

# Suraj Narayanan Sasikumar

Reinforcement Learning • Machine Learning



## CONTACT

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## LINKS

🌐 <https://surajx.in>  
🌐 [surajx](#)  
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## COURSEWORK

- 🔗 Statistical Machine Learning (SML)
- 🔗 Bio-Inspired Computing
- 🔗 Artificial Intelligence (AI)
- 🔗 Adv. AI: Universal AI (AIXI)
- 🔗 Adv. Analysis 1: Metric Spaces
- 🔗 Adv. SML: Convex Optimization

## CONFERENCES

[IJCAI](#) (Melbourne, 2017)  
[AGI](#) (Melbourne, 2017)  
[MIRIx](#) (Canberra, 2016, 2017)  
[LSS](#) (Canberra, 2015)

## PROGRAMMING

### Languages

5000+ LOC  
Python • JavaScript • Shell • Java  
1000+ LOC  
C++ •  $\LaTeX$  • SQL  
Familiar  
Go • Haskell • Matlab

### Frameworks

TensorFlow • Keras  
Android • Node.js • Docker

## OBJECTIVE

Contribute to Artificial Intelligence and AI Safety research. My current research focuses on scalable directed exploration in Reinforcement Learning (RL).

## EDUCATION

### Masters in Computer Science (Advanced) 2015 - 17

THE AUSTRALIAN NATIONAL UNIVERSITY (ANU)

First Class Honours • 6.81/7.0 GPA

Specialization: Artificial Intelligence

Thesis: [Exploration in Feature Space for Reinforcement Learning](#)

Supervisors: Prof. [Marcus Hutter](#) & [Tom Everitt](#)

### Bachelor of Technology 2004 - 08

UNIVERSITY OF KERALA, INDIA

Specialization: Electronics and Communication

## EXPERIENCE

### Independent Researcher 2018 -

Topic: Extension to [MSEH17]

Currently working on replacing linear function approximation in [MSEH17], with a deep Q-network (DQN) for value estimation. Intricacies include handling evolving features in the novelty estimator.

### Teaching Assistant ANU, 2016

Course: Formal Methods in Software Engineering

The course covered Logic, Natural Deduction, Formal Verification (Functional and Imperative), and Theory of Computation. I conducted recitation sessions for a cohort of 40 students, and was responsible for grading assignments.

Supervisor: Prof. [Rajeev Goré](#)

### Technology Analyst INFOSYS LTD., 2008 - 14

Responsibility: Software Design and Development

- Worked on enterprise-grade projects with major clients like Time Warner Cable, Equifax, and Telstra.
- Designed and Developed applications for a wide range of domains as a Full-stack Developer, Enterprise Java Developer, Android App Developer, Source Code Maintainer, and Build & Release Engineer.
- Led a team of 5-7 people in the last three years at Infosys. Received customer appreciations for delivering projects on-time and with high-quality.
- Developed Proof of Concept projects to showcase applicability of cutting-edge technology such as Augmented Reality and Machine Learning to clients. Full list of professional projects are available on my [AngelList profile](#).

## PUBLICATIONS

[MSEH17] Jarryd Martin, Suraj Narayanan Sasikumar, Tom Everitt, and Marcus Hutter. Count-Based Exploration in Feature Space for Reinforcement Learning. In Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence, IJCAI-17, pages 2471--2478, Melbourne, Aug 2017.

## LANGUAGES

- English (fluent)
- Malayalam (native)
- Hindi (basic)

## REFERENCES\*

- Prof. [Marcus Hutter](#)
- Dr [Miguel Ramirez Javega](#)
- [Tom Everitt](#)

\* Contact details can be provided on request

## HIGHLIGHT PROJECTS

### Count-based Exploration in Feature Space for RL ANU, 2016 - 17

Role: Implementation, Empirical Evaluation, and Design

- Introduced a novel optimistic count-based exploration algorithm that is feasible in high-dimensional RL problems.
- A collaboration project, where I was fully responsible for the implementation of the algorithm, and performing empirical evaluation in the ALE.
- Published as [MSEH17] at [IJCAI-17](#). Invited to present at the Scaling-Up RL (SURL) workshop, and the Asian Workshop on RL (AWRL) .

Links: [Paper URL](#), [Video](#)

Supervisors: Prof. Marcus Hutter & Tom Everitt

Software Stack: C++, Arcade Learning Environment (ALE), Shell

### MC-AIXI-CTW ANU, 2017

Role: Team Lead, Architect, and Developer

- An implementation of the [paper](#): A Monte Carlo AIXI Approximation.
- I was fully responsible for implementing the CTW module, software architecture design, integration, integration testing, and empirical evaluation.

Link: [Source](#)

Supervisor: Prof. Marcus Hutter

Software Stack: C++

### Autoencoded Q-Learner ANU, 2016

Role: Team Lead, Architect, and Lead Developer

- We investigated the effect of using an autoencoded state-space on the performance of tabular Q-learning.
- Our algorithm outperformed vanilla tabular Q-learning, however, it could not achieve the performance of Q-learning with Linear Function Approximation.
- I was fully responsible for the implementation of the project.

Links: [Poster](#), [Source](#)

Supervisor: Dr Miguel Ramirez Javega

Software Stack: Keras, Python

### Proof Assistant ANU, 2015 - 16

Role: Team Lead, Architect, UX Designer, and Lead Developer

- An online platform to enable Logic students to write, verify, and store System L style Natural Deduction proofs.
- Provides real-time proof-checking and contextual error messages.
- I was fully responsible for developing the proof validation module, parser, web-application design and development, integration testing, and UI design.

Links: [Website](#), [Source](#)

Supervisor: Prof. [John Slaney](#)

Software Stack: JavaScript, Node.js, MongoDB, ANTLR4, Bootstrap, Jade

## AWARDS

- Nominated for University Medal at the Australian National University 2017
- Awarded full Scholarship for a [CFAR](#) Workshop 2017
- Shine Award from Telstra for automating a complex 3-way Code Merge 2011
- Outstanding Achievement Award for Build Automation at Infosys 2010
- Ranked top 1.5% (752/52,866) in the State Engineering Entrance Exam 2004

## COMMUNITY SERVICE

- Reviewed papers for Uncertainty in Artificial Intelligence ([UAI](#)), 2017.
- Volunteered in the National Conference on Mobile Computing (2006), as a member of the IEEE Student Cell, and Free Software Cell of my college.
- Volunteered in the Technopark Linux Install Festival (2008), and the [Freedom Toaster](#) initiative as a member of the Local Free Software [community](#).