R Venkatesh

Chief Scientist & Head – Foundations of Computing Research Area

TCS Research & Innovation

Education

- M.Sc. in Computer Science from Pune University
- B.Tech. in Metallurgical Engineering from IIT Bombay

Research Interests

- Scalable formal verification
- Formal notations and semantics
- Static analysis
- Test case generation
- Applications of SAT/SMT solving
- Model checking

Positions held

- Chair, ACM India Education Committee
- Vice President, Indian Association of Research in Computer Science
- Member ACM Education Board

Awards

- VeriAbs won a gold in the ReachSafety category of SV-COMP ’19 (https://sv-comp.sosy-lab.org/2019/results/results-verified/) and a bronze in the Systems Category. The tool has won a silver in the ReachSafety category in ’18 (https://sv-comp.sosy-lab.org/2018/results/results-verified/)
- VeriFuzz won an overall gold in Test-Comp ’19 (https://test-comp.sosy-lab.org/2019/results/results-verified/)

VeriAbs and VeriFuzz are tools developed by the group.

Conference/Journal Publications

1. Chowdhury, Animesh Basak; Medicherla, Raveendra Kumar; Venkatesh, R; VeriFuzz: Program aware fuzzing International Conference on Tools and Algorithms for the Construction and Analysis of Systems 244-249 2019 Springer, Cham
2. Azeem, Muqsit; Madhukar, Kumar; Venkatesh, R; Generalizing specific-instance interpolation proofs with SyGuS Proceedings of the 40th International Conference on Software Engineering: New Ideas and Emerging Results 57-60 2018 ACM
3. Becker, Martin; Metta, Ravindra; Venkatesh, R; Chakraborty, Samarjit; Scalable and precise estimation and debugging of the worst-case execution time for analysis-friendly processors: a comeback of model checking International Journal on Software Tools for Technology Transfer Jan-29 2018 Springer Berlin Heidelberg
4. Becker, Martin; Metta, Ravindra; Venkatesh, R; Chakraborty, Samarjt; Scalable and Precise Estimation and Debugging of the Worst-Case Execution Time for Analysis-Friendly Processors arXiv preprint arXiv:1802.09239 2018
5. Darke, Priyanka; Prabhu, Sumanth; Chimdyalwar, Bharti; Chauhan, Avriti; Kumar, Shrawan; Basakchowdhury, Animesh; Venkatesh, R; Datar, Advaita; Medicherla, Raveendra Kumar; VeriAbs: Verification by Abstraction and Test Generation International Conference on Tools and Algorithms for the Construction and Analysis of Systems 457-462 2018 Springer, Cham
6. Kumar, Shrawan; Sanyal, Amitabha; Venkatesh, R; Shah, Punit; Property checking array programs using loop shrinking International Conference on Tools and Algorithms for the Construction and Analysis of Systems 213-231 2018 Springer, Cham
7. Prabhu, Sumanth; Madhukar, Kumar; Venkatesh, R; Efficiently learning safety proofs from appearance as well as behaviours International Static Analysis Symposium 326-343 2018 Springer, Cham
8. Yeolekar, Anand; Metta, Ravindra; Venkatesh, R; Chakraborty, Samarjit; Refining Task Specifications using Model Checking 2018 IEEE 24th International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA) 185-191 2018 IEEE
9. Chimdyalwar, Bharti; Darke, Priyanka; Chauhan, Avriti; Shah, Punit; Kumar, Shrawan; Venkatesh, R; VeriAbs: verification by abstraction (competition contribution) International Conference on Tools and Algorithms for the Construction and Analysis of Systems 404-408 2017 Springer, Berlin, Heidelberg
10. Darke, Priyanka; Chimdyalwar, Bharti; Chauhan, Avriti; Venkatesh, R; Efficient Safety Proofs for Industry-Scale Code Using Abstractions and Bounded Model Checking 2017 IEEE International Conference on Software Testing, Verification and Validation (ICST) 468-475 2017 IEEE

