Ashish Mishra

Assistant Professor G-I, CSE

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Major Areas of Research

- <u>Program Verification</u>
- <u>Program Synthesis</u>, <u>Programming Languages</u>
- Formal Methods, NeuroSymbolic Programming

Major Research Facilities in the Group

• <u>GPU: 2 * Intel Xeon Gold 6326</u> 2.9GHz with 256 GB RAM.

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్ भारतीय प्रौद्योगिकी संस्थान हैदराबाद Indian Institute of Technology Hyderabad





Covering All the Bases: Type-Based Verification of Test Input Generators

ZHE ZHOU, Purdue University, USA ASHISH MISHRA, Purdue University, USA BENJAMIN DELAWARE, Purdue University, USA SURESH JAGANNATHAN, Purdue University, USA

Test input generators are an important part of property-based testing (PBT) frameworks. Because PBT is intended to test deep semantic and structural properties of a program, the outputs produced by these generators can be complex data structures, constrained to satisfy properties the developer believes is most relevant to testing the function of interest. An important feature expected of these generators is that they be capable of *producting all generatible* all the structures of the second structure of the second structures of the second structures of the second structure of the second structures of the second structure structures of the second structure structure structures of the second structure structure structures of the second structure structure structure structures of the second structure structure structure structure structures of the second structure structure structure structure structures of the second structure structu



Specification-Guided Component-Based Synthesis from Effectful Libraries

ASHISH MISHRA, Purdue University, USA SURESH JAGANNATHAN, Purdue University, USA

Component-based synthesis seeks to build programs using the APIs provided by a set of libraries. Oftentimes, these APIs have effects, which make it challenging to reason about the correctness of potential synthesis candidates. This is because changes to global state made by effectful library procedures affect how they may be composed together, yielding an intractably large search space that can confound typical enumerative synthesis techniques. If the nature of these effects are exposed as part of their specification, however, deductive synthesis

Significant Publications

- <u>[PLDI '23]Covering All the Bases: Type-based Verification of</u> <u>Test Input Generators. Selected for Distinguished Paper Award</u> <u>at PLDI '23</u>
- [OOPSLA' 22] Specification-Guided Component-Based Synthesis from Effectful Libraries.
- [ECOOP' 23] Morpheus: Automated Type-Based Verification of Parser Combinator Programs.

Antony Franklin

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Major Areas of Research/Up to 3 major sponsored projects

- 1. Next Generation Mobile Networks (5G and Beyond)
- 2. Multi-Access Edge Computing
- 3. Cloud Radio Access Networks
- 4. SDN/NFV
- 5. V2X

Major Research Facilities in the Group

- 1. IITH 5G Core Testbed with MEC support and RAN+UE Emulator
- 2. High end workstations and servers, whiebox switches, etc.
- 3. SDR Boards for 4G/5G RAN using OAI
- 4. V2X Development Boards

Technology/Product Developed/Up to 3 most significant Publications

- 1. IITH 5G Core with Support for MEC, Network Slicing, and Orchestration
- 2. S. Vittal and A. A. Franklin, "HARNESS: High Availability Supportive Self Reliant Network Slicing in 5G Networks," in IEEE Transactions on Network and Service Management, vol. 19, no. 3, pp. 1951-1964, Sept. 2022.
- 3. Shashwat Kumar, Sai Vineeth Doddala, A. Antony Franklin, Jiong Jin, RAN-aware adaptive video caching in
- multi-access edge computing networks, Journal of Network and Computer Applications, Volume 168, 2020
- 4. V. R. Chintapalli, S. B. Korrapati, B. R. Tamma and A. F. A, "NUMASFP: NUMA-Aware Dynamic Service Function Chain Placement in Multi-Core Servers," COMSNETS 2022, pp. 181-189. (Best Paper Award)







N.R.Aravind

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Major Areas of Research:

Parameterized Algorithms, Random Graphs, Graph coloring

Major Research Facilities in the Group: N/A

<u>3 most significant Publications:</u>





Dichotomy Results on the Hardness of H-free Edge Modification Problems

N R Aravind R B Sandeen and Naveen Sivadasan https://doi.org/10.1137/16M1055797



A Tools

Abstrac

For a graph H, the H-free Edge Deletion problem asks whether there exist at most k edges whose deletion from the input graph Gresults in a graph without any induced copy of H. H-free Edge Completion and H-free Edge Editing are defined similarly where only completion (addition) of edges are allowed in the former and both completion and deletion are allowed in the latter. We completely settle the classical complexities of these problems by proving that H-free Edge Deletion is NP-complete if and only if H is a graph with at least two edges, H-free Edge Completion is NP-complete if and only if H is a graph with at least two nonedges, and H-free Edge Editing is NP-complete if and only if H is a graph with at least three vertices. Our result on H-free Edge Editing resolves a conjecture by Alon and Stav [Theoret. Comput. Sci., 2009, pp. 4920--4927]. Additionally, we prove that these NP-complete problems cannot be solved in parameterized subexponential time, i.e., in time $2^{o(k)} \cdot |G|^{O(1)}$, unless the exponential time hypothesis fails. Furthermore, we obtain implications on the incompressibility and the inapproximability of these problems.

Keywords

H-free edge modification, NP-completeness, parameterized lower bounds

Dichotomy Results on the Hardness of H-free Edge Modification problems, SIAM J. Disc Math, 2017

On Polynomial Kernelization of H-free Edge Deletion, Algorithmica, 2017

An FPT Algorithm for Matching Cut and d-Cut, IWOCA 2021

Bheemarjuna Reddy Tamma

Professor, Networked Wireless Systems (NeWS) Lab, Dept. of CSE

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Major Areas of Research

Wireless Networks, Network Security

Mobile Edge Computing, C-V2X, Quantum Internet

Major Research Facilities in the Group

Programmable 5G Cloud RAN testbed

SDN Switches, USRP SDR boards

High-end Servers and workstations

Technology/Product Developed

LWIP: LTE-Wi-Fi Radio Level Interworking System

FENCE: Privacy-Preserving Enterprise Internet Forensics at Scale

Open source contributions on LWIP, Network Intrusion Detection using AI/ML, Intelligent energy saving in data centres using BMaaS under-cloud, and 5G SBA Core using SDN/NFV







C. Krishna Mohan

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Major Areas of Research/Up to 3 major sponsored projects

- Action recognition, emotion recognition and video analytics
- Computer vision for autonomous vehicle technology
- Aerial imagery analysis and image/video captioning
- Medical imaging

Major Research Facilities in the Group

- Workstation consisting of four Nvidia A6000 GPU cards each with 48GB RAM.
- Three workstations each consisting of 32GB Nvidia Tesla series GPU cards.
- Four 24GB RAM Nvidia Quadro series GPU cards

Technology/Product Developed/Up to 3 most significant Publications

- Prudviraj Jeripothula, Chalavadi Vishnu, C Krishna Mohan, "AAP-MIT: Attentive Atrous Pyramid Network and Memory Incorporated Transformer for Multi-Sentence Video Description", IEEE Transactions on Image Processing, https://doi.org/10.1109/TIP.2022.3195643, 2022.
- Inayathullah Ghori, & Debaditya Roy, Renu John, and C Krishna Mohan, "Echocardiogram Analysis using Motion Profile Modeling," *IEEE Transactions on Medical Imaging*, vol. 39, no. 5, pp. 1767-1774, https://doi.org/10.1109/tmi.2019.2957290, 2019.
- Nazil Perveen, Debaditya Roy and C Krishna Mohan, "Facial Expression Recognition in Videos using Dynamic Kernels," IEEE Transactions on Image Processing, vol. 29, pp. 8316-8325, 10.1109/TIP.2020.3011846, 2020.









