

Alvin Chan

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Education

Ph.D (Computer Science)

Nanyang Technological University, Singapore

Aug 2018 – Present

- Ph.D thesis: “Adversarial Robustness for Deep Learning”

B.Eng (Bioengineering)

Nanyang Technological University, Singapore

Aug 2009