# Shivaram Kalyanakrishnan: Curriculum Vitae

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## Research Summary

I am a computer scientist with a specialisation in artificial intelligence. My research is motivated by the goal of creating intelligent agents, especially ones that can learn. In pursuit of this goal, I consider both theoretical and empirical questions, in areas such as sequential decision making, multiagent learning, multi-armed bandits, and humanoid robotics. I have applied my research in domains such as robot soccer, computer games, and on-line advertising.

## Appointments

- **Indian Institute of Technology Bombay**. *Associate Professor*, Department of Computer Science and Engineering. December 2018–present.
- **Indian Institute of Technology Bombay**. *Assistant Professor*, Department of Computer Science and Engineering. February 2015–December 2018.
- **Indian Institute of Science**. *INSPIRE Faculty Fellow*, Department of Computer Science and Automation. July 2014–January 2015.
- **Yahoo Labs Bangalore**. *Research Scientist*. February 2012–June 2014.
- **Honda Research Institute**, *Intern*. July–October 2008.
- **Tejas Networks**. *Intern*. May–July 2003.

## Education

- **University of Texas at Austin**. August 2004–December 2011.

  Ph.D., Computer Science
  Advisor: Peter Stone
  GPA: 3.7925/4.00

- **Indian Institute of Technology Madras**. July 2000–July 2004.

  B.Tech., Computer Science and Engineering
  Project Supervisor: Deepak Khemani
  CGPA: 9.22/10.00

## Honours and Awards

- **Prof. Krithi Ramamritham Award for Creative Research** for the year 2016, awarded by IIT Bombay, November 2017.
- Among **AI's 10 to Watch**, list published by IEEE Intelligent Systems, January 2016.
- **INSPIRE Faculty Fellowship**, awarded by the Government of India, December 2013.
- **Best Student Paper Award**, RoboCup International Symposium 2009, Graz, Austria. Paper title: *Learning Complementary Multiagent Behaviors: A Case Study*.
- **Nominee for Best Student Paper Award**, AAMAS 2007, Honolulu, Hawai'i, USA. Paper title: *Batch Reinforcement Learning in a Complex Domain*.
- **Best Student Paper Award**, RoboCup International Symposium 2006, Bremen, Germany. Paper title: *Half Field Offense in RoboCup Soccer: A Multiagent Reinforcement Learning Case Study*.
- **All-India Rank 75**, IIT Joint Entrance Examination 2000 (out of approximately 200,000 students).

- **First Rank** in high school class of 2000 (of approximately 60), Vidya Mandir Adyar, with a score of 483/500 (Central Board of Secondary Education).
- Recipient of the **National Talent Search scholarship** awarded by the Government of India (to the top 0.01% of students), 1999.

**Teaching**

- **"Computer Programming and Utilization"**, undergraduate course, IIT Bombay, Spring 2024.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2023.
- **"Advances in Intelligent and Learning Agents"**, graduate course, IIT Bombay, Spring 2023.
- **"Mathematical Foundations of Artificial Intelligence and Machine Learning"**, NCM-CEP Course, February 2023.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2022.
- **"Advances in Intelligent and Learning Agents"**, graduate course, IIT Bombay, Spring 2022.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2021.
- **"Advances in Intelligent and Learning Agents"**, graduate course, IIT Bombay, Spring 2021.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2020.
- **"Certificate Program in Machine Learning & AI"**, CEP course, IIT Bombay, Summer 2020.
- **"Advances in Intelligent and Learning Agents"**, graduate course, IIT Bombay, Spring 2020.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2019.
- **"Artificial Intelligence and Machine Learning"**, undergraduate course, IIT Bombay, Spring 2019.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2018.
- **"Artificial Intelligence"**, undergraduate course, IIT Bombay, Spring 2018.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2017.
- **"Theoretical Analysis of Policy Iteration"**, tutorial presented at the Twenty-sixth International Joint Conference on Artificial Intelligence (IJCAI 2017), Melbourne, Australia, August 2017.
- **"Artificial Intelligence"**, undergraduate course, IIT Bombay, Spring 2017.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2016.
- **"Advances in Intelligent and Learning Agents"**, graduate course, IIT Bombay, Spring 2016.
- **"Foundations of Intelligent and Learning Agents"**, graduate course, IIT Bombay, Autumn 2015.

