

Nikhil Kumar Singh

CONTACT INFORMATION

D-215 Hall-8
IIT Kanpur

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GitHub: <https://github.com/ciniks117>

RESEARCH INTERESTS

Reinforcement Learning, Control Theory, Formal Methods, Optimization.

EDUCATION

Indian Institute of Technology, Kanpur,

PhD, Computer Science and Engineering, Jan 2020 - Present (9.50/10)
Thesis : Specification Guided Automated Synthesis of Feedback Controllers.
Advisor: Dr. Indranil Saha

Indian Institute of Technology, Kanpur,

MS, Computer Science and Engineering, Dec 2019 (9.0/10)
Thesis : Specification guided Automated Debugging of CPS Models.
Advisor: Dr. Indranil Saha

National Institute of Technology, Jamshedpur,

B.Tech(Hons), Computer Science and Engineering, May 2014 (8.70/10)
Project: Intelligent Web Search Engine.

PUBLICATIONS

- **Nikhil Kumar Singh**, Indranil Saha. “*Frugal Actor-Critic: Sample Efficient Off-Policy Deep Reinforcement Learning Using Unique Experiences.*” Accepted at the International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2024).
- **Nikhil Kumar Singh**, Indranil Saha. “*STL-Based Synthesis of Feedback Controllers Using Reinforcement Learning.*” Accepted at AAAI Conference on Artificial Intelligence (AAAI 2023), February 07-14, 2023.
Code at <https://github.com/ciniks117/RLSTL>
- **Nikhil Kumar Singh**, Indranil Saha. “*Specification Guided Synthesis of Feedback Controllers.*” ACM SIGBED International Conference on Embedded Software (EMSOFT 2021), ACM/IEEE, virtual conference, October 08-15, 2021.
Published in ACM Transactions on Embedded Computing Systems (2021) <https://dl.acm.org/doi/10.1145/3477011>.
Code at <https://github.com/iitkcpslab/SCoSyn>
- **Nikhil Kumar Singh**, Indranil Saha. “*Specification Guided Automated Debugging of CPS Models.*” International Conference on Embedded Software (EMSOFT2020), ACM/IEEE, virtual conference, September 20-25, 2020.
Published in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (2020) <https://ieeexplore.ieee.org/document/9211574/>.
Code at <https://github.com/iitkcpslab/Blars>

PROJECTS

Geo-Spatial Analysis of Twitter Data. Prof. Arnab Bhattacharya

As course project for Data mining course (CS685A)

Aug’20 - Dec’20

Star-based Abstractions for Outside-the-Box framework. Prof. Subhajit Roy

As course project for Program Analysis, Verification and Testing (CS639A)

Aug’20 - Dec’20

TALKS

Specification Guided Controller Synthesis Using RL CSE Dept. IIT Kanpur

Oct’23

Learning-based Controller Synthesis Ericsson AI Research

Mar’23

Introduction to Controller Synthesis CSE Dept. IIT Kanpur

Oct’21

WORK EXPERIENCE

Instructor Introduction to PyTorch (PMRF Lecture series)

Institute of Smart Structures and Systems (ISSS)

Sep’23 - Present

Instructor Controller Synthesis using Python (PMRF Lecture series) <i>Institute of Smart Structures and Systems (ISSS)</i>	Mar'23 - Jul'23
Instructor Introduction to Controller Synthesis (PMRF Lecture series) <i>Institute of Smart Structures and Systems (ISSS)</i>	Sep'22 - Dec'22
Tutor Introduction to Computing (ESC101) <i>Indian Institute of Technology, Kanpur</i>	May'22 - Jun'22
Teaching Assistant Software Development (CS253) <i>Indian Institute of Technology, Kanpur</i>	Jan'22 - May'22
Teaching Assistant Autonomous Cyber-Physical Systems (CS659A) <i>Indian Institute of Technology, Kanpur</i>	Jan'21 - May'21
Teaching Assistant Embedded and Cyber-Physical Systems (CS637A) <i>Indian Institute of Technology, Kanpur</i>	Sept'20 - Dec'20
Teaching Assistant Formal Methods for Robotics and Automation (CS638A) <i>Indian Institute of Technology, Kanpur</i>	Jan'20 - May'20
Senior Student Research Associate FMSAFE Project, IIT Kanpur <i>Sponsor: MHRD IMPRINT</i> - Developed an Automated Tool BLARS for Debugging CPS Models.	Jan'18 - Dec'19
Software Engineer OptumSoft, Bangalore - Software Development in the domain of Distributed Systems. This involved a high-level TACC Compiler Framework. - Projects related to development and maintenance of Dashboard Software. - Working with the build servers.	June'14 - Jun'16
Intern HPES-IIIT Allahabad - Worked on Digital Library using PHP and MySQL.	May'13 - June'13

AWARDS AND CERTIFICATES

- **Prime Minister's Research Fellowship** (Dec-2020).
- Nominated by the Department of CSE, IIT Kanpur for **Cadence Gold Medal** and **SIIC Student Innovation Award** for MS thesis.
- **First** prize in Data structure & algorithm based event *CODATHON* in OJASS'13.
- **Third** prize in Coding based event *CODEMANIA* in Ojass' 13.
- **Second** prize in the event *CODESTORM* conducted by the Computer Society of India at NIT-Jamshedpur held in March-2012.
- **First** prize in the event *LET US C* conducted by the Computer Society of India at NIT-Jamshedpur held in April-2011.

ACTIVITIES

- Coordinator** CODATHON @ OJASS'14
- Organised the flagship Data structure and Algorithms based event in OJASS - the technical fest of NIT Jamshedpur. More than 300 candidates from all over India participated in this event.