

# Shantanu Jaiswal

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## EDUCATION

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### Nanyang Technological University (NTU Singapore)

Singapore

*Bachelor of Engineering in Computer Engineering, Specialization in Intelligent Systems*

Aug 2014 – Jun 2018

- **GPA:** 4.64/5.00 (Honours highest distinction)
- **Selected Courses:** CE4041 (Machine Learning, A+); CE4034 (Information Retrieval, A+); CE4042 (Neural Networks, A); EE8087 (Living with Mathematics, A+); MH8300 (Math in Real World Applications, A); CE1008 (Engineering Mathematics, A+); MH1812 (Discrete Mathematics, A); CE1007 (Data Structures; A+)

## RESEARCH INTERESTS

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Scene Understanding & Reasoning; Self-supervised & Continual Learning; Embodied AI; Semantic Development

## PUBLICATIONS

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### Conference papers

- [1] **Shantanu Jaiswal**, Debaditya Roy, Basura Fernando, and Cheston Tan. “Learning to Reason Iteratively and Parallely for Complex Visual Reasoning Scenarios”. In: *Under review at Conference on Neural Information Processing Systems (NeurIPS) 2024*. [[Paper](#)].
- [2] Ishaan Rawal, Alexander Matyasko, **Shantanu Jaiswal**, Basura Fernando, and Cheston Tan. “Dissecting Multimodality in VideoQA Transformer Models by Impairing Modality Fusion”. In: *International Conference on Machine Learning (ICML) 2024*. [[Paper](#)].
- [3] **Shantanu Jaiswal**, Basura Fernando, and Cheston Tan. “TDAM: Top-Down Attention Module for Contextually-Guided Feature Selection in CNNs”. In: *European Conference on Computer Vision (ECCV) 2022*. [[Paper](#)] [[Suppl.](#)] [[Code](#)].
- [4] **Shantanu Jaiswal**, Dongkyu Choi, and Basura Fernando. “What do CNNs gain by imitating the visual development of primate infants?”. In: *31st British Machine Vision Conference (BMVC) 2020*. [[Paper](#)] [[Suppl.\(zip\)](#)] [[Code](#)] [[Abstract \(Cogsci 2020\)](#)].

### Other workshop/symposium/tiny-track papers and technical reports

- [5] Aishik Nagar, **Shantanu Jaiswal**, and Cheston Tan. “Dissecting Zero-Shot Visual Reasoning Capabilities in Vision and Language Models”. In: *The Second Tiny Papers Track at ICLR 2024 (Notable)*. [[Paper](#)].
- [6] Cheston Tan\* and **Shantanu Jaiswal\*** (equal contribution). “The Path to AGI Goes through Embodiment”. In: *Proceedings of the AAI Symposium Series. Vol. 1. No. 1. 2023*. [[Paper](#)].
- [7] Ishaan Rawal, **Shantanu Jaiswal**, Basura Fernando, and Cheston Tan. “Are VideoQA models truly multimodal?”. In: *NeurIPS 2023 XAI in Action Workshop*. [[Paper](#)].
- [8] **Shantanu Jaiswal**, Liu Yan, Dongkyu Choi, and Kenneth Kwok. “A Probabilistic-Logic based Commonsense Representation Framework for Modelling Inferences with Multiple Antecedents and Varying Likelihoods”. In: *arXiv 2022*. [[Tech. Report](#)].
- [9] Annamalai Narayanan, Mahinthan Chandramohan, Rajasekar Venkatesan, Lihui Chen, Yang Liu, and **Shantanu Jaiswal**. “graph2vec: Learning Distributed Representations of Graphs”. In: *Proceedings of the 13th International Workshop on Mining and Learning with Graphs (MLG) 2017*. [[Paper](#)] [[Code](#)].

## RESEARCH EXPERIENCE

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### Senior Research Engineer I – A\*STAR Center for Frontier AI Research

Jan 2019 – July 2024

*Advisors: Dr. Cheston Tan and Dr. Basura Fernando; Topic: Cognitively-inspired computer vision*

*Singapore*

- Investigated design of more effective architectural components and training approaches for scene understanding and reasoning tasks by taking inspiration from relevant cognitive phenomena (related papers: [1], [3], [4]).