**Teaching Assistantship**

- **"Reinforcement Learning: Theory and Practice"**, graduate course taught by Peter Stone, UT Austin, Fall 2007.
- **"Elements of Databases"**, undergraduate course taught by Glen Nuckolls, UT Austin, Fall 2005.
- **"Contemporary Issues in Computer Science"**, undergraduate course taught by John Messerly, UT Austin, Fall 2004–Spring 2005.
- **"Introduction to Computing"**, undergraduate course taught by N. S. Narayanaswamy, IIT Madras, Spring 2003.

**Thesis Supervision**

- Vedang Gupta, B.Tech., 2024 (jointly supervised with Nikhil Karamchandani). *Asymptotically Optimal $\delta$-PAC Stopping Rules for Best Arm Identification using Uniform Sampling in Bernoulli Bandits.*
- Yash Vinesh Gadhia, Dual Degree (B.Tech/M.Tech.), 2023 (jointly supervised with Manjesh K. Hanawal). *Multi Armed Bandits with Uniform Exploration and its applications to Policy Search.*
- Ayush Kumar Tripathi, M.Tech., 2023 (co-supervisor: Harshad Khadilkar). *Efficient scheduling and deadlock prevention techniques for Railway.*
- Ritika, B.Tech., 2022. *Learning to search on Tangrams.*
- Rushabh Kanadiya, B.Tech., 2022. *Learning to search on Tangrams.*
- Nitish Tongia, Dual Degree (B.Tech/M.Tech.), 2022 (jointly supervised with Jayanta Mukherjee). *Fianchetto: A Winning Agent for Reconnaissance Blind Chess.*
- Shashank Shet, M.Tech., 2022 (co-supervisor: Harshad Khadilkar). *Application of Mixed Integer Linear Programming Methods to scheduling of trains in railway networks.*
- Mohith Jagalmohanan, M.Tech., 2022. *On the Complexity of Two Planning Problems of Intelligent Agents.*
- Debabrata Biswal, M.Tech., 2022 (co-supervisor: Harshad Khadilkar). *Online Three Dimensional Bin Packing Problem.*
- Ashish Aggarwal, M.Tech., 2022 (co-supervisor: Harshad Khadilkar). *Online 3D Bin Packing Problem.*
- Keshav Agarwal, M.Tech., 2022 (co-supervisor: Harshad Khadilkar). *Real-time Railway Scheduling.* Joint winner, **Departmental Research Excellence Award**, M.Tech. Project category.
- Rajesh Mahale, M.Tech., 2021, *Learning Successful Defense Strategiesfor Robot Soccer.*
- Arghya Roy Chaudhuri, Ph.D., 2021, *Quantile-Based Reduction of Large Bandit Instances.*
- Mayanka Medhe, B.Tech., 2020 (primary supervisor: Leena Vachhani). *Multi-Agent Path Planning and Collision Avoidance using Reinforcement Learning.*
- Durgesh Samant, M.S., 2020. *Towards building agents that sense, explain and act optimally in RL settings.*
- Rohit Prasad, M.Tech., 2020 (co-supervisor: Harshad Khadilkar). *Optimising a Real-time Scheduler for RailwayNetworks using Policy Search.*
- Suraj Singh, M.Tech., 2020. *Online Reinforcement Learning for Autonomous Driving.*
- Deep Karkhanis, B.Tech., 2020. *Tractable Policy Iteration in POMDPs.*
- Divyansh, B.Tech., 2019. *A Smartphone-based Document-scanning System.*
- Archit Gupta, B.Tech., 2019. *PAC-Optimal MDP Planning Algorithms.*
- Nilesh Gupta, B. Tech., 2019. *Learning complex behaviours and Keepaway in 3D Robocup Environment.*