Fahad Panolan

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Major Areas of Research/Up to 3 major sponsored projects

Parameterized Algorithms and

Complexity Approximation Algorithms

Streaming Algorithms

Major Research Facilities in the Group

GPU Workstation with NVIDIA A6000

Three most significant Publications

- 1. Deleting, Eliminating and Decomposing to Hereditary Classes Are All FPT-Equivalent. In SODA 2022. With A. Agrawal, L. Kanesh, D. Lokshtanov, M.S. Ramanujan, S. Saurabh, M. Zehavi.
- 2. Lossy kernelization.

In STOC 2017. With D. Lokshtanov, M.S. Ramanujan, S. Saurabh.

3. Efficient Computation of Representative Families with Applications in Parameterized and Exact Algorithms. In JACM 2016. With F. V. Fomin, D. Lokshtanov, S. Saurabh.







J. Saketha Nath Associate Professor, CSE

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- Machine Learning
 - Kernel methods, Learning theory and optimization
- Fujitsu project on Causal ML (~1.1 Cr)
- Google PhD Student Award (~37 La)
- Microsoft gift (~12 La)
- <u>Chance constrained uncertain classification via robust optimization</u>. *Mathematical Programming*.
- Maximum mean discrepancy for class ratio estimation: Convergence bounds and kernel selection. ICML.
- On the algorithmics and applications of a mixed-norm based kernel learning formulation. *NeurIPS*.

Jyothi Vedurada

Indian Institute of Technology Hyderabad Asst. Professor, Dept. of Computer Science & Engineering

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<u>Major Areas of Research/Up to 3 major sponsored projects</u>

- 1. Towards High Programmer Productivity Using AI and Program Analysis (Funded by Microsoft Research + Seed grant)
- 2. Compiler Optimizations for GPU programs
- 3. High-performant Large-scale Graph Algorithms on GPUs

<u>Major Research Facilities in the Group</u>

1. Server Node with 2 x Nvidia A100 40GB GPU cards and dual CPU Processor, each with 16C

2. Server Node with dual CPU processor, each with 16C

Technology/Product Developed/Up to 3 most significant Publications

1. Tool for Automatic Code Comprehension of Data Science Notebooks 2. LLVM Compiler Implementation for GSOHC: Global Synchronization **Optimization in Heterogeneous Computing**



भारतीय प्रौद्योगिकी संस्थान हैदराबाद



Karteek Sreenivasaiah

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Major Areas of Research/Up to 3 major sponsored projects

Computational Complexity Algorithms Theoretical Computer Science

Major Research Facilities in the Group

Technology/Product Developed/Up to 3 most significant Publications

Nutan Limaye, Karteek Sreenivasaiah, Srikanth Srinivasan, Utkarsh Tripathi, S. Venkitesh: *A Fixed-Depth Size-Hierarchy Theorem for AC0[+] via the Coin Problem*. SIAM J. Comput. 50(4): 1461-1499 (2021)

Christian Ikenmeyer, Balagopal Komarath, Christoph Lenzen, Vladimir Lysikov, Andrey Mokhov, Karteek Sreenivasaiah: *On the Complexity of Hazard-free Circuits*. J. ACM 66(4): 25:1-25:20 (2019)



M. V. Panduranga Rao

Associate Professor, CSE

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<u>Quantum Computing and Communications</u> <u>Formal Methods: Theory and Applications</u> <u>Algorithms and Complexity</u>

Recent Papers (2022):

- 1. Statistical Model Checking for Probabilistic Temporal Epistemic Logics. ICAART (1) 2022: 53-63 (with Yenda Ramesh)
- 2. Model Checking for Entanglement Swapping. FORMATS 2022: 98-114, with Surya Sai Teja Desu, Anubhav Srivastava
- 1. Quantum learning of concentrated Boolean functions. Quantum Inf. Process. 21(7): 256 (with Krishna Palem and Duc Hung Pham,