11. Venkatesh, R; Niyas, C; Scaling Bounded Model Checking by Transforming Programs with Arrays Logic-Based Program Synthesis and Transformation: 26th International Symposium, LOPSTR 2016, Edinburgh, UK, September 6–8, 2016, Revised Selected Papers 10184 275 2017 Springer
12. Yeolekar, Anand; Madhukar, Kumar; Bhutada, Dipali; Venkatesh, R; Sequentialization using timestamps International Conference on Theory and Applications of Models of Computation 684-696 2017 Springer, Cham
13. Jana, Anushri; Khedker, Uday P; Datar, Advaita; Venkatesh, R; Niyas, C; Scaling bounded model checking by transforming programs with arrays International Symposium on Logic-Based Program Synthesis and Transformation 275-292 2016 Springer, Cham
14. Metta, Ravindra; Becker, Martin; Bokil, Prasad; Chakraborty, Samarjit; Venkatesh, R; TIC: a scalable model checking based approach to WCET estimation ACM SIGPLAN Notices 51 5 72-81 2016 ACM
15. Zare, Amey; Datar, Advaita; Venkatesh, R; Hasegawa, Miwako; Simplifying the Review of Communicating Finite State Machines Implementation using Static Analysis 2016 SAE Technical Paper
16. Bokil, Prasad; Krishnan, Padmanabhan; Venkatesh, R; Achieving effective test suites for reactive systems using specification mining and test suite reduction techniques ACM SIGSOFT Software Engineering Notes 40 1 01-Aug 2015 ACM
17. Darke, Priyanka; Chimdyalwar, Bharti; Venkatesh, R; Shrotri, Ulka; Metta, Ravindra; Over-approximating loops to prove properties using bounded model checking Proceedings of the 2015 Design, Automation & Test in Europe Conference & Exhibition 1407-1412 2015 EDA Consortium
18. Venkatesh, R; Shrotri, Ulka; Zare, Amey; Agrawal, Supriya; Cost-effective functional testing of reactive software 2015 International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE) 67-77 2015 IEEE
19. Venkatesh, R; Shrotri, Ulka; Zare, Amey; Agrawal, Supriya; On Generating Test Cases from EDT Specifications International Conference on Evaluation of Novel Approaches to Software Engineering Jan-20 2015 Springer, Cham
20. Venkatesh, R; Shrotri, Ulka; Krishna, G Murali; Agrawal, Supriya; EDT: a specification notation for reactive systems 2014 Design, Automation & Test in Europe Conference & Exhibition (DATE) 01-Jun 2014 IEEE
21. Madhukar, Kumar; Metta, Ravindra; Shrotri, Ulka; Venkatesh, R; Trace based reachability verification for statecharts 2013 1st FME Workshop on Formal Methods in Software Engineering (FormaliSE) 22-28 2013 IEEE
22. Madhukar, Kumar; Metta, Ravindra; Singh, Priyanka; Venkatesh, R; Reachability verification of rhapsody statecharts 2013 IEEE Sixth International Conference on Software Testing, Verification and Validation Workshops 96-101 2013 IEEE
23. Yeolekar, Anand; Unadkat, Divyesh; Agarwal, Vivek; Kumar, Shrawan; Venkatesh, R; Scaling model checking for test generation using dynamic inference 2013 IEEE Sixth

International Conference on Software Testing, Verification and Validation 184-191 2013 IEEE

