Sanjit Kumar Roy

Personal Data

Current Position:	Research Scholar, Dept. of CSE, IIT Guwahati.
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Education

- **(Current Affiliation:)**
  Indian Institute of Technology Guwahati, Guwahati, India — Jul. 2013 -Till Date
  Doctor of Philosophy (Tentative Thesis submission by mid of February, 2021).
  Thesis Title: New Approaches to Computation-Communication Co-scheduling in Real-time Cyber-Physical Systems.
  Supervisors: Dr. Arnab Sarkar and Dr. Chandan Karfa (Administrative Supervisor).
- **National Institute of Technology Durgapur**, Durgapur, India — Jun. 2013
  Master of Technology in Information Technology
  Thesis Title: Application of Distributed Key Generation in Secured Sealed-Bid Auction Mechanism.
  Supervisor: Dr. Jaydeep Howlader.
  CGPA: 8.96/10
- **West Bengal University of Technology**, Kolkata, India — Aug. 2008
  Bachelor of Technology in Information Technology
  DGPA: 7.26/10

Research Interest

Real-time Systems, Cyber-Physical Systems, Embedded Systems, Mixed-critical Systems, Scheduling, etc.

Teaching Interest

Operating Systems, Computer Organization & Architecture, Database Management System, Data Structures & Algorithms, Automata Theory, etc.

Research Experience

- **Dept. of CSE, IIT Guwahati (Jul. 2013 -Till Date)**
  Doctor of Philosophy (Tentative Thesis submission by mid of February, 2021).
  Thesis Title: New Approaches to Computation-Communication Co-scheduling in Real-time Cyber-Physical Systems.
  Supervisors: Dr. Arnab Sarkar and Dr. Chandan Karfa (Administrative Supervisor).

  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
Published/Submitted

1. **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, May 2020, 101706.
2. **Sanjit Kumar Roy**, Arnab Sarkar and Rahul Gangopadhyay. "Processor and Bus Co-scheduling Strategies for Real-time Tasks with Multiple Service-levels." *Springer Journal of Scheduling (JOSH)*, (Major revision received).
3. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "SAQA: Quality-level Aware Scheduling of Task Graphs on Heterogeneous Distributed Systems." *ACM Transactions on Embedded Computing Systems (ACM TECS)*, (Review response submitted).
4. **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)*, (Minor revision received).
5. **Sanjit Kumar Roy**, Rajesh Devaraj and Arnab Sarkar. "Energy-aware Co-scheduling of Multiple Task Graphs on Shared Bus based Heterogeneous Platforms." (Manuscript under preparation).

Conference Papers

1. **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.
2. **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.
3. 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)*, Seoul, Korea, Nov. 2013.

Language/Tool Skills

C, Python, Matlab, Java, CPLEX.

Conference Presentation

- ISORC 2019, Valencia, Spain (May, 2019)

Scholarships & Awards

- Received **Scholarship** form **MHRD, Govt. of India** to pursue Ph.D. at IIT Guwahati, India. Jul. 2013
- Received **Scholarship** from **MHRD, Govt. of India** to pursue M.Tech at NIT Durgapur, India. Aug. 2011

Referees

- **Dr. Arnab Sarkar**
  Professor, Advanced Technology Development Centre, IIT Kharagpur,
  Kharagpur - 721302, West Bengal, India
  Phone: +91-3222-2-81954 (Off), +91-3222-2-81955 (Res)
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- **Dr. Chandan Karfa**
  Professor, Dept. of Computer Science & Engineering, IIT Guwahati,
  Guwahati - 781039, Assam, India
  Phone: +91-361-258-2375 | Fax: +91-361-269-2787
  Email: ckarfa@iitg.ac.in
  Website: https://www.iitg.ac.in/cse/internet-pages/ckarfa

- **Dr. Santosh Biswas**
  Professor, Dept. of Electrical Engineering and Computer Science, IIT Bhilai,
  Raipur - 492015, Chhattisgarh, India
  Phone: +91-771-2973602
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  Website: https://www.iitbhilai.ac.in/index.php?pid=santosh

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