Sai Koti Reddy Danda

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Research Interests

My primary research interests lie in Reinforcement Learning and Stochastic Optimal Control. Recently, I started exploring the role of Game Theory in making Multi-agent Reinforcement Learning algorithms more practical to real world 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 Supply chain 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

Indian Institute of Science — Bangalore, Karnataka
M.Sc(Engg). in Computer Science, Advisor: Prof. Shalabh Bhatnagar — 2014 - 2017

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

NRI Institute of Technology — Guntur, A.P
B.Tech. in Information Technology, Advisor: Dr. Viswanath Pulabaigari — 2008 - 2012

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

Experience

IBM Research India — Bangalore, Karnataka
Research Engineer position at AI for Supply-chains Group — 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 — Bangalore, Karnataka
Project Assistant position at Stochastic System Lab under Prof. Shalabh Bhatnagar — 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 — Bangalore, Karnataka
Summer Intern position at Mathematical Modeling and Industrial Solutions Group — 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

[1] 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 *Proceedings of the IEEE PES Innovative Smart Grid Technologies Conference*, 2020.

[2] K. Sampath, **S. Danda**, P. Dayama, and V. D. Pandit, "Collaborative shipping sans orchestrator using blockchain", in *Proceedings of INFORMS Annual Meeting*, 2020.

[3] K. Sampath, **S. Danda**, P. Dayama, and S. Sankagiri, "Spot collaborative shipping sans orchestrator using blockchain", in *Proceedings of IEEE Blockchain*, 2020.

[4] K. Sampath, P. Dayama, **S. Danda**, and V. D. Pandit, "Invoice reconciliation using blockchain", in *Proceedings of INFORMS Annual Meeting*, 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

- 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 saikotireddy.github.io/patents.html

Awards and Achievements

- 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^{nd} rank during my undergraduate studies in Information Technology Department. 2008–2012

Skills

- **Programming Stack:** Python, Golang, Matlab, C
- **Frameworks:** AngularJS, NodeJS, Dash
- **Databases:** MongoDB, Neo4j
- **Tools:** Git, Bash, LaTeX

Courses

- **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

Teaching

- **Teaching Assistant** at Neuromatch Academy, July 2020

  Computational Neuroscience

- **Teaching Assistant** at Indian Institute of Science, Fall 2016

  Algorithms and Programming

Academic Service

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

References

- **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