
90	EC7	2018	Pruning Techniques for Mixed Ensembles of Genetic Programming Models						X								
91	EC7	2019	Software review: DEAP (Distributed Evolutionary Algorithm in Python) library					X									
92	EC7, EC9	2013	Large-scale bioinformatics data mining with parallel genetic programming on graphics processing units		X												
93	EC7, EC9	2015	Genetically improved software		X												

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94	EC7, EC9	2019	Privacy-Preserved Data Sharing for Evidence-Based Policy Decisions: A Demonstration Project Using Human Services Administrative Records for Evidence-Building Activities									X					
95	EC9	2013	Theoretical Analysis of GP-Evolved Risk Evaluation Formulas for Spectrum Based Fault Localisation		X												
96	IC2	2017	Genetic programming-based composition of fault localization heuristics		X												