International Conference on Formal Modeling and Analysis of Timed Systems

Model Checking for Entanglement Swapping

Surya Sai Teja Desu, Anubhav Srivastava & M. V. Panduranga Rao 🖂

Conference paper | First Online: 29 August 2022 157 Accesses

Part of the Lecture Notes in Computer Science book series (LNCS,volume 13465)

Abstract

Entanglement swapping is a basic primitive in long distance quantum communications. The stochastic nature of various operations like entanglement generation and BSMs makes the entanglement swapping primitive failure prone. It is difficult to predict whether or not an entanglement swapping operation will succeed within a stipulated time. In this paper, we use Probabilistic Timed Automata (PTA) to model the experiment and analyze it through model checking. We report a proof-of-concept mechanism, opening way for the analysis of large scale quantum networks through formal methods. We also report supporting results on a quantum simulator.

Keywords

Entanglement Swapping Quantum Networks

s Probabilistic Timed Automata

Quantum Network Simulators

Manish Singh

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Major Areas of Research/Up to 3 major sponsored projects

Recommendation Systems

Social Network Analysis

NLP **Major Research Facilities in the Group**

DGX System

GPU Servers



Technology/Product Developed/Up to 3 most significant Publications

Sailaja Rajanala, Arghya Pal, Manish Singh, Raphael C.-W. Phan, KokSheik Wong: DeSCoVeR: Debiased Semantic Context Prior for Venue Recommendation. SIGIR 2022: 2456-2461

K. Survamukhi, P. D. Vivekananda, Manish Singh: Mining Tag Relationships in COA Sites. ER 2021: 345-355





Maria Francis

Assistant Professor, Computer Science & Engineerin

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Major Areas of Research

- Privacy preserving mechanisms over blockchains
- Lightweight cryptography for IoT
- Lattice-based cryptography
- **Computational algebra**

Major Research Facilities in the Group



Lightweight cryptography Groups, Lattices Integers Lattice based for IoT Integers Linear cryptography Algebra Pairings based cryptography **ZKPs** over lattices **ZKPs Privacy Preserving** Mechanisms Threshold **ZKPs** over credentials blockchains Blockchains

Algebra

Our work focuses mainly on theoretical results and prototype implementations which do not require any special facilities.

Technology/Product Developed/Up to 3 most significant Publications

- A. Naaz, T. V. Pavan Kumar B, M. Francis and K. Kataoka, "Integrating Threshold Opening With Threshold Issuance of 1. Anonymous Credentials Over Blockchains for a Multi-Certifier Communication Model," in IEEE Access, vol. 10, pp. 128697-128720, 2022.
- M. Francis and T. Verron. "On Two Signature Variants Of Buchberger's Algorithm Over Principal Ideal Domains", 2. International Symposium on Symbolic and Algebraic Computation (ISSAC) 2021.
- M. Francis and A. Dukkipati. "On Ideal Lattices, Gröbner Bases and Generalized Hash Functions", Journal of Algebra and 3. its Applications, Vol. 17, No. 06, 1850112 (2018).



Dr. Maunendra Sankar Desarkar

Associate Professor, Department of CSE

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Major Areas of Research/Up to 3 major sponsored projects

<u>Major areas of work:</u> NLP, Recommendation Systems, Information Retrieval <u>Projects:</u>

- Zero-shot Multi-lingual Personalized Auto-suggest Generation
- M2SMART SATREPS Project: Multimodal Regional Transport System -Smart Cities for Emerging Countries based on Sensing, Networking, and Big Data Analysis.

