Rohan Bavishi

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CONTACT & PROFILES

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RESEARCH INTERESTS

Program Analysis & Verification **Program Synthesis** Compiler Optimizations

RESEARCH-RELEVANT SKILLS

Source Code Knowledge:

Expert: CBMC • Intermediate: Z3

API Knowledge:

Proficient: MathSAT | MiniSAT

RFI FVANT COURSEWORK

Fundamentals of Computing Data Structures & Algorithms Discrete Mathematics Introduction to Electronics Mathematics - Calculus Mathematics - Linear Algebra Logic for Computer Science Abstract Algebra **Computer Organisation Operating Systems** Theory of Computation Advanced Algorithms

PROGRAMMING SKILLS

C • C++ • Python • ŁTFX• Bash HTML • Verilog

COMPETITIVE PROGRAMMING

SPOJ

SOLVED: 145 | WORLD RANK: 968

Project Euler SOLVED: 234/502

INDIA RANK: 12 | WORLD: 895

FDUCATION

B.Tech | Computer Science | INDIAN INSTITUTE OF TECHNOLOGY, KANPUR Expected July 2013 - Aug 2017 | GPA: 9.7/10.0 (Overall)

HSC | Class 12 | SHIVAJI SCIENCE COLLEGE, NAGPUR

May 2013 | Aggregate: 90.16%

AISSCE | Class 10 | MODERN SCHOOL, NAGPUR

May 2011 | Aggregate : 96.4%

RESEARCH PROJECTS

Fault localization using Craig Interpolants

July 2015 - Ongoing | Under Prof. Subhajit Roy | (Source will be released after publication) Ongoing research project in fault localization, using the CBMC model checker, coupled with interpolation procedures from the MathSAT 5 solver.

- Modified major sections of CBMC to accomodate trace formula generation for test-cases.
- Added significant number of modules in CBMC for efficient interaction with the MathSAT interpolation engine.
- Developed a working version of the state-of-the-art fault localization tool BugAssist for comparision. Quality of our tool's fault localization results is higher as compared to BugAssist.

DirectFix Implementation in CBMC

May 2015 - July 2015 | Under Prof. Subhajit Roy | Tode

Implemented the automated repair algorithm, from scratch, described in the DirectFix publication using the model checker CBMC, and the Z3 solver for the MaxSAT formulation.

 Added multiple modules in CBMC to use the trace formula to generate the component based encoding (CBE) to be passed as an SMT-Lib formula to Z3.

ACADEMIC PROJECTS

Median Algorithms for Disk-Resident Data

Aug 2014 - Nov 2014 (Second Year) | Under Prof. Surender Baswana | Aug 2014 - Nov 2014 (Second Year) Independently developed a 2-pass deterministic and a 2-pass randomized algorithm to find median of large data-sets (1 Terabyte) with performance tests.

- Deterministic algorithm similar to the original paper by Munro-Paterson(1980) An ϵ -approximate median is calculated in the first pass, followed by the exact median value in the second pass.
- Randomized algorithm employed basic random-sampling techniques using Mersenne-Twister PRNG. Success probability close to 0.6 achieved for medium-sized data-sets (10-50 GB)

Peer-to-Peer Dropbox

Aug 2013 - Nov 2013 (First Year) | Under Prof. Subhajit Roy | P2P Dropbox

A Linux application for back-up and syncing of files between two or more peers

- Users have a shared folder across different machines, with local copies, in which any changes made are synced across all devices
- Linux inotify API used to track changes in the shared folder and rsync used to sync the modifications to ensure efficient transfer
- Multithreading with mutexes used to parallelize syncing and file-monitoring operations

AWARDS & ACHIEVEMENTS

- Academic Excellence Award 2013-2014
- Secured an All-India-Rank of 202 in JEE Advanced 2013 amongst 150,000 candidates
- Secured an All-India-Rank of 175 in JEE Mains 2013 amongst 20,00,000 candidates
- Secured an All-India-Rank of 33 in AMTI Mathematics Olympiad 2013
- Best Overall Student (2011-2013) Shivaji Science College, Nagpur