Comments from the Editors

Dear ACM/SIGDA members,

We are excited to present to you the June E-News. We encourage you to invite your students and colleagues to be a part of the SIGDA newsletter. The newsletter covers a wide range of information from the upcoming conferences and funding deadlines, hot research topics to news and technical activities from our community. Get involved and contact us if you want to contribute an article or announcement.

The newsletter is evolving, please let us know what you think.

Happy reading!

Debjit Sinha, Keni Qiu, Editors-in-Chief, SIGDA E-News

To renew your ACM SIGDA membership, please visit http://www.acm.org/renew or call between the hours of 8:30am to 4:30pm EST at +1-212-626-0500 (Global), or 1-800-342-6626 (US and Canada). For any questions, contact acmhelp@acm.org

"SIGDA E-News Editorial Board:"

"'Debjit Sinha'", E-Newsletter co Editor-in-Chief

"'Keni Qiu'", E-Newsletter co Editor-in-Chief

"'Xiang Chen'", E-Newsletter Associate Editor for SIGDA News column

"'Yanzhi Wang'", E-Newsletter Associate Editor for SIGDA Local chapter news column

"'Pingqiang Zhou'", E-Newsletter Associate Editor for SIGDA Awards column

"'Wanli Chang'", E-Newsletter Associate Editor for SIGDA What is column

"'Xun Jiao'", E-Newsletter Associate Editor for SIGDA What is column

"What is" Column

What is the set boundary-based reachability method?

Dr. Bai Xue

Associate Research Professor

State Key Laboratory of Computer Science

Institute of Software, Chinese Academy of Sciences

Beijing, China

The rapidly increasing deployment of cyber-physical systems in diverse safety-critical application domains, ranging from transportation systems to chemical processes and healthcare, among others, renders safety analysis and verification for these systems societally important. Formally, the safety verification problem can often be reduced to a problem of deciding whether the system of interest may in its evolution touch a specified set of unsafe states. Reachability analysis, which involves computing over-approximations (i.e., super-sets of the actual reachable set), plays a fundamental role in addressing such safety verification challenges. Overly pessimistic over-approximations, however, render many reachability properties unverifiable in practice. This pessimism mainly arises due to the wrapping effect, which is the propagation and accumulation of over-approximation error through the iterative computation in the construction of reachable sets. As the extent of the wrapping effect correlates strongly with the volume of the initial set, techniques that partition the initial state space and independently compute reachable sets of those partitions are often used to reduce the wrapping effect, especially for large initial sets and/or large time horizons. Such partitioning may, however, induce excessive demand on computation time and memory, often rendering the existing reachability methods not suitable for complex real-world applications.

Due to the fact that the solution mapping of an ordinary differential equation is a homeomorphism and thus maps the boundary of the initial set onto the boundary of the reachable set, the set boundary-based reachability method was proposed, which is a method that guides existing over-approximate reachability approaches to perform computations on the initial set's boundary in solving safety verification problems [1]. The set-boundary reachability method concludes that the ordinary differential equation satisfies the given safety specification if the states traversed by the initial set's boundary satisfies it. As opposed to the conventional approach employing safely over-approximating state extrapolation on the full volume of the initial set, the set boundary-based reachability method applies such state extrapolation only to the initial set's boundary, which has significantly smaller volume. This helps to enhance precision and reduce computational burden when solving safety verification problems, especially for cases with large initial sets and/or large time horizons. Based on sensitivity analysis, the set-boundary reachability method was further extended to compute interval over-approximations by only performing computations on a subset of the initial set's boundary for ordinary differential equations [3]. Also, the set-boundary reachability method was extended to compute under-approximations (i.e., sub-sets of the actual reachable set) for ordinary differential equations [2] as well as (perturbed) delay differential equations [4,5], which are often used to either falsify safety specifications or determine a set of initial states such that the system performs safely.