24. Darke, Priyanka; Khanzode, Mayur; Nair, Arun; Shrotri, Ulka; Venkatesh, R; Precise analysis of large industry code 2012 19th Asia-Pacific Software Engineering Conference 1 306-309 2012 IEEE
25. Krishnan, Padmanabhan; Venkatesh, R; Bokil, Prasad; Muske, Tukaram; Suman, Vijay; Effectiveness of random testing of embedded systems 2012 45th Hawaii International Conference on System Sciences 5556-5563 2012 IEEE
26. Venkatesh, R; Shrotri, Ulka; Darke, Priyanka; Bokil, Prasad; Test generation for large automotive models 2012 IEEE International Conference on Industrial Technology 662-667 2012 IEEE
27. Shrotri, Ulka; Venkatesh, R; Metta, Ravindra; Proving unreachability using bounded model checking Proceedings of the 3rd India software engineering conference 73-82 2010 ACM
28. Suman, P Vijay; Muske, Tukaram; Bokil, Prasad; Shrotri, Ulka; Venkatesh, R; Masking boundary value coverage: Effectiveness and efficiency International Academic and Industrial Conference on Practice and Research Techniques Aug-22 2010 Springer, Berlin, Heidelberg
29. Bokil, Prasad; Darke, Priyanka; Shrotri, Ulka; Venkatesh, R; Automatic test data generation for c programs 2009 Third IEEE International Conference on Secure Software Integration and Reliability Improvement 359-368 2009 IEEE
30. Kulkarni, Aniket; Metta, Ravindra; Shrotri, Ulka; Venkatesh, R; Scaling up Model-checking Next Generation Design and Verification Methodologies for Distributed Embedded Control Systems 275-283 2007 Springer, Dordrecht
31. Sukumaran, Srihari; Sreenivas, Ashok; Venkatesh, R; A rigorous approach to requirements validation Fourth IEEE International Conference on Software Engineering and Formal Methods (SEFM'06) 236-245 2006 IEEE
32. Bast, Wim; Belaunde, Mariano; Blanc, Xavier; Duddy, Keith; Griffin, Catherine; Helsen, Simon; Lawley, Michael; Murpree, Michael; Reddy, Sreedhar; Sendall, Shane; Mof qvt final adopted specification Object Management Group (OMG) 28 31-32 2005
33. Bast, Wim; Murphree, Michael; Michael, Lawley; Duddy, Keith; Belaunde, Mariano; Griffin, Catherine; Sendall, Shane; Didier, Voitisiek; Steel, Jim; Tratt, Laurence; MOF QVT final adopted specification: meta object facility (MOF) 2.0 query/view/transformation specification. 2005 Object Management Group
34. Kholkar, Deepali; Krishna, G Murali; Shrotri, Ulka; Venkatesh, R; Visual specification and analysis of use cases Proceedings of the 2005 ACM symposium on Software visualization 77-85 2005 ACM
35. Liu, Zhiming; Venkatesh, R; Tools for formal software engineering IFIP Working Conference on Verified Software: Theories, Tools and Experiments (VSTTE, http://vstte. ethz. ch/), held on Oct-13 2005
36. Appukuttan, Biju K; Clark, Anthony; Reddy, Sreedhar; Tratt, Laurence; Venkatesh, R; A model driven approach to model transformations. Proceedings of Workshop in Software

Model Engineering (WiSME) 2003, October 2003, San Francisco. 2003 Springer Berlin Heidelberg

37. Shrotri, Ulka; Bhaduri, Purandar; Venkatesh, R; Model checking visual specification of requirements First International Conference onSoftware Engineering and Formal Methods, 2003. Proceedings. 202-209 2003 IEEE
38. Bhaduri, Purandar; Venkatesh, R; Formal consistency of models in multi-view modelling Workshop on Consistency Problems in UML-Based Software Development 2002
39. Bhaduri, Purandar; Venkatesh, R; Palshikar, Girish K; Formal techniques for analysing scenarios using message sequence charts Electronic Notes in Theoretical Computer Science 65 7 Jan-17 2002 Elsevier
40. Kulkarni, Vinay; Venkatesh, R; Reddy, Sreedhar; Generating enterprise applications from models International Conference on Object-Oriented Information Systems 270-279 2002 Springer, Berlin, Heidelberg
41. Sreenivas, Ashok; Venkatesh, R; Joseph, Mathai; Meta-modelling for formal software development Electronic Notes in Theoretical Computer Science 42 01-Nov 2001 Elsevier
42. Venkatesh, R; Bhaduri, Purandar; Joseph, Mathai; Formalizing models and meta-models for system development extended abstract Proceedings Eighth Asia-Pacific Software Engineering Conference 155-158 2001 IEEE
43. Ghaisas, Smita; Shrotri, Ulka; Venkatesh, R; Requirement-centric method for Application Development Engineering Methods to Support Information Systems Evolution 75