Major Research Facilities in the Group

Servers and GPU Powered workstations



Technology/Product Developed/Up to 3 most significant Publications

- Kaushal Kumar Maurya, Maunendra Sankar Desarkar, Yoshinobu Kano, Kumari Deepshikha: ZmBART: An Unsupervised Cross-lingual Transfer Framework for Language Generation. ACL/IJCNLP (Findings) 2021: 2804-2818
- Suvodip Dey, Maunendra Sankar Desarkar: Hi-DST: A Hierarchical Approach for Scalable and Extensible Dialogue State Tracking. SIGDIAL 2021: 218-227
- Samujjwal Ghosh, Subhadeep Maji and Maunendra Sankar Desarkar, "Unsupervised Domain Adaptation With Global and Local Graph Neural Networks Under Limited Supervision and Its Application to Disaster Response," in IEEE Transactions on Computational Social Systems, doi: 10.1109/TCSS.2022.3159109.





Dr. Nitin Saurabh

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Major Areas of Research/Up to 3 major sponsored projects

Theoretical Computer Science. In particular, Computational Complexity theory, especially Boolean and Algebraic complexity theory, Analysis of Boolean functions and Algorithms.

Major Research Facilities in the Group

Technology/Product Developed/Up to 3 most significant Publications

- 1) Approximate Polymorphisms.
 - G. Chase, Y. Filmus, D. Minzer, E. Mossel and N. Saurabh. In STOC 2022.
- Improved Bounds on Fourier entropy and min-entropy.
 S. Arunachalam, S. Chakraborty, M. Koucky, N. Saurabh and R. de Wolf. In ACM TOCT 13, 2021.
- Some Complete and Intermediate Polynomials in Algebraic Complexity Theory. M. Mahajan and N. Saurabh. In Theory of Computing Systems 62, 2018.





Praveen Tammana

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Major Areas of Research/Up to 3 major sponsored projects

- **Computer Networks and Systems**
- Network Security
- Edge compute, Software-Defined Networks, P4
- **Major Research Facilities in the Group**
- IoT devices connected to P4/SDN/Servers
- Kubernetes cluster for observability
- Software-Defined Networking testbed

Technology/Product Developed/Up to 3 most significant Publications

PUF-based Authentication Protocol for IoT Security IoT-MUD enforcement to secure L3/L4 communication Efficient Intrusion detection system Edge Cloud for Autonomous Navigation Applications Validation of packet-processing behavior at a P4 switch



TEDMINAL-1

TERMINAL-2

WITHINGS

IoT Device-





Rajesh Kedia

Assistant Professor, Computer Science and Engine

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Major Areas of Research/Up to 3 major sponsored projects

- 1. Computer architecture
- 2. Embedded systems
- 3. VLSI design automation
- Major Research Facilities in the Group
- 1. ZCU102 board
- 2. Versal ACAP (VCK190) board

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Technology/Product Developed/Up to 3 most significant Publications

- 1. CoMeT Open source architectural and thermal simulator, TACO 2022
- 2. DSE of FPGA based system with DNN Accelerators, IEEE ESL 2021
- 3. CoreMemDTM: Thermal management for processor and 3D memory, DATE 2022



Rakesh Venkat

Assistant Professor, CSE Department

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<u>Major Areas of Research/Up to 3 major sponsored</u> projects

Broad Area: Theoretical Computer Science

Graph Partitioning, Communication Complexity, Approximation Algorithms, Quantum Computation

Major Research Facilities in the Group

$\lim_{(x, y, z) \to (x, y, z)} \sum_{(x', y', z) \to (x', y', z) \to (x', y', z) \to (x', y', z)} \lim_{(x', y', z) \to (x', y', z) \to (x', y', z) \to (x', y', z)} \lim_{(x', y', z) \to (x', y',$

Technology/Product Developed/Up to 3 most significant Publications

A Refined Approximation for Euclidean k-Means (with F. Grandoni, R. Ostrovsky, Y. Rabani, L. Schulman), Information Processing Letters, 2022

Semi-random Graphs with Planted Sparse Vertex Cuts: Algorithms for Exact and Approximate Recovery. With A.Louis, ICALP 2019