- Rishabh Shah, B.Tech., 2019 (co-supervisor: Parag Chaudhuri). *Training Primitive Skills to Soccer Bots*.
- A. Srinath Naik, B.Tech., 2018 (co-supervisor: Siddhartha Chaudhuri). *Smart phone based book digitization system*.
- Vishal B. Bhavani, B.Tech., 2018 (co-supervisor: Siddhartha Chaudhuri). *Document Image Dewarping using Deep Learning*.
- Samiran Roy, M.Tech., 2017. *A Bandit-based Framework for Self-evaluation in Autonomous Learning Agents*.
- A. Siddharth, M.Tech., 2017. *On the Effect of the Frequency of Decision Making in Temporal Difference Learning*.
- Mihir Kulkarni, Dual degree (B.Tech./M.Tech.), 2017. *Barbicels: Towards a world-class Scrabble agent*.
- Anchit Gupta, B.Tech., 2017 (co-supervisor: Supratik Chakraborty). *Improved Strong Worst-case Upper Bounds for MDP Planning*. Joint winner, **Departmental Research Excellence Award**, B.Tech. Project category.
- Harshad Chavan, M.Tech., 2016 (primary supervisor: Pushpak Bhattacharyya). *Study of Reordering in Pivot Based SMT*. Nominal supervisor.
- Deepak Patil, M.Tech., 2016 (primary supervisor: Pushpak Bhattacharyya). *Study of Reordering in Pivot based Statistical Machine Translation*. Nominal supervisor.
- Shivam Garg, B.Tech., 2016 (primary supervisor: N. Hemachandra). *Adaptive Sliding-Window Based Approach for Multi-Armed Bandits*.

## Professional Activities

### Service

- Member, Apex Committee, National Centre for Mathematics, 2022–.
- Member, Advisory Committee, Technocraft Centre for Applied Artificial Intelligence, IIT Bombay, 2021–.
- Member, Expert Committee, Start-up Research Grant (SRG) and National Post Doctoral Fellowship (NPDF) schemes in Engineering Science, Science and Engineering Research Board, 2021–.
- Member, Expert Committee, CURIE (Consolidation of University Research through Innovation and Excellence in Women Universities) Programme, Department of Science and Technology, 2019–2022.
- Consultant to E-committee, Supreme Court of India on National Judicial Data Grid, 2018.
- Member, Task force on Strategic Implementation of AI on National Security and Defence Needs, Department of Defence Production, Government of India, 2018.
- Member, 2015 Study Panel, One Hundred Year Study on Artificial Intelligence (AI100), 2016.

### Organisational

- Chair, Demonstrations Program, $31^{st}$ AAAI Conference on Artificial Intelligence, 2017.
- Organiser, Yahoo! Labs IISc Student Seminar, 2013.
- Technical Committee, $2^{nd}$ Annual Reinforcement Learning Competition, 2008.
- Coordinator, UTCS Reinforcement Learning Reading Group, Spring 2006–Spring 2011.

### Senior Programme Committee

- $37^{th}$ AAAI Conference on Artificial Intelligence, 2023.

- $25^{th}$ International Joint Conference on Artificial Intelligence, 2016.
- $28^{th}$ AAAI Conference, 2014.
- $23^{rd}$ International Joint Conference on Artificial Intelligence, 2013.

