BRIAN FORMENTO

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Experience

Researcher 08/2019 – 08/2020
IDS, National University of Singapore, Singapore

Research in computer vision for medical imaging.
Built a front end WebUI (A medical software for hospitals and polyclinics in Singapore).
Developed a business insight tool to analyse the spending behaviour of 1.5M Singaporeans for **EzLink**.
Supervised by: Prof Wynne Hsu & Prof Mong Lee

Intern - Signal processing 07/2017 – 09/2017
Roke Manor Research, United Kingdom

Working with Matlab, C and Python, for the implementation of a researched SP algorithm.

Intern - Electronic engineer 07/2016 – 09/2016
L3 ASV, United Kingdom

Designed a PCB, reduced costs by 63% per item.

Projects

PhD Program 08/2020 – present
National University of Singapore, Singapore

Investigating robustness in deep learning and their limitations against adversarial samples and dataset shift.

Gait recognition meta-learner 01/2019 – 07/2019
National University of Singapore, Singapore

Used video data and one-shot learning with a recurrent convolutional neural network in a Siamese formation for gait recognition research.

Point cloud AI denoiser 07/2018 – 01/2019
Southampton University, United Kingdom

Using ML to remove aliasing and moiré from point cloud render videos.

Scenery recognition 07/2018 – 01/2019
Southampton University, United Kingdom

15 class scene recognition. Achieved 3rd highest accuracy in a class of 300 students.

Protein structure predictor 01/2018 – 07/2018
Southampton University, United Kingdom

Secondary protein structure prediction using an LSTM. Achieved close to state-of-the-art performance.

Education

PhD Candidate – Computer Science – GPA 4.63/5 08/2020 – present
National University of Singapore, Singapore

Received the Singapore International Student Award scholarship.
Supervised by: Prof See-Kiong Ng NUS, Dr. Chen Zhenghua and Dr.. Chuan Sheng Foo A*Star,

MEng (1st Class Hons) Electronic engineering with AI 09/2015 – 07/2019
Southampton University, United Kingdom

Key Modules: Computer Vision, Evolution of complexity, Advanced programming, Machine Learning, Computational Biology.

University's entrepreneurial activities

- Co-organised and co-run 5 speaker events and 2 workshops throughout the year 16/17.
- Scouted and fast-forwarded through an incubator 3 teams, one won £25k from 3 investors in 2017.
- Pitched a start-up together with two all-star students in 2016
- Pitched another start-up in 2016 and won £3k.

Skills

Computer science
NLP, Transformers, TextAttack, Numpy, Scikit-learn, Pandas, Keras, Pytorch, Matplotlib, Anaconda, Git, Docker, Linear algebra, Deep learning, Computer Vision, OpenCV, Machine learning, HTML, ReactJS, C, C++.

Languages
English & Italian Native

Hackathons

Attended 8, Finalist in 3.

F10 hackathon 15/09/2019
PWC headquarters, Singapore

Developed with a team an AI tool to aid corporate action decision making. It uses stock exchange data and random forest decision trees.

Yitu online hackathon 20/02/2019
Singapore

Object detection task on pedestrian/cars, my model achieved the 10th highest accuracy in the whole of Singapore, **won $300.**

Publications

1. **Brian Formento**, See-Kiong Ng, Chuan Sheng Foo. Special symbol attacks on NLP, IEEE International Joint Conference on Neural Networks, **Description:** An algorithm to discover and exploit special symbols in NLP frameworks such as BERT. (**IJCNN 2021 Oral**)
2. **Brian Formento**, Chuan Sheng Foo, Luu Anh Tuan, See-Kiong Ng. Using Punctuation as an Adversarial Attack on Deep Learning Based NLP Systems: An Empirical Study, European Chapter of the Association for Computational Linguistics. **Description:** A paper investigating the use of punctuation as an attack vector in deep learning NLP systems. (**EACL 2023 Findings**)
3. **(Current Project) Brian Formento,** Chuan Sheng Foo, Luu Anh Tuan, See-Kiong Ng. Optimal Transport Transformer for robust representation learning under adversarial attacks. **Description**: Applying optimal transport (SinkHorn) to BERT to match the key, query and values distributions for each head before doing self-attention between the model under normal inference and under adversarial inference.

Community Service

1. **Teaching Assistant (2023):** I spent a semester creating and marking assignments for the Text Mining CS5246 module.
2. **NUS MComp Application Reviewing (2022):** Reviewed 30 applications to the school of computer science for admission purposes.
3. **Mentoring Undergrads (2022):** Built a statistical data cleaning pipeline based on the ActiveClean model with four undergrad students. Video: http://y2u.be/A69TggS9r0k
4. **Supervising Undergrads (2022/2023):** I sourced and employed two undergrads under the institute of data science (IDS) at NUS, which I was supervising while they worked part-time. We were building a customer feedback classifier and summarizer for Changi Airport Group (CAG).
5. **Stack Overflow:** Reached over 100k people through my questions and answers with a reputation of ~720. https://stackoverflow.com/users/6423473/brian-formento