Mihir P Mehta

Department of Computer Science
University of Texas at Austin

+1 512-952-0104
www.cs.utexas.edu/~mihir

Education

Ph.D., Computer Science, University of Texas at Austin. (2014 - present)
GPA: 3.3/4 (Spring 2018)

B.Tech., Computer Science and Engineering, Indian Institute of Technology (IIT) Delhi. (2009 - 2013)
GPA: 7.9/10

Exchange semester, Ecole des Mines, Saint-Etienne. (2011)

Professional Experience

Research Intern at Oracle Corp., Belmont, CA, USA. (2018)

- Completed a code proof to certify the correctness of a highly optimised assembly language program.
- Contributed to a timing analysis of this program, to ensure the avoidance of race conditions.
- Studied the potential use of the TLAPS theorem prover for distributed systems, and created some preliminary internal documentation.

Research Intern at Apple Computer, Inc., Austin, TX, USA. (2017)

- Used model checking tools towards verifying Apple's hardware microarchitectures
- Developed proofs of correctness of hardware components with respect to specifications, with code changes where necessary.

Research Intern at Intel Corporation, Austin, TX, USA. (2015)

- Built a Pintool to dynamically analyse executables.
- Augmented the analysis with fine-grained information obtained from static analysis techniques.

Software Engineer at Samsung Research Institute, Noida, India. (2013-2014)

- Optimised the Linux kernel for Samsung's Android devices.
- Improved core components of the Linux virtual memory subsystem.

Research Experience

Filesystem modelling for FAT32 with Professor Warren A. Hunt Jr., CS department, UT Austin. (2016-present)

- Developed a model for the FAT32 file system and separation-based reasoning about filesystems and file-manipulating programs with ACL2.
- Published paper on this work in the proceedings of ACL2-2018 and ITP-2019.

Program verification in object-oriented languages with Professors Isil Dillig and Thomas Dillig, CS department, UT Austin. (2014-2015)

- Developed a prototype verifier based on Hoare logic and weakest pre-conditions.
- Used the Soot compiler framework to generate verification conditions and the Z3 theorem prover to discharge them.
- Generated example inputs demonstrating bugs in several test programs.

Algorithms for bisimilarity with Professor S Arun Kumar, CSE Department, IIT Delhi (2012-2013)

- Conceptualised and implemented a toolkit for verifying bisimilarity and other properties of timed automata and labelled transition systems.
- Improved an algorithm for generating a zone graph from a timed automaton.

Publications

Formalising Filesystems in the ACL2 Theorem Prover: an Application to FAT32. In: *Proceedings of the 15th International Workshop on the ACL2 Theorem Prover and Its Applications, Austin, Texas, USA, November 5-6, 2018. Electronic Proceedings in Theoretical Computer Science.* Matt Kaufmann and Shilpi Goel, editors. Vol. 280, pp. 18-29, 2018. URL `https://cgi.cse.unsw.edu.au/~eptcs/paper.cgi?ACL22018.2`.

Binary-Compatible Verification of Filesystems with ACL2. In: *10th International Conference on Interactive Theorem Proving (ITP 2019) (Leibniz International Proceedings in Informatics (LIPIcs))*, John Harrison, John O'Leary, and Andrew Tolmach (Eds.), Vol. 141. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, Dagstuhl, Germany, 25:1-25:18. URL `https://doi.org/10.4230/LIPIcs.ITP.2019.25`.

Coursework (selected graduate courses)

UT Austin: Automated Logical Reasoning, Introduction to Mathematical Logic, Formal Verification and Semantics, Automatic Verification of Software, Numerical Linear Algebra, Dependable Computing Sytems, Advanced OS, Recursion and Induction, Programming Languages (teaching assistant).
IIT Delhi : Compiler Design, Theory of Computation, Numerical Optimisation.

Technical Skills

Theorem provers: ACL2, Coq, TLAPS.
Programming languages: Functional languages (OCaml, SML), logic programming languages (Prolog), hardware description languages (VHDL, Verilog).
Operating systems: GNU/Linux (kernel and application development).
Compiler frameworks: Soot (Java), LLVM (C++).
Others: Xilinx, Matlab, PostgreSQL.

Scholastic Achievements

- Awarded the UT Austin Graduate School's Recruitment Fellowship. (2014-2017)
- All India Rank 138 (out of 400000), Joint Entrance Examination (IIT-JEE). (2009)
- Secured All India Rank 29 in the All India Engineering Entrance Examination (AIEEE) among 1000000 candidates. (2009)
- Scored 99 percentile in Verbal and Analytical Reasoning, GRE. (2012)

Others

Languages: English, French, Gujarati, Hindi.