Programme Committee/Invited Reviewing

- Transactions on Pattern Analysis and Machine Intelligence, 2024.
- $27^{th}$ International Conference on Artificial Intelligence and Statistics, 2024.
- 2023 European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, 2023.
- npj Digital Medicine, 2022.
- Mathematics of Operations Research, 2022.
- $31^{st}$ International Joint Conference on Artificial Intelligence, 2022.
- AI Magazine, 2022.
- $25^{th}$ International Conference on Artificial Intelligence and Statistics, 2022.
- Asian Journal of Social Science, 2021
- $35^{th}$ Conference on Neural Information Processing Systems, 2021.
- SIAM Conference on Control and Its Applications, 2021.
- IEEE Journal on Selected Areas in Information Theory, 2021.
- $34^{st}$ Conference on Neural Information Processing Systems, 2020.
- Neural Computation, 2019.
- $14^{th}$ Inter-Research-Institute Student Seminar in Computer Science, IIT Gandhinagar, 2019.
- $32^{nd}$ Annual Conference on Learning Theory, 2019.
- Sadhana, 2018.
- $5^{th}$ Indian Control Conference, 2018.
- Artificial Intelligence Journal, 2018.
- $28^{th}$ International Conference on Automated Planning and Scheduling, 2018.
- $31^{st}$ Annual Conference on Neural Information Processing Systems, 2017.
- Journal of Artificial Intelligence Research, 2016.
- $30^{th}$ Annual Conference on Neural Information Processing Systems, 2016.
- IEEE Transactions on Cognitive and Developmental Systems, 2016.
- $3^{rd}$ ACM IKDD Conference on Data Science, 2016.
- Journal of Machine Learning Research, 2015.
- $32^{nd}$ International Conference on Machine Learning, 2015.
- 2015 ACM SIGMOD/PODS Conference, 2015.
- AAAI 2015 Workshop on Multiagent Interaction without Prior Coordination, 2015.
- $23^{rd}$ ACM International Conference on Information and Knowledge Management, 2014.
- AAAI 2014 Workshop on Multiagent Interaction without Prior Coordination, 2014.
- 2014 Conference on Learning Theory, 2014.
- Journal of Machine Learning Research, 2012.
- Journal of Autonomous Agents and Multi-Agent Systems, 2012.
- International Journal of Adaptive Control and Signal Processing, 2012.
- $10^{th}$ European Workshop on Reinforcement Learning, 2012.

– Neural Networks, 2012.
– $29^{th}$ International Conference on Machine Learning, 2012.
– Adaptive and Learning Agents Workshop at AAMAS 2012, 2012.
– $9^{th}$ European Workshop on Reinforcement Learning, 2011.
– $24^{th}$ Annual Conference on Learning Theory, 2011.
– RoboCup International Symposium 2011, 2011.
– 2011 International Conference on Artificial Neural Networks, 2011.
– Artificial Intelligence Journal, 2010.
– 2011 IEEE International Conference on Robotics and Automation, 2010.
– Adaptive and Learning Agents Workshop at AAMAS 2010, 2010.
– RoboCup International Symposium 2009, 2009.
– $26^{th}$ International Conference on Machine Learning, 2009.
– Journal of Artificial Intelligence Research, 2008.
– $10^{th}$ International Conference on Intelligent Autonomous Systems, 2008.
– AAMAS 2006 Workshop on Adaptation and Learning in Autonomous Agents and Multiagent Systems, 2006.

Invited Talks

– Department of Computer Science and Engineering, Indian Institute of Technology Guwahati, May 2024. *On Designing a Winning Agent for Reconnaissance Blind Chess (RBC).*
– Symposium 2.0, Department of Computer Science and Engineering, Indian Institute of Technology Indore, March 2024. *On Designing a Winning Agent for Reconnaissance Blind Chess (RBC).*
– SynTalk, March 2024. Panelist, *The Learnable And Not.*
– Workshop on "Reinforcement Learning: Recent Trends and Future Directions", Indian Institute of Science, February 2024. *On Designing a Winning Agent for Reconnaissance Blind Chess (RBC).*
– Centre for Networked Intelligence, Indian Institute of Science, August 2023. *PAC Mode Estimation using PPR Martingale Confidence Sequences.* On-line talk.
– Chennai Mathematical Institute, September 2022. *Towards a Better Theoretical Understanding of Policy Iteration.*
– Chennai Mathematical Institute, June 2022. *PAC Mode Estimation using PPR Martingale Confidence Sequences.*
– The Robotics Society, Miranda House, October 2021. *Supervised Learning from the Inside.* On-line talk.
– TCS Research and Innovation, April 2021. *Designing Learning Agents: Two Investigations.* On-line talk.
– Webinar on "AI for Data Driven Navy", INS Valsura, October 2020. *Supervised Learning from the Inside.* On-line talk.
– Vaibhav summit, October 2020. Panelist, *Mathematical Foundations of AI.* On-line participation.
– Search Technology Center, Microsoft India, September 2020. *An Introduction to Stochastic Multi-armed Bandits.* On-line talk.
– Rizvi College of Engineering, Mumbai, India, September 2020. *Artificial Intelligence: A Natural Pursuit.* On-line talk.