Multiplayer Parallel Repetition for Expanding Games (with I. Dinur, P. Harsha, H. Yuen, ITCS 2017)



Ramakrishna Upadrasta

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Major Areas of Research

<u>Compilers, Compiler Optimizations, Polyhedral</u> <u>Compilation, Machine Learning for Compilers,</u> <u>Compilers for Machine Learning, High Performance</u> <u>Computing (HPC), Compilers for Networking</u>

data-planes, Open-source Compiler Infrastructures

Updat & KIII Training Inference Downstream Tasks epresentat Learning eed Embede Basic Block Vecto Instruction Vector Vocabular LLVM-IR Triplets Encor Function Vector truction Program LLVM-IR Programs for Training С С++ Program Vecto

Major Research Facilities in the Group



<u>Technology/Product Developed</u> <u>IR2Vec, LLOV, UTVPI-OA,</u> <u>BullsEye, RL4ReAl, GeMS, ...</u>



Rameshwar Pratap

Assistant Professor, Computer Science & Engineer

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Major Areas of Research

- 1) Algorithm for Big Data
- 2) Sketching and Sampling Algorithms
- 3) Machine Learning
- 4) Theoretical Computer Science

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Technology/Product Developed/Up to 3 most significant Publications

1) Dimensionality Reduction for Categorical Data. Debajyoti Bera, Rameshwar Pratap, and Bhisham Dev Verma. Accepted to the <u>IEEE Transactions on Knowledge and Data Engineering</u> (<u>TKDE</u>), 2021. (<u>Paper link</u>.)

2) Variance reduction in Feature Hashing using MLE and Control Variate Method. Bhisham Dev Verma, Rameshwar Pratap, and Manoj Thakur. In the <u>Machine Learning</u>, 2022. (<u>Paper Link</u>.)

3) Efficient Sketching Algorithm for Sparse Binary Data. Rameshwar Pratap, Debajyoti Bera, and Karthik Revanuru. In <u>IEEE- ICDM</u> (International Conferences of Data Mining), pages 508-517, 2019.

Rogers Mathew

Associate Professor, TCS, Department of CSE

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Major Areas of Research

- 1. Combinatorics
- 2. Graph Theory
- 3. Graph Algorithms

Major Research Facilities in the Group

Nil. The work is fully mathematical in nature that needs only pen and paper.

Three Most Significant Publications

1. Sriram Bhyravarapu, Subrahmanyam Kalyanasundaram, Rogers Mathew: A short note on conflict-free coloring on closed neighborhoods of bounded degree graphs. J. Graph Theory 97(4): 553-556 (2021)

2. Rogers Mathew, Ilan Newman, Yuri Rabinovich, Deepak Rajendraprasad: Hamiltonian and pseudo-Hamiltonian cycles and fillings in simplicial complexes. J. Comb. Theory, Ser. B 150: 119-143 (2021)

3. Rogers Mathew, Tapas Kumar Mishra, Ritabrata Ray, Shashank Srivastava: Modular and Fractional \$L\$-Intersecting Families of Vector Spaces. Electron. J. Comb. 29(1) (2022)

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Received: 13 November 2020 Accepted: 7 February 2021

DOI: 10.1002/jgt.22670

WILEY

A short note on conflict-free coloring on closed neighborhoods of bounded degree graphs

Sriram Bhyravarapu 💿 | Subrahmanyam Kalyanasundaram 🧿 | Rogers Mathew 🛇

Department of Computer Science and Engineering, Indian Institute of Technology Hyderabad, Hyderabad, India

Correspondence Rogers Mahow, Department of Computer Science and Engineering, Indian Institute of Technology Hyderabad, Hyderabad (2028), India, Email: rogers@ith.acin and rogers@icsclith.acin Abstract The closed neighborhood conflict free dramatic number of a graph G, denoted by $\chi_{CS}(G)$, is the minimum number of colors required to color the vertices of G such that for every vertex, there is a color that appears exactly once in its closed neighborhood. Pach and Tardos showed that $\chi_{CS}(G) = O(Oe^{3+2}A)$. for any $\epsilon > 0$, where Δ is the maximum degree. In 2014, $G_{CS}(G) = O(Oe^{2}A)$. In this saticle, we bridge the gap between the two bounds by showing that $\chi_{CS}(G) = O(Oe^{2}A)$.

