# Vignesh Subramanian

Atlanta, Georgia, USA

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## Education

**Georgia Institute of Technology** **Aug 2023 - Ongoing**
Ph.D. - Computer Science | 2nd Year Atlanta, Georgia
Advisor - Prof. Suguman Bansal

**National Institute of Technology, Tiruchirappalli** **Aug 2019 - April 2023**
B.Tech. - Electrical and Electronics Engineering Tiruchirappalli, Tamil Nadu
Minor - Computer Science Engineering

**Relevant Coursework:** Logic in Computer Science, SAT/SMT solvers, Machine Learning and Deep Learning, Software Analysis and Testing, Artificial Intelligence, Data Structures and Algorithms

## Publications

**Certification-Guided Evaluation of Reinforcement Learning Generalization**
*AAAI - Workshop on Generalization in Planning 2024 [to appear]*
**Vignesh Subramanian**, Djordje Zikelic, Suguman Bansal **[Link]**

**Inductive Generalization in Reinforcement Learning from Specifications**
*ArXiv Preprint, 2024*
**Vignesh Subramanian**, Rohit Kushwah, Subhajit Roy, Suguman Bansal **[Link]**

**Inductive Generalization in Reinforcement Learning from Specifications (Short Paper)**
*NeurIPS - Workshop on Generalization in Planning 2023*
Rohit Kushwah, **Vignesh Subramanian**, Subhajit Roy, Suguman Bansal **[Link]**

**Reinforcement Learning for Stochastic Max-Plus Linear Systems**
*Conference on Decision and Control, IEEE 2023*
**Vignesh Subramanian**, Farzaneh Farhadi, Sadegh Soudjani **[Link]**

**A Novel Facial Emotion Recognition Model Using Segmentation VGG-19 Architecture**
*International Journal of Information Technology, Springer, 2023*
**Vignesh Subramanian**, Savithadevi, M. Sridevi, Rajeswari Sridhar **[Link]**

**SIHeDA-Net: Sensor to Image Heterogeneous Domain Adaptation for Sign Language Detection**
*Medical Imaging with Deep Learning, 2022*
Ishikaa Lunawat, **Vignesh Subramanian**, S P Sharan **[Link]**

## Teaching Experience

**Graduate Teaching Assistant - SAT/SMT Solvers** **Fall 2024**
*Georgia Institute of Technology* *Atlanta, Georgia*

- Guiding students on advanced topics in SAT and SMT solvers, including model checking, symbolic execution, neural network verification, and formal verification techniques.
- Supporting assignments and projects that integrate LLM-based reinforcement learning, LLM inference, and proof synthesis for solving complex problems in solver architecture and proof complexity.

## Internships

**Newcastle University, United Kingdom** | Paper link **Jan 2022 - Nov 2022**
*Research Intern - Mentor: Prof. Sadegh Soudjani* *Newcastle, England*

- Proposed a novel optimization strategy using Deep Q-Learning for Stochastic Max-Plus-Linear Discrete Event Systems under uncertainties, achieving a 2.5x speedup over Model Predictive Control for minimizing stochastic delays in railway systems, published at **Conference on Decision and Control, IEEE, 2023**.

**Samsung R&D Institute, Bangalore** | Report link **Aug 2021 - Feb 2022**
*Research Intern - Mentor: Mr. Sujoy Saha, Mr. Rajat Kumar Jain* *Karnataka, India*

- Developed a Tri-Stage Occlusion Handling Normal Map Estimation Algorithm to enhance 3D human normal map estimation on blurred, noisy, low-res 2D images, achieving 92.78% IoU (vs. 71.26% baseline) by effectively addressing occlusions from shadows, blur, and background.

**National Institute of Technology, Tiruchirappalli** | Paper link | Github link **Feb 2021 - Dec 2021**
*Research Intern - Mentor: Prof. M. Sridevi* *Tamil Nadu, India*

- Designed a novel CNN architecture integrating U-Net and VGG layers for Facial Emotion Recognition, achieving 75.97% accuracy on the FER-2013 dataset, ranking in the **Top 5** on the global leaderboard. Findings were published in the **International Journal of Information Technology, Springer**.

## Technical Skills

- **Languages**: C/C++, Python, Java, Javascript, Lean
- **Packages/Frameworks**: Pytorch, Tensorflow, Keras, Scikit-learn, OpenCV, OpenAI Gym, Stable Baselines
- **Reinforcement Learning**: Policy Gradient Methods, Generalization Algorithms, Safety Certificates for RL, Reachability and Safety Analysis
- **Formal Verification**: Static Analysis, Model Checking, Formal Methods for Safety Verification, Path-Insensitive and Context-Sensitive Reachability Analysis
- **LLM**: Pre-training and fine-tuning large-scale transformer models, LLM-based inference for complex logical queries, reinforcement learning from human feedback (RLHF), and automated proof generation.

## Positions Of Responsibility

**Reviewer** **2025**
*AAAI*

- Selected to serve as a reviewer for the AAAI - Workshop on Generalization in Planning.

**Student Research Mentor, Machine Learning and AI** **2020 - 2023**
*Spider R&D, NIT Trichy*

- Led ML/AI projects at Spider R&D, NIT Trichy; developed *SIHeDA-NET* (Paper) and *GISiL* (Demo), conducted workshops, and represented NIT in national competitions.

**Coordinator, Workshops and Publicity** **2020 - 2021**
*Currents Symposium, NIT Trichy*

- Coordinated workshops, publicity, and hospitality for Currents, EEE Dept. symposium; organized a web development workshop with 600+ participants and promoted events nationwide.