- Contributed to design of probing techniques and benchmarking studies for vision-language models to systematically examine their reasoning capabilities and analyze potential multimodal biases (related papers: [2], [5], [7]).

**Undergraduate Research Assistant – NTU School of EEE** Sep 2016 – Aug 2017  
*Advisor: Dr. Lihui Chen; Topic: Deep learning for graph representation learning* Singapore

- Implemented deep learning approaches for graph representation learning and aspect-based sentiment analysis.
- Contributed to development of the *graph2vec* framework and evaluation of other graph learning approaches (incl. node2vec, deep graph kernels and Weisfeiler-Lehman graph kernels) on relevant benchmarks (related paper: [9]).

## SCHOLARSHIPS, AWARDS AND HONOURS

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President’s Research Scholar, Nanyang Technological University	<b>2017</b>
Ideasinc Collab4Good Seed Fund (declined), Nanyang Technopreneurship Center	<b>2016</b>
Most Innovative Prize, NTU Hackathon on Digital Economy and Services	<b>2016</b>
Ministry of Education (MOE) Tuition Grant (merit-based; international student category), Govt. of Singapore	<b>2014</b>
Scholarship for Higher Education (SHE-INSPIRE) for meritorious academic performance (top 1%ile overall; perfect marks in Math and Computer Science, Indian School Certificate Board Exams), Govt. of India	<b>2014</b>

## INDUSTRIAL EXPERIENCE

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**A\*STAR Social and Cognitive Computing Department** Aug 2018 – Dec 2022  
*Lead Engineer in “Commonsense Knowledge” group of K-EMERGE Programmatic Grant* Singapore

- Developed a commonsense knowledge representation framework and hierarchical conceptual ontology (using ProbLog) to encode probabilistic facts and inferential rules (related technical report: [8]).
- Co-designed a crowd-sourcing pipeline for knowledge collection and applied the framework for rule-based semantic parsing of aerospace documents within a larger industrial machine reading and question-answering system.

**Government of Singapore Investment Corporation (GIC Private Ltd.)** Jun 2017 – Aug 2017  
*Graduate Internship Program – Data and Analytics* Singapore

- Implemented forecasting models and bias-reduction strategies for real-estate investment trust (REIT) predictions.

**SAP Innovation Center Network (Leonardo Machine Learning)** Jan 2017 – May 2017  
*Developer Intern – Sales and Service Ticket Intelligence* Singapore

- Developed model deployment and evaluation framework for clients to analyze models in real-time.

## REFERENCES

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**Cheston Tan:** cheston-tan@i2r.a-star.edu.sg (*Senior Principal Scientist II, A\*STAR Center for Frontier AI Research*)  
**Basura Fernando:** fernando\_basura@cfar.a-star.edu.sg (*Principal Scientist II, A\*STAR Center for Frontier AI Research*)  
**Lihui Chen:** elhchen@ntu.edu.sg (*Associate Professor, NTU School of Electrical and Electronic Engineering*)  
**Kenneth Kwok:** kenkwok@ihpc.a-star.edu.sg (*Department Director, A\*STAR Social and Cognitive Computing*)

## SKILLS AND STANDARDIZED TESTS

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**Programming languages:** Python, Java, Matlab, Prolog, C  
**Select frameworks:** PyTorch, ProbLog, TensorFlow, Scikit-learn, CoreNLP, Networkx, Pandas, Git, MTurk  
**Languages:** English (native), Hindi  
**GRE (General):** 169Q, 165V, 4.5AW

## ORGANIZATIONS AND ACTIVITIES

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Reviewer for NeurIPS (Main and Datasets track) 2023, 2024; ICLR 2024; CVPR 2024; ICML 2024	-
Hall Soccer Team Member (trained towards professional soccer in 2nd university year), NTU	Aug 2015 – Dec 2017
Press and Publicity Director, NTU Astronomical Society	Aug 2015 – May 2016
High-school Computer Science Teacher, Shri Ram School Aravali	June 2014 - July 2014
Varsity Soccer (U-17 ASISC North West Regional 2011 winning team), Shri Ram School	Aug 2009 – July 2013
Indian team (3 members) at Pacific Astronomy Summit, Hawaii Space Grant Consortium	Jan 2013 – July 2013