[1]. Bai Xue, Arvind Easwaran, Nam-Joon Cho and Martin Fränzle. Reach-Avoid Verification for Nonlinear Systems Based on Boundary Analysis. IEEE Transactions on Automatic Control, 62(7):3518--3523, 2016.

[2]. Bai Xue and Zhikun She and Arvind Easwaran. Under-Approximating Backward Reachable Sets by Polytopes. CAV 2016, pp. 457--476, 2016.

[3]. Bai Xue and Martin Fränzle and Peter Nazier Mosaad. Just scratching the surface: Partial exploration of initial values

in reach-set computation. CDC 2017, pp. 1769--1775, 2017.

[4]. Bai Xue and Peter Nazier Mosaad and Martin Fränzle and Mingshuai Chen and Yangjia Li and Naijun Zhan. Safe Over- and Under-Approximation of Reachable Sets for Delay Differential Equations. FORMATS 2017, pp. 281--299, 2017.

[5]. Bai Xue and Qiuye Wang and Shenghua Feng and Naijun Zhan. Over- and Under-Approximating Reachable Sets for Perturbed Delay Differential Equations. IEEE Transactions on Automatic Control, 2020. DOI: 10.1109/TAC.2020.2977993.

Back to Contents

Paper Submission Deadlines

IWBDA'20 - Int'l Workshop on Bio-Design Automation
Online
Deadline: June 5, 2020
Aug 3-5, 2020
http://www.iwbdaconf.org/2020

HiPC'20 – IEEE Int'l Conference on High Performance Computing, Data, And Analytics
Pune, India
Deadline: July 1, 2020 (Abstracts due: July 8, 2020)
Dec 16-19, 2020
http://www.hipc.org

iSES'20 – IEEE Int'l Symposium on Smart Electronic Systems
Chennai, India
Deadline: July 31, 2020
Dec 14-16, 2020
http://www.ieee-ises.org

Back to Contents

Upcoming Conferences and Symposia

ISCA'20 – Int'l Symposium on Computer Architecture
Virtual
May 30 – Jun 3, 2020
https://iscaconf.org/isca2020/

NATW'20 – IEEE North Atlantic Test Workshop
Virtual workshop
June 10 & 17, 2020
http://natw.ieee.org

LCTES'20 – ACM Int'l Conference on Languages Compilers, Tools and Theory of Embedded Systems
Virtual conference
Jun 15-20, 2020
https://conf.researchr.org/home/LCTES-2020

ISVLSI'20 – IEEE Computer Society Annual Symposium on VLSI
Limassol, Cyprus
Jul 6-8, 2020
http://www.isvlsi.org

ICDCS'20 – IEEE Int'l Conference on Distributed Computing Systems
Singapore
Jul 8-10, 2019
https://icdcs2020.sg

DAC'20 – Design Automation Conference
Virtual

Jul 19-23, 2020
http://www.dac.com/

ISLPED'20 – ACM/IEEE Int'l Symposium on Low Power Electronics and Design
Boston, MA
Aug 10-12, 2020
http://www.islped.org

ESWEEK'20 - Embedded Systems Week (CASES, CODES+ISSS, and EMSOFT)
Hamburg, Germany
Deadline: Apr 17, 2020 (Abstracts due: Apr 3, 2020)
Sept 20-25, 2020
http://www.esweek.org

NOCS'20 – IEEE/ACM Int'l Symposium on Networks-on-Chip (co-located with ESWEEK'20)
Virtual Conference
Sept 24-25, 2020
http://nocs2020.engr.uky.edu/

GLSVLSI'20 – ACM Great Lakes Symposium on VLSI
Beijing, China
Sept xxxx, 2020
http://www.glsvlsi.org

PACT'20 - Int'l Conference on Parallel Architectures and Compilation
Techniques
Atlanta, GA
Oct 3-7, 2020
http://www.pactconf.org

VLSI-SoC'20 – IFIP/IEEE Int'l Conference on Very Large Scale Integration
Salt Lake City, UT
Oct 5-7, 2020
http://www.vlsi-soc.com

