Sanjit Kumar Roy

Personal Data

Current Position:	Postdoctoral position, Department of Information Technology, Uppsala University, Sweden.
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Education

- **Ph.D.:** Department of Computer Science & Engineering, IIT Guwahati, India — Sep. 2022
- **M.Tech.:** Department of Information Technology, NIT Durgapur, India — Jun. 2013
- **B.Tech.:** Department of Information Technology, Asansol Engineering College, MAKAUT (Formerly known as WBUT), India — Aug. 2008

Research Interest

Real-time Systems, Cyber-Physical Systems, Embedded Systems, Scheduling

Research Experience

- **Doctor of Philosophy (Ph.D.)** at *Dept. of CSE, IIT Guwahati, India* — Jul. 2013 - Sep. 2022
  Thesis Title: Task and Message Co-scheduling Strategies in Real-time Cyber-Physical Systems
  Supervisor: Prof. Arnab Sarkar

  The principal aim of the Ph.D. dissertation has been to investigate a few important theoretical and practical aspects of task-message co-scheduling strategies in safety-critical Cyber-Physical Systems (CPSs), keeping in view the challenges/hurdles related to timing requirements, resource constraints, energy minimization, etc. In particular, the objectives of the work are as follows:

  - Development of co-scheduling strategies for a set of independent periodic tasks executing on a bus-based homogeneous multiprocessor system, with the objective of maximizing system level Quality of Service (QoS).
  - Design and implementation of QoS adaptive scheduling mechanisms for real-time systems modeled as Precedence-constrained Task Graphs (PTGs), on fully-connected heterogeneous multiprocessor systems.
  - Development of optimal and heuristic co-scheduling strategies for PTGs executing on a shared-bus based heterogeneous distributed platform.
  - Design of an energy-aware processor-bus co-scheduling strategy for multiple independent PTGs executing on a bus based heterogeneous platform.

Publications

Journal Papers

1. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "SAFLA: Scheduling Multiple Real-time Periodic Task Graphs on Heterogeneous Systems." *IEEE Transactions on Computers (IEEE TC)*, Volume 72, Pages 1067-1080, 2022.
2. **Sanjit Kumar Roy**, Rajesh Devaraj, Arnab Sarkar and Debabrata Senapati. "SLAQA: Quality-level Aware Scheduling of Task Graphs on Heterogeneous Distributed Systems." *ACM Transactions on Embedded Computing Systems (ACM TECS)*, Volume 20, Pages 1-31, 2021.

3. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "Contention Cognizant Scheduling of Task Graphs on Shared Bus based Heterogeneous Platforms." *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (IEEE TCAD)*, Volume 41, Pages 281-293, 2021.
4. **Sanjit Kumar Roy**, Rajesh Devaraj, Arnab Sarkar, Sayani Sinha and Kankana Maji. "Contention-aware optimal scheduling of real-time precedence-constrained task graphs on heterogeneous distributed systems." *Elsevier Journal of Systems Architecture (JSA)*, Volume 105, 2020.

Conference Papers

1. **Sanjit Kumar Roy**, Arnab Sarkar and Rahul Gangopadhyay. "Processor and Bus Co-scheduling Strategies for Real-time Tasks with Multiple Service-levels." *IEEE 27th International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*, Pages 21-30, 2021.
2. **Sanjit Kumar Roy**, Rajesh Devaraj, Arnab Sarkar, Sayani Sinha and Kankana Maji. "Optimal scheduling of precedence-constrained task graphs on heterogeneous distributed systems with shared buses." *IEEE 22nd International Symposium on Real-Time Distributed Computing (ISORC)*, Pages 185-192, 2019.
3. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "Optimal scheduling of PTGs with multiple service levels on heterogeneous distributed systems." *American Control Conference (ACC)*, Pages 157-162, 2019.
4. Jaydeep Howlader, **Sanjit Kumar Roy**, Ashis Kumar Mal. "Practical Receipt-Free Sealed-Bid Auction in the Coercive Environment". *16th International Conference on Information Security and Cryptology (ICISC)*, Pages 418-434, 2013.

Teaching Interest

Data Structures, Algorithms, Digital Design, Operating Systems, Computer Organization & Architecture, etc.

Teaching Experience

- **Assistant Professor** at SRM University AP, Andhra Pradesh, India — Dec. 2021 - Jul. 2023
  - Courses taught: Operating Systems (CSE301), Operating Systems Lab (CSE301L), Design and Analysis of Algorithms (CSE201), Design and Analysis of Algorithms Lab (CSE201L), Data Structures (CSE107), Data Structures Lab (CSE107L)
- **Assistant Professor** at UPES, Dehradun, India — Sep. 2021 - Dec. 2021
- **Teaching Assistant** at IIT Guwahati, India — Jul. 2013 - Dec. 2018
  - Courses: Operating Systems Lab (CS342), CAD for VLSI (CS526), Data Structure Laboratory (CS210), Compilers Lab (CS347), Data Structures Lab (CS513), Computer Systems (CS548), Programming Languages Lab (CS431), Computing Lab (CS110), System Software Lab (CS241)
- **Teaching Assistant** at NIT Durgapur, India — Aug. 2011 - May 2013
  - Courses: Operating System Lab, Microprocessor Lab
- **Teaching Assistant** of the NPTEL Online Certification course, "Optimization Techniques for Digital VLSI Design", funded by the MHRD, Govt. of India, organized at IIT Guwahati, India — Feb. - Mar. 2018
- **Teaching Assistant** of the NPTEL Online Certification course, "Embedded Systems-Design Verification And Test", funded by the MHRD, Govt. of India, organized at IIT Guwahati, India — Jul. - Oct. 2018

Language/Tool Skills

C, Python, Matlab, Java, Shell Script, CPLEX

Conference Presentation

- ISORC 2019, Valencia, Spain (May, 2019)
- RTCSA 2021, Virtual Conference (August, 2021)

Scholarships & Awards

- Received Scholarship from MoE (MHRD), Govt. of India to pursue Ph.D. at IIT Guwahati
  Jul. 2013 - Jun. 2018
- Received Scholarship from MoE (MHRD), Govt. of India to pursue M.Tech. at NIT Durgapur
  Aug. 2011 - May. 2013

Professional Activities

- Reviewer
  - Journals: Complex & Intelligent Systems (Springer CAIS)
  - Conferences: COMSNETS 2022, Indicon 2021, VDAT 2016
- Volunteer in FSTTCS, Dec. 2013, IIT Guwahati, India
- Volunteer and active participant in GIAN course, "Mixed-Criticality Real-Time Systems", funded by the MoE (MHRD), Govt. of India, organized at IIT Guwahati, May 2018

Referees

- **Dr. Arnab Sarkar**
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- **Dr. Chandan Karfa**
  Professor, Dept. of Computer Science & Engineering, IIT Guwahati,
  Guwahati - 781039, Assam, India
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