KEYWORDS bounded degree graphs, conflict-free coloring

1 | INTRODUCTION

Conflict-free coloring was introduced [2] in 2003 motivated by problems arising from situations in wireless communication. Over the past two decades, conflict-free coloring has been extensively studied [6].

Definition 1 (Conflict-free chromatic number of hypergraphs). The conflict-free chromatic number of a hypergraph H = (V, E) is the minimum number of colors required to color the points in V such that every $e \in E$ contains a point whose color is distinct from that of every other point in e.

Conflict-free coloring has also been studied in the context of hypergraphs created out of simple graphs. Two such variants are conflict-free coloring on closed neighborhoods and conflictfree coloring on open neighborhoods. In this note, we focus on the former variant. For any vertex *l* Coupt Theor, 2015;75:55. wileyntineithroycon:jurnalign = 0.201 Web Presolution LL 593

Received: 13 November 2020 Accept

Dr. Sathya Peri

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Major Areas of Research

- Parallel & ConcurrentSystems
- Distributed Systems & Blockchains

Up to 3 major sponsored projects

- Parallelization of Smart Contract Execution in Tezos Blockchain
- In Tezos Blockchain
- Design and Development of a Unified Blockchain Framework for offering
- National Blockchain Service
- Concurrent and Distributed Programming primitives
- and algorithms for Temporal Graphs





Dr. Shirshendu Das

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Major Areas of Research:

Most computer architecture innovations during the past 20 years have been based on the incorrect assumption that everything is innocent. A Side Channel or Covert Channel attack on such innovations can leak information and also degrades performance.

My research areas are:

- **Computer Architecture** Designing efficient cache mer
- Hardware Security Making the multicore systems secu
- **Emerging Memory Technologies** Using alternate me technologies to design cache memories. Major Research Facilities:
 - Simulators Used: gem5, Champsim, CACTI.
 - Modules available: Tiled-based CMP (TCMP) with 2, 3, and 4 levels of cache memories, NVM support for Champsim, MESI CMP Protocol for 2, 3, and 4 levels of cache hierarchy, Covert Channel Attack (CCA) on

TCMP. Three most significant Publications:

- Jaspinder Kaur and Shirshendu Das, "TPPD: Targeted Pseudo Partitioning based Defence for Cross-Core Covert Channel Attacks", 1. Elsevier Journal of System Architecture, Accepted, December 2022.
- Kaustav Goswami, Dip Sankar Banerjee and Shirshendu Das, "Towards Enhanced System Efficiency While Mitigating Row Hammer", 2. ACM Transactions on Architecture and Code Optimization (TACO), 18(4), December 2021.
- Anurag Agarwal, Jaspinder Kaur and Shirshendu Das, "Exploiting Secrets by Leveraging Dynamic Cache Partitioning of Last Level 3. Cache", Design, Automation and Test in Europe Conference (DATE) 2021.



NoC interconnect

भारतीय प्रौद्योगिकी संस्थान हैदराबाद

тсмр





Ch. Sobhan Babu

Associate Professor, CSE

Office Room No.; Office Phone No.; Mobile (optional); Institute Email; Webpage Link

<u>Major Areas of Research/Up to 3 major sponsored projects</u>

Big Data Analytics, Financial Fraud Analytics and applied Graph Theory

Major Research Facilities in the Group

Technology/Product Developed/Up to 3 most significant Publications

Mehta, P., Mathews, J., Kumar, K. S., Suryamukhi, K., Babu, C. S., Rao, S. V. K. V., Shivapujimath, V., & Bisht, D. (2019). Big data analytics for tax administration, In Electronic government and the information systems perspective - 8th international conference, EGOVIS 2019, linz, austria, august 26-29, 2019, proceedings.

Adsul, B., Babu, C. S., Garg, J., Mehta, R., & Sohoni, M. A. (2010b). A simplex-like algorithm for fisher markets, In Algorithmic game theory - third international symposium, SAGT 2010, athens, greece, october 18-20, 2010. proceedings.





Office 535 Block C ; Phone No. 080 2301 6186;srijith@cse.iith.ac.in; https://sites.google.com/site/pksrijith/home ; https://sites.google.com/view/brainiith Major Areas of Research/Up to 3 major sponsored projects

Machine learning, Deep Learning, Bayesian learning, Continual Learning. Applications : Computer Vision, natural language processing and social media. Publications in top venues like NeurIPS, AAAI, WACV, ACL, EMNLP, UAI etc.

Major Research Facilities in the Group

Expertise in machine learning , deep learning, vision, language, social media, generative modelling and spatio- temporal modelling.

GPU servers and access to the state-of-the-art NVIDIA DGX servers.

Technology/Product Developed/Up to 3 most significant Publications

1.Srikar Dupati, Sakshi Varshney, P.K. Srijith, Sunil, Gupta, Continual Learning with Dependency Preserving Hypernetworks, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2023.
2. Srinivas Anumasa and P. K. Srijith, Latent Time Neural Ordinary Differential Equations, Proceedings of the Association for the Advancement of Artificial Intelligence (AAAI), 2022.
3. Sakshi Varshney, Vinay Kumar Verma, P. K. Srijith, Lawrence Carin, Piyush Rai: CAM-GAN: Continual Adaptation Modules for Generative Adversarial Networks, Neural Information Processing Systems, 2021.
4. Developed a real time social media system to aid people in disaster like floods and earthquakes.

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్ भारतीय प्रौद्योगिकी संस्थान हैदराबाद Indian Institute of Technology Hyderabad



Input/Hidden/Output



Input/Hidden/Output

Srijith P K Associate Professor, BRAIN, Computer Science and Engineering

Subrahmanyam Kalyanasundaram

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Major Areas of Research

- **Theoretical Computer Science**
- Combinatorics ullet
- **Graph Algorithms**

Major Research Facilities in the Group

Theoretical research without much need for major facilities

Selected Publications

- Sriram Bhyravarapu, Subrahmanyam Kalyanasundaram, Rogers Mathew (2022). • Conflict-Free Coloring Bounds on Open Neighborhoods. Algorithmica, Volume 84, pages 2154-2185.
- Prasad Krishnan, Rogers Mathew, Subrahmanyam Kalyanasundaram (2021). Pliable \bullet Index Coding via Conflict-Free Colorings of Hypergraphs. Proc. of the 2021 IEEE International Symposium on Information Theory - ISIT 2021, Melbourne, Australia.

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Major Areas of Research:

- Machine Learning/Deep Learning
- Computer Vision
- Explainable AI
- Causal Inference

Major Research Facilities in the Group:

- NVIDIA DGX1/DGX2s
- Multiple GPU servers with 1080Ti/2080Tis
- GPU workstations

Technology/Product Developed/Up to 3 most significant Publications

- Explainable AI: Grad-CAM++, WACV 2018 (1300+ citations), NASSCOM AI Gamechanger Runner-up 2022
- Learning with Limited Labeled Data: Open-world Object Detection, CVPR 2021 (~150 citations, ~900 stars, ~140 forks), NASSCOM AI Gamechanger Winner 2022
- Causality: Causal Perspective to Neural Network Attributions, ICML 2019 (~100 citations, ~50 stars, ~20 forks)