ISCAS'20 – IEEE Int'l Symposium on Circuits and Systems
Seville, Spain
Oct 11-14, 2020
http://iscas2020.org

MICRO'20 – IEEE/ACM Int'l Symposium on Microarchitecture
Athens, Greece
Oct 17-21, 2020
http://www.microarch.org/micro53

BodyNets'20 – Int'l Conference on Body Area Networks
Cyberspace
Oct 21-22, 2020
http://www.bodynets.org

ICCAD'20 – IEEE/ACM Int'l Conference on Computer-Aided Design
San Diego, CA
Nov 2-5, 2020
http://www.iccad.com

HOST'20 – IEEE Int'l Symposium on Hardware-Oriented Security and Trust
San Jose, CA
TBD (postponed later this year)
http://www.hostsymposium.org

Activity Spotlight - Design Automation WebiNar (DAWN)

Activity Spotlight - Design Automation WebiNar (DAWN)

Hosts:
Yiran Chen, Duke University
Tsung-Yi Ho, National Tsing Hua University

Time:
May 7, 2020, 6PM-8PM Pacific Time (USA and Canada)
May 7, 2020, 9PM-11PM Eastern Time (USA and Canada)
May 8, 2020, 9AM-11AM China Standard Time

Zoom Meeting Link: https://duke.zoom.us/j/91699298896
Password: DAWN2020

Due to the outbreak of coronavirus (COVID-19), almost all conferences/symposiums in the design automation community are canceled/postponed. People are not able to meet each other, learn recent advances, and discuss research ideas. The whole community is quarantined, just like shrouded in the darkness made by COVID-19. Thus, it is about time to bring the light from inspired scholars in our community and therefore we are thrilled to announce Design Automation WebiNar (DAWN) to drive research momentum and ensure our community remains at the cutting edge. Different from the conventional keynote- and sole-speaker-style webinars, DAWN is a special-session-style webinar. DAWN is formed by multiple presentations on the focused topic by leading experts in our community.

The first DAWN is on the topic of Machine Learning for EDA. It consists of five excellent talks followed by Q&A with the panelists.

Agenda:
Talk 1 (0'-20') Reinforcement Learning for Placement Optimization
Speaker: Azalia Mirhoseini and Anna Goldie, Google Brain
Talk 2 (20'-35') AI-Enabled Agile IC Physical Design and Manufacturing
Speaker: David Z. Pan, University of Texas at Austin
Talk 3 (35'-50') Plug-in Use of Machine Learning and Beyond
Speaker: Jiang Hu, Texas A&M University
Talk 4 (50'-65') Efficient AI, TinyML, Model Compression
Speaker: Song Han, Massachusetts Institute of Technology
Talk 5 (65'-80') Pin Access Optimization Using Machine Learning
Speaker: Shao-Yun Fang, National Taiwan University of Science and Technology
Panel (80'-120') Q&A
Panelist: All speakers

Sponsors: ACM SIGDA, IEEE CEDA

More details about DAWN can be found at: https://jiachenmao.github.io/DAWN/

Back to Contents

Technical Activities

(1)"Sensors Expo & Conference"

Date: June 22 - 24, 2020

Place: McEnery Convention Center 150 W. San Carlos Street, SAN JOSE, CA 95113 USA

Celebrating its 35th year, Sensors Expo & Conference has established itself as North America's largest event dedicated to sensors, connectivity, and IoT. Leading engineers and technological influencers will come together to be a part of the ONLY event where you can find the latest solutions to your sensing challenges. With over 350 sensor industry giants covering the expo floor, and a comprehensive conference program covering today's applications and future trends, attendees have the tools to explore sensing technologies that are driving tomorrow's solutions.
[https://www.sensorsexpo.com/]

(2)"Nanotech 2020 Conference and Expo"

Date: June 29 - July 1, 2020

Place: National Harbor, MD USA

Join us in National Harbor, MD for the 22nd annual Nanotech 2020 Conference & Expo, co-located with the

