

# Sai Koti Reddy Danda

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## Research Interests

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My primary research interests lie in *Reinforcement Learning* and *Stochastic Optimal Control*. Recently, I have started exploring the role of *Game Theory* in making multi-agent reinforcement learning algorithms more practical to real-world business applications.

Amongst the application domains, I am interested in *Supply chains*, *Smart grids* and *Robotics*. On the software engineering side, I built several *Blockchain* based solutions for Finance and Auto manufacturing sectors. I am currently building AI based solutions for various use-cases in supply chains. More broadly, I am excited by research at the intersection of computer science, mathematics and software engineering.

## Education

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### Indian Institute of Science

M.Sc(Engg). in Computer Science, Advisor: Prof. Shalabh Bhatnagar

Bangalore, Karnataka

2014 - 2017

- **Thesis:** Stochastic Newton methods with enhanced Hessian estimation

### NRI Institute of Technology

B.Tech. in Information Technology, Advisor: Dr. Viswanath Pulabaigari

Guntur, A.P

2008 - 2012

- **Thesis:** An Improvement to k-Nearest Neighbor Classifier

## Experience

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### IBM Research India

**Research Engineer** position at AI for Supply-chains Group

Bangalore, Karnataka

Jul 2017 - Current

**Projects:** AI for MEBNs, Blockchain Solutions

- AI based analytics for Sterling Commerce Multi Enterprise Business Networks
- Led the development of IPDC Supply Chain and Dealer Finance Blockchain Platform
- Invoice Reconciliation Using Blockchain for Bajaj Auto Limited first of a kind project

### Robert Bosch Center for Cyber Physical Systems

**Project Assistant** position at Stochastic System Lab under Prof. Shalabh Bhatnagar

Bangalore, Karnataka

Dec 2016 - Jun 2017

**Project Title:** Distributed Multi-Agent Algorithms for Dynamic Control of Microgrids

- Explored the role of reinforcement learning for the distributed control of microgrids
- I also co-written research proposal along with my project mentor, which is accepted and funded by Department of Science Technology - India
- My research work during this period resulted in two top tier publications.

### IBM Research India

**Summer Intern** position at Mathematical Modeling and Industrial Solutions Group

Bangalore, Karnataka

May - Nov 2016

**Project Title:** Use-cases on Blockchain

- Built initial version of invoice discounting (supply chain finance) project for Mahindra & Mahindra on hypeledger fabric 0.6.

## Publications

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- [1] K. Sampath, **S. Danda**, P. Dayama, and S. Sankagiri, “Spot collaborative shipping sans orchestrator using blockchain”, in *Accepted in IEEE Blockchain*, 2020.
- [2] K. Sampath, P. Dayama, **S. Danda**, and V. D. Pandit, “Invoice reconciliation using blockchain”, in *Accepted in INFORMS Annual Meeting*, 2020.
- [3] K. Sampath, **S. Danda**, P. Dayama, and V. D. Pandit, “Collaborative shipping sans orchestrator using blockchain”, in *Accepted in INFORMS Annual Meeting*, 2020.
- [4] S. Nayak, C. A. Ekbote, A. P. S. Chauhan, R. B. Diddigi, P. Ray, A. Sikdar, **S. Danda**, and S. Bhatnagar, “A stochastic game framework for efficient energy management in microgrid networks”, in *Accepted in IEEE PES Innovative Smart Grid Technologies Conference (ISGT)*, 2020.
- [5] **S. Danda**, A. Saha, S. G. Tamilselvam, P. Agrawal, and P. Dayama, “Risk averse reinforcement learning for mixed multi-agent environments”, in *Proceedings of the AAMAS*, 2019, pp. 2171–2173.
- [6] R. B. Diddigi, **S. Danda**, P. KJ, and S. Bhatnagar, “Actor-critic algorithms for constrained multi-agent reinforcement learning”, in *Proceedings of the AAMAS*, 2019, pp. 1931–1933.
- [7] D. R. Bharadwaj, **S. Danda**, and S. Bhatnagar, “A unified decision making framework for supply and demand management in microgrid networks”, in *2018 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, IEEE, 2018, pp. 1–7.
- [8] K. Chandramouli, K. Prabuchandran, **S. Danda**, and S. Bhatnagar, “Generalized deterministic perturbations for stochastic gradient search”, in *2018 IEEE Conference on Decision and Control (CDC)*, IEEE, 2018, pp. 5734–5739.
- [9] **S. Danda**, L. Prashanth, and S. Bhatnagar, “Improved hessian estimation for adaptive random directions stochastic approximation”, in *2016 IEEE 55th Conference on Decision and Control (CDC)*, IEEE, 2016, pp. 3682–3687.
- [10] **S. Danda**, T. H. Sarma, P. Viswanath, and S. Raghava, “An improvement to k-nearest neighbor classifier”, *3rd International Conference on Data Management*, pp. 314–324, 2013.

## Patents

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- Decentralized Online Multi Agent Visual Question Answering
- System and Method for Factchecking AI models using Blockchain
- Option-based Distributed Reservation System
- Date Quality Control

See full list of defensive publications on [saikotiredy.github.io/patents.html](https://saikotiredy.github.io/patents.html)

## Awards and Achievements

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| • IBM Research Spotlight Award   | 2020      |
| • IBM Client Value Outstanding Technical Achievement Award   | 2019      |
| • IBM Research Accomplishment Award  | 2018      |
| • MHRD Scholarship for securing rank among the top 1% in Graduate Aptitude Test in Engineering       | 2014–2017 |
| • Secured 2 <sup>nd</sup> rank during my undergraduate studies in Information Technology Department. | 2008–2012 |

## Skills

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- **Programming Stack:** Python, Golang, Matlab, C
- **Frameworks:** AngularJS, NodeJS, Dash
- **Databases:** MongoDB, Neo4j
- **Tools:** Git, Bash, L<sup>A</sup>T<sub>E</sub>X

## Teaching

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- **Teaching Assistant** at Neuromatch Academy,  
July 2020  
*Computational Neuroscience*
- **Teaching Assistant** at Indian Institute of Science,  
Fall 2016  
*Algorithms and Programming*

## References

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- **Prof. Shalabh Bhatnagar**,  
Department of Computer Science and Automation,  
Indian Institute of Science Bangalore, India.  
E-mail: shalabh@csa.iisc.ernet.in
- **Dr. Viswanath Pulabaigari**,  
Department of Computer Science and Engineering,  
Indian Institute of Information Technology, Chittoor, India.  
E-mail: viswanth.p@iiits.in  
viswanth.pulabaigari@gmail.com

## Courses

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Selective course work :

- **Artificial Intelligence:** Reinforcement Learning, Machine Learning, Deep Learning
- Computational Methods in Optimization, Design and Analysis of Algorithms, Introduction to Big Data, Game Theory
- **Mathematics:** Stochastic Models and Applications, Linear Algebra and Applications, Real Analysis

## Academic Service

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### Conference Reviewer:

- IEEE International Conference on Data Mining 2020
- American Control Conference 2020
- IEEE International Conference on Data Mining 2019
- ACM International Conference on Information and Knowledge Management 2019
- IEEE Conference on Decision and Control 2017