

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

Scene Understanding and Reasoning; Cognitively-Inspired AI; Visual attention and memory; Semantic Development

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 Center for Frontier AI Research

Jan 2019 – Present

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

Singapore

- Identifying relevant cognitive phenomena (and their 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) A developmentally-inspired training approach for faster training of CNNs wherein visual inputs are refined (in resolution and color) and base model is grown in parameters over discrete 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 – Dec 2022

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

Singapore

- 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.

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 (merit-based; international student category), Govt. of Singapore	2014
Scholarship for Higher Education (SHE-INSPIRE) for meritorious academic performance, Govt. of India	2014

REFERENCES

Kenneth Kwok: kenkwok@ihpc.a-star.edu.sg (*Department Director, A*STAR Social and Cognitive Computing*)
Cheston Tan: cheston-tan@i2r.a-star.edu.sg (*Senior Scientist III, A*STAR Center for Frontier AI Research*)
Basura Fernando: fernando_basura@cfar.a-star.edu.sg (*Senior Scientist I, A*STAR Center for Frontier AI Research*)
Erik Cambria: cambria@ntu.edu.sg (*Associate Professor, NTU School of Computer Science and Engineering*)

INDUSTRY EXPERIENCE

Government of Singapore Investment Corporation (GIC Private Ltd.)	Jun 2017 – Aug 2017
<i>Graduate Internship Program – Data and Analytics</i>	<i>Singapore</i>
<ul style="list-style-type: none">• 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
<i>Developer Intern – Sales and Service Ticket Intelligence</i>	<i>Singapore</i>
<ul style="list-style-type: none">• 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
Varsity Soccer (U-17 ASISC North West Regional 2011 winning team), Shri Ram School	Aug 2009 - July 2013