TechConnect World Innovation Conference, AI TechConnect, and SBIR/STTR Innovation Conferences. On behalf of our symposium organizers, we warmly invite you to submit your research abstract and participate in this exciting international event.
[https://techconnectworld.com/Nanotech2020/]

(3) "Semicon China 2020"

Dates: June 27th-29th, 2020

Place: Shanghai New International Expo Centre - Hall E6 - Booth E6181
[https://www.semiconchina.org/]

(4) "ESD Alliance Hosts Virtual 2020 CEO Outlook"

Date: May 22 - June 17, 2020

Place: 673 South Milpitas Blvd. Milpitas, CA 95035 USA

The 2020 CEO Outlook, hosted by the ESD Alliance, will be held Wednesday, June 17, from 10:30 am until noon PDT.
[http://esd-alliance.org/2020-esd-alliance-ceo-outlook/]

Job Openings:
----
(1) University of California Los Angeles, United States

Job Title: Professor of Computer Science

Description: The Department of Computer Science in the Henry Samueli School of Engineering and Applied Science at the University of California, Los Angeles, invites applications for part-time positions as a visiting professor. These areas include, but are not limited to, Artificial Intelligence, Computer System Architecture & CAD, Computational Systems Biology, Graphics and Vision, Information & Data Management, etc. A Ph.D. in Computer Science or an equivalent degree is required. The University of California, Los Angeles is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, age or protected veteran status. For the complete University of California nondiscrimination and affirmative action policy, see: UC Nondiscrimination & Affirmative Action Policy at:
http://policy.ucop.edu/doc/4000376/NondiscrimAffirmAct

(2) Uppsala University, Department of Information Technology, Sweden

Job Title: Associate Professor in Computer Science with specialization in Cybersecurity

Description: Cybersecurity is a computing-based discipline dealing with the presence of adversaries. Within computer science, the area of cybersecurity spans many areas, including (but not limited to) data security, cryptography, software and hardware security, network and systems security, and privacy. The position includes teaching, research and administration. Teaching duties include course responsibility, course administration, supervision of second- and third-cycle students, and development of courses in cybersecurity. The holder shall also keep abreast of developments within the subject area and the developments in the wider community that are significant for the work at the university. Associate Professors are expected to maintain their own external research grants, collaborate with other researchers within the department, contribute in coordination of cybersecurity activities within the department, and participate in innovation and research collaborations with organizations outside the university. According to the Swedish Higher Education Ordinance those qualified for appointment as Associate Professor are persons who have demonstrated teaching expertise and been awarded a PhD or have the corresponding research competence or some other professional expertise. For further information about the position please contact: Head of Department Professor Lina von Sydow, tel +46 18-471 2785, e-mail lina.von.sydow@it.uu.se or Professor Christian Rohner, tel +46 70-1679361, e-mail christian.rohner@it.uu.se

(3) University of Freiburg, Faculty of Engineering, Germany

Job Title: W3 Professorship for Intelligent Embedded Systems

Description: In the Department of Computer Science with a simultaneous appointment as a member of the Board of Directors of the Institut für Mikro-und Informationstechnik der Hahn-Schickard-Gesellschaft für angewandte Forschung e.V. Fulltime position, Start-date: At the earliest possible date. The position entails close collaboration with the Institut für Mikro-und Informationstechnik der Hahn-Schickard-Gesellschaft located in Villingen-Schwenningen and Freiburg and

includes the appointment as a member of the Board of Directors. A close collaboration with the Department of Computer Science and with the Department of Microsystems Engineering (IMTEK) is expected. The candidate should be able to demonstrate successful implementation of research results into industrial applications. Therefore, professional experience in a managerial position in industry or industry-related research is advantageous. A proven track record in the acquisition of research projects as well as very good knowledge of German research and funding opportunities are required. Experience in research and teaching is desired in the areas of intelligent embedded systems, especially in the design and implementation of machine learning methods, treatment of Big Data and Data Mining for the digitization of economics, in the design of virtual models for cyber-physical systems, the data and system security and safety, or the development of solutions for resource-efficient production environments.

