

Shantanu Jaiswal

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EDUCATION

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)
- **Select Courses:** CE4041 (Machine Learning); CE4042 (Neural Networks); CE4034 (Information Retrieval); EE8087 (Living with Mathematics); CE1007 (Data Structures); CE2001 (Algorithms)

RESEARCH INTERESTS

Cognitively-inspired AI; Scene Understanding; Language Grounding; Semantic Development; Computational Neuroscience

PUBLICATIONS

Papers

- [1] **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) (Poster)*. 2022. [\[Paper\]](#) [\[Suppl.\]](#) [\[Code\]](#).
- [2] **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 \(Cogsci 2020\)\]](#).

Pre-prints and workshop papers

- [3] **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. [\[Preprint\]](#) [\[Code & data release pending agency approval\]](#).
- [4] 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

Research Engineer – A*STAR Artificial Intelligence Initiative

Nov 2018 – Present

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

Singapore

- Identifying relevant cognitive phenomena and their possible functions for scene understanding tasks, and accordingly proposing new computational blocks/operations and variations in training approaches.
- Past work: (i) Integration of top-down computation in CNN blocks for more contextually-guided feature selection across the model hierarchy; (ii) Analysis of a developmentally-inspired training approach wherein visual inputs are refined (in terms of resolution and colour) and base model is grown in parameters over discrete training stages.
- Ongoing work: (i) Using logic-representations for questions along with a recurrent visual attention method for more interpretable visual question answering (VQA) and description-based object counting; (ii) Adaptive feedback computation methods to make video QA models more efficient.

Research Engineer – Social and Cognitive Computing, A*STAR IHPC

Aug 2018 – Present

Advisors: Dr. Kenneth Kwok and Dr. Erik Cambria; Topic: Commonsense knowledge for NLU

Singapore

- Studying how to represent commonsense knowledge for machine-reading and language understanding tasks, and accordingly developing a knowledge-base that can be a more effective knowledge resource for language models.
- Designed a knowledge representation framework that – (i) utilizes a probabilistic logic representation scheme to model inferential knowledge with multiple antecedents and represent conceptual beliefs with varying likelihoods, and (ii) incorporates a hierarchical conceptual ontology to identify concept relevant relations and organize beliefs at different conceptual levels (thereby promoting re-use of knowledge through inheritance where applicable).

- Developed crowd-sourcing pipeline for knowledge collection, extended an existing knowledge-base with above stated representation framework (using ProbLog), and applied knowledge-base for rule-based semantic parsing and question answering on aerospace documents (this system is being utilized as part of a larger industrial project).

Undergraduate Research Assistant – NTU School of EEE

Sep 2016 – Aug 2017

Advisor: Dr. Lihui Chen; Topic: Deep learning for graph representation learning

Singapore

- Studied and implemented deep learning and traditional machine learning approaches for problems of graph representation learning and aspect-based sentiment analysis.
- Contributed to the development of the graph2vec framework and the evaluation of existing graph representation learning approaches (incl. node2vec, deep graph kernels and Weisfeiler-Lehman graph kernels) on benchmark graph classification and clustering tasks.
- Presented a survey on deep learning approaches for graph representation learning and aspect-based sentiment analysis at International Conference of Undergraduate Research 2017.

AWARDS AND HONOURS

President's Research Scholar, Nanyang Technological University	2017
Ideasinc Collab4Good Seed Fund (worth 10,000 SGD; declined), Nanyang Technopreneurship Center	2016
Most Innovative Prize, NTU Hackathon on Digital Economy and Services	2016
Ministry of Education (MOE) Tuition Grant Recipient, Govt. of Singapore	2014
Scholarship for Higher Education (SHE-INSPIRE) for meritorious academic performance, Govt. of India	2014

TECHNICAL REPORTS AND SELECT PROJECTS

Unsupervised domain adaptation of aspect-based sentiment analysis models Sep 2017 – Apr 2018

Final Year Project, NTU School of Computer Science and Engineering; Advisor: Dr. Sinno Pan Singapore

- Analysed impact of different word embedding methods and surveyed relevant transfer learning techniques for domain adaptation of deep learning models for aspect-based sentiment analysis.
- Developed an approach to model the semantic relevance of a word in a given sentence through sequence-to-sequence autoencoders and thereby obtain more contextualized and domain-agnostic word embeddings.
- Report link: <https://dr.ntu.edu.sg/handle/10356/74089>

Clothe application – Encouraging philanthropy through social media

Mar 2016 – Oct 2016

Lead of 3 member self-initiated project (Top-12 finalist for Ideasinc start-up accelerator) Singapore

- Designed application that enables social-media users to raise awareness and funds for charitable causes while obtaining referrals through promotion of purchases and activity at local clothing and food retailers.
- Collaborated with local retailers and events such as the Singapore Fashion Runway to pilot-test application and refined business strategy with industry mentors as part of a 9-month start-up accelerator program.

INDUSTRY EXPERIENCE

Government of Singapore Investment Corporation (GIC Private Ltd.)

Jun 2017 – Aug 2017

Graduate Internship Program – Data and Analytics

Singapore

- Adapted an expert-system time-series forecasting model to allow domain-experts to adjust relevant factors for real-estate investment trust (REIT) valuation predictions and reduce biases in REIT forecasting.
- Studied usage of “Deepdive” framework for extracting structured knowledge from stock analyst reports.
- Applied density-based anomaly detection techniques for quality checking of manually recorded stock metrics.

SAP Innovation Center Network (Leonardo Machine Learning)

Jan 2017 – May 2017

Developer Intern – Sales and Service Ticket Intelligence

Singapore

- Developed a model evaluation framework to allow clients to evaluate performance of deployed models on custom datasets and provide feedback to data scientists.
- Utilized OpenFace framework and implemented Siamese Neural Network models for face clustering.

SKILLS AND STANDARDIZED TESTS

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

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
Head of Media, NTU Model United Nations Organizing Committee	Aug 2014 – May 2015
Computer Science Teacher, Shri Ram School Aravali	June 2014 - July 2014