– Faculty Development Programme on Data Science and Data Analytics, Indian Institute of Technology Gandhinagar, Gandhinagar, India, February 2020. *Deep Reinforcement Learning.*

– Ubisoft India, Pune, India, January 2020. *Deep Reinforcement Learning.*

– Kishinchand Chellaram College, Mumbai, India, December 2019. *Artificial Intelligence: Opportunities and Challenges.*

– Indian Institute of Management Kozhikode, Kozhikode, India, September 2019. *Deep Reinforcement Learning.*

– Cotton Corporation of India, Navi Mumbai, India, July 2019. *Relevance of AI/ML to the Cotton Corporation of India.*

– Department of Electronics Engineering, Rizvi College of Engineering, Mumbai, India, July 2019. *Artificial Intelligence: A Natural Pursuit.*

– Forum for Medical Ethics Society (FMES), Mumbai, India, July 2019. Panelist, *Emerging AI technology in health care in India, health equity and justice: Critical reflections and charting out way forward.*

– IMCs India Calling Conference, IMC (Chamber of Commerce and Industry), Mumbai, India, March 2019. Panelist, *AI the Game Changer—An Overview on Opportunities and Changing the Way of Doing Business.*

– Symposium on Artificial Intelligence/Machine Learning: Science and Society, Indian Academy of Sciences, Bengaluru, India, February 2019. *Towards a Better Theoretical Understanding of AI: The Case of Policy Iteration.*

– Computational Optimization Laboratory, Stanford University, Stanford, USA, October 2018. *Improved Strong Upper Bounds for Policy Iteration.*

– Stanford Intelligent Systems Laboratory, Stanford University, Stanford, USA, October 2018. *Reinforcement Learning with Imperfect Representations.*

– School of Technology and Computer Science, Tata Institute of Fundamental Research, Mumbai, India, August 2018. *Improved Strong Upper Bounds for Policy Iteration.*

– Mazagon Dock Shipbuilders Limited, Mumbai, India, May 2018. *Artificial Intelligence: A Natural Pursuit.*

– BARC-BRNS Workshop on Machine Learning and Artificial Intelligence, Bhabha Atomic Research Centre, Mumbai, May 2018. *Reinforcement Learning.*

– BARC-BRNS Workshop on Machine Learning and Artificial Intelligence, Bhabha Atomic Research Centre, Mumbai, May 2018. *Exploration and On-line Learning.*

– International Conference on Knowledge Organization, Library and Information Management, Chennai, India, October 2017. *The Explore-Exploit Tradeoff in Recommender Systems.*

– RoboVR, Mumbai, India, November 2017. Panelist, *Emerging Robotics and Robot Sports in India & World.*

– In-Service Course for PGT Computer Science, Kendriya Vidyalaya IIT Powai, Mumbai, India, May 2017. *Artificial Intelligence: A Natural Pursuit.*

– THINK Research Club, Vidyalankar Institute of Technology, Mumbai, India, March 2017. *Deep Reinforcement Learning.*

– Mumbai Artificial Intelligence Meetup, Mumbai, India, February 2017. *Deep Reinforcement Learning.*

– Carnegie India Global Technology Summit, Bengaluru, India, December 2016. *Artificial Intelligence: A Natural Pursuit.*

– Microsoft Machine Learning & Data Sciences Conference, Bengaluru, India, August 2016. *PAC Subset Selection in Stochastic Multi-Armed Bandits.*

– $2^{nd}$ Indian Workshop on Machine Learning, Kanpur, India, July 2016. *Deep Reinforcement Learning.*

– Sixth Indo-American Frontiers of Science Symposium (IAFOS-2015), Irvine, USA, August 2015. *Reinforcement Learning.*

– Workshop on Non-convex Optimization for Machine Learning, Indian Institute of Technology Bombay, Mumbai, India, June 2015. *Improved Expected Running Time for MDP Planning.*

– Recent Advances in Reinforcement Learning Workshop 2015, Indian Institute of Technology Madras, Chennai, India, March 2015. *Learning with Imperfect Representations.*

– Recent Advances in Reinforcement Learning Workshop 2015, Indian Institute of Technology Madras, Chennai, India, March 2015. *An Improved Bound for MDP Planning.*

– Tutorial and Workshop on Learning and Related Probabilistic Applications, Tata Institite of Fundamental Research, Mumbai, India, February 2015. *Improved Expected Running Time for MDP Planning.*

– "CS 729: Topics in Machine Learning", upper-division undergraduate and graduate course, Department of Computer Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India, September 2014. *An Introduction to Stochastic Multi-armed Bandits.*

– "CS 621: Artificial Intelligence", upper-division undergraduate and graduate course, Department of Computer Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India, September 2014. *RoboCup: A Grand Challenge for AI.*

– Department of Computer Science and Engineering, Indian Institute of Technology Delhi, New Delhi, India, April 2014. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– Research Promotion Workshop on Machine Learning and Social Networks, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India, March 2014. *Panel Discussion: Research as a Career in Computer Science.*

– Research Promotion Workshop on Machine Learning and Social Networks, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India, March 2014. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– "CS60073: Advanced Machine Learning", graduate course, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Kharagpur, India, March 2014. *Tutorial: Exploration and Multi-armed Bandits.*

– Machine Learning Seminar Series, Department of Computer Science and Engineering, Indian Institute of Technology Kanpur, Kanpur, India, March 2014. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– Indo-US Lectures Week in Machine Learning, Game Theory and Optimization, Indo-US Joint Center for Advanced Research in Machine Learning, Game Theory and Optimization, Bengaluru, India, January 2014. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– School of Technology and Computer Science, Tata Institute of Fundamental Research, Mumbai, India, November 2013. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– NLP-AI Lecture, Department of Computer Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India, October 2013. *Tutorial: Exploration and Multi-armed Bandits.*

– "CS 725: Foundations of Machine Learning", upper-division undergraduate and graduate course, Department of Computer Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India, October 2013. *Tutorial: An Introduction to Reinforcement Learning.*

– Department of Computer Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India, October 2013. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– Department of Computer Science and Engineering, Indian Institute of Technology Madras, Chennai, India, October 2013. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– Intelligent Autonomous Systems Group, Informatics Institute, University of Amsterdam, Teleconference, August 2013. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

– Forum for Artificial Intelligence, The University of Texas at Austin, Austin, TX, USA, August 2013. *PAC Subset Selection in Stochastic Multi-armed Bandits.*

- "E0 270: Machine Learning", graduate course, Department of Computer Science and Automation, Indian Institute of Science, Bengaluru, India, March 2013. *An Introduction to Reinforcement Learning.*
- Machine Learning Special Interest Group, Department of Computer Science and Automation, Indian Institute of Science, Bengaluru, India, October 2012. *PAC Subset Selection in Stochastic Multi-armed Bandits.*
- CORAL Research Group, Computer Science Department, Carnegie Mellon University, Pittsburgh, PA, USA, April 2011. *Learning Methods for Sequential Decision Making in Practice.*
- Department of Computer Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India, December 2010. *Learning Methods for Sequential Decision Making in Practice.*
- Germinait Solutions Private Limited, Mumbai, India, December 2010. *Learning Methods for Sequential Decision Making in Practice.*
- Department of Computer Science and Engineering, Indian Institute of Technology Madras, Chennai, India, December 2010. *Learning Methods for Sequential Decision Making in Practice.*
- Department of Computer Science and Engineering, Indian Institute of Technology Delhi, New Delhi, India, December 2010. *Learning Methods for Sequential Decision Making in Practice.*
- ICML 2010 Workshop on Reinforcement Learning and Search in Very Large Spaces, Haifa, Israel, June 2010. *Learning Methods for Sequential Decision Making in Practice.*
- Interactive Intelligence Lab, Department of Computer Science and Engineering, Indian Institute of Technology Madras, Chennai, India, February 2009. *An Empirical Analysis of Value Function-Based and Policy Search Reinforcement Learning.*

Competitions

- IIT Bombay team "Fianchetto": **2nd place**, NeurIPS 2022 Reconnaissance Blind Chess Tournament, 2022.
- IIT Bombay team "Fianchetto": **1st place**, NeurIPS 2021 Reconnaissance Blind Chess Tournament, 2021.
- IIT Bombay team: **1st place**, 2048 Controller Competition, GECCO 2015, Madrid, Spain, 2015.
- UT Austin Villa team: **1st place**, RoboCup 3D Simulation Competition, Istanbul, Turkey, 2011.
- UT Austin Villa team, RoboCup 3D Simulation Competition, Singapore, 2010.
- UT Austin Villa team, RoboCup 3D Simulation Competition, Suzhou, China, 2008.
- LARG team: **1st place**, Tetris Event, First Annual Reinforcement Learning Competition, 2007.
- UT Austin Villa team, RoboCup 3D Simulation Competition, Atlanta, GA, USA, 2007.
- UT Austin Villa team: **2nd place**, RoboCup Simulation Coach Competition, Bremen, Germany, 2006.

## Publications

Journals

- **Direction-Changing Fall Control of Humanoid Robots: Theory and Experiments**, Ambarish Goswami, Seung-kook Yun, Umashankar Nagarajan, Sung-Hee Lee, KangKang Yin, and Shivaram Kalyanakrishnan, *Autonomous Robots, 36(3): 199–223, March 2014.*
- **Characterizing Reinforcement Learning Methods through Parameterized Learning Problems**, Shivaram Kalyanakrishnan and Peter Stone, *Machine Learning, 84(1–2): 205–247, July 2011.*

– **Learning to Predict Humanoid Fall**, Shivaram Kalyanakrishnan and Ambarish Goswami, *International Journal of Humanoid Robotics, 8(2): 245–273, June 2011.*

Conferences

– **Linear-Time Optimal Deadlock Detection for Efficient Scheduling in Multi-Track Railway Networks**, Hastyn Doshi, Ayush Tripathi, Keshav Agarwal, Harshad Khadilkar, and Shivaram Kalyanakrishnan, *In Proceedings of the Thirty-third International Joint Conference on Artificial Intelligence (IJCAI 2024). To appear.*

– **Optimal Stopping Rules for Best Arm Identification in Stochastic Bandits under Uniform Sampling**, Vedang Gupta, Yash Gadhia, Shivaram Kalyanakrishnan, and Nikhil Karamchandani, *In Proceedings of the 2024 IEEE International Symposium on Information Theory (ISIT 2024). To appear.*

– **PAC Mode Estimation using PPR Martingale Confidence Sequences**, Shubham Anand Jain, Rohan Shah, Sanit Gupta, Denil Mehta, Inderjeet Nair, Jian Vora, Sushil Khyalia, Sourav Das, Vinay J. Ribeiro, and Shivaram Kalyanakrishnan, *In Proceedings of the Twenty-fifth International Conference on Artificial Intelligence and Statistics (AISTATS 2022), pp. 5815–5852, PMLR, 2022.*

– **Optimising a Real-Time Scheduler for Indian Railway Lines by Policy Search**, Rohit Prasad, Harshad Khadilkar, and Shivaram Kalyanakrishnan, *In Proceedings of the Seventh Indian Control Conference (ICC 2021), pp. 75–80, IEEE Press, 2021.*

– **Intelligent and Learning Agents: Four Investigations**, Shivaram Kalyanakrishnan, *In Proceedings of the Thirtieth Internarional Joint Conference on Artificial Intelligence (IJCAI 2021), pp. 4946–4950, International Joint Conferences on Artificial Intelligence Organization, 2021.* Invited contribution.

– **Regret Minimisation in Multi-Armed Bandits Using Bounded Arm Memory**, Arghya Roy Chaudhuri and Shivaram Kalyanakrishnan, *In Proceedings of the Thirty-fourth AAAI Conference on Artificial Intelligence (AAAI 2020), pp. 10085–10092, AAAI Press, 2020.*

– **A Tighter Analysis of Randomised Policy Iteration**, Meet Taraviya and Shivaram Kalyanakrishnan, *In Proceedings of the 2019 Conference on Uncertainty in Artificial Intelligence (UAI 2019), ID 174, AUAI Press, 2019.*

– **PAC Identification of Many Good Arms in Stochastic Multi-Armed Bandits**, Arghya Roy Chaudhuri and Shivaram Kalyanakrishnan, *In Proceedings of the Thirty-sixth International Conference on Machine Learning (ICML 2019), pp. 991–1000, PMLR, 2019.*

– **Quantile-Regret Minimisation in Infinitely Many-Armed Bandits**, Arghya Roy Chaudhuri and Shivaram Kalyanakrishnan, *In Proceedings of the 2018 Conference on Uncertainty in Artificial Intelligence (UAI 2018), pp. 425–434, AUAI Press, 2018.*

– **Opportunities and Challenges for Artificial Intelligence in India**, Shivaram Kalyanakrishnan, Rahul Alex Panicker, Sarayu Natarajan, and Shreya Rao, *In Proceedings of the First AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES 2018), pp. 164–170, ACM, 2018.*

– **Improved Strong Worst-case Upper Bounds for MDP Planning**, Anchit Gupta and Shivaram Kalyanakrishnan, *In Proceedings of the Twenty-sixth International Joint Conference on Artificial Intelligence (IJCAI 2017), pp. 1788–1794, IJCAI, 2017.*

– **PAC Identification of a Bandit Arm Relative to a Reward Quantile**, Arghya Roy Chaudhuri and Shivaram Kalyanakrishnan, *In Proceedings of the Thirty-first AAAI Conference on Artificial Intelligence (AAAI 2017), pp. 1777–1783, AAAI Press, 2017.*

– **Batch-Switching Policy Iteration**, Shivaram Kalyanakrishnan, Utkarsh Mall, and Ritish Goyal, *In Proceedings of the Twenty-fifth International Joint Conference on Artificial Intelligence (IJCAI 2016), pp. 3147–3153, AAAI Press, 2016.*

– **Randomised Procedures for Initialising and Switching Actions in Policy Iteration**, Shivaram Kalyanakrishnan, Neeldhara Misra, and Aditya Gopalan, *In Proceedings of the Thirtieth AAAI Conference on Artificial Intelligence (AAAI 2016), pp. 3145–3151, AAAI Press, 2016.*

– **On Building Decision Trees from Large-scale Data in Applications of On-line Advertising**, Shivaram Kalyanakrishnan, Deepthi Singh, and Ravi Kant, *In Proceedings of the Twenty-third ACM International Conference on Information and Knowledge Management (CIKM 2014), pp. 669–678, ACM, 2014.*

– **GEV-Canonical Regression for Accurate Binary Class Probability Estimation when One Class is Rare**, Arpit Agarwal, Harikrishna Narasimhan, Shivaram Kalyanakrishnan, and Shivani Agarwal, *JMLR Workshop and Conference Proceedings (International Conference on Machine Learning, 2014), 32(1): 1989–1997, 2014.*

– **Information Complexity in Bandit Subset Selection**, Emilie Kaufmann and Shivaram Kalyanakrishnan, *JMLR Workshop and Conference Proceedings (Conference on Learning Theory, 2013), 30: 228–251, 2013.*

– **PAC Subset Selection in Stochastic Multi-armed Bandits**, Shivaram Kalyanakrishnan, Ambuj Tewari, Peter Auer, and Peter Stone, *In John Langford and Joelle Pineau, Editors, Proceedings of the Twenty-ninth International Conference on Machine Learning (ICML 2012), pp. 655–662, Omnipress, 2012.*

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