For further information, please contact Dr. Rainer Giersiepen on the phone number +49 761 203-8085 or E-Mail rainer.giersiepen@sonne.uni-freiburg.de

(4) University of Toronto Mississauga

Job Title: Assistant Professor, Teaching Stream - Contractually Limited Term Appointment (CLTA) - Computer Science

Description: The Department of Mathematical and Computational Sciences at the University of Toronto Mississauga (UTM) invites applications for up to four two-year Contractually Limited Term Appointments (CLTA) at the rank of Assistant Professor, Teaching Stream, in the field of Computer Science. The appointments are expected to begin on August 1, 2020 and end on July 31, 2022. Candidates must have at least a Master's degree in Computer Science or a related discipline by the time of the appointment. A PhD is preferred. We seek candidates whose teaching interests complement and enhance our existing departmental strengths (see https://www.utm.utoronto.ca/math-cs-stats/home). Candidates must have a demonstrated record of teaching excellence that includes creating an enjoyable and educational experience for students and teaching undergraduate Computer Science courses. Candidates with experience teaching the introductory sequence, computer organization, theory of computing, or technical writing courses are preferred.

(5). New York University Department of Computer Science United States

Job Title: Adjunct Faculty in Computer Science

Description: The Department of Computer Science at New York University seeks highly motivated individuals to teach graduate and undergraduate level courses on a part-time basis. Courses could include introductory undergraduate courses; advanced Computer Science major courses; and graduate-level courses. Undergraduate introductory level teaching could include courses in programming with Python and Java, data structures, web design, and web-based programming. Advanced Computer Science major teaching could include courses in areas such as machine learning, computer security, and software engineering, among others. Graduate-level teaching could include courses in areas such as scientific computing, web-based system design, software engineering, machine learning, data mining, and intelligent systems, among others.

Applicants should submit a letter of interest /cover letter (please see instruction in the application), curriculum vita, and provide the names and contact information of at least three references via the contact reference required document in the application. All application materials should be uploaded through Interfolio.

(6). Université de Sherbrooke, Faculty of Engineering, Canada

Job Title: Professor, Research Chair of Hardware Development for Quantum and Neuromorphic Computing

Description: As part of the call for proposals for a MEI / UdeS Research Chair, the Faculty of Engineering of The Université de Sherbrooke is seeking candidates to fill a professorship in the field of hardware development for quantum and neuromorphic computing. This is a regular full-time position. The recruited person will be attached to the department that best matches their profile. This research Chair is supported by the ministère de l'Économie et de l'Innovation du Gouvernement du Québec. It is part of the Government strategy, described in the Québec 2019-2020 budget and aims to promote technologies supporting Artificial intelligence, allowing Université de Sherbrooke to recruit the best world-class researchers in this field. This chair will benefit from annual funding of $200,000, for 5 years.

The expertise of the candidates must be linked mainly to the field of this Chair and in particular to the research and development of integrated hardware solutions dedicated to artificial intelligence (AI) and quantum computing requiring control electronic operating at very low temperatures. The main challenges are related to the development of electronics allowing efficient qubits control, notably by reducing the number of interconnects within the limited thermal budget. In addition, efficient implementation of AI algorithms requires dedicated hardware designs. Expertise in this area will improve the energy efficiency of proposed solutions.

For more information, please contact the Dean Faculty of Engineering via e-mail: doyen-genie@USherbrooke.ca

Notice to Authors

This newsletter is a free service for current SIGDA members and is added automatically with a new SIGDA membership. Circulation: 2,700

This ACM/SIGDA E-NEWSLETTER is being sent to all persons on the ACM/SIGDA mailing list. To unsubscribe, send an email to listserv@listserv.acm.org with "signoff sigda-announce" (no quotes) in the body of the message. Please make sure to send your request from the same email as the one by which you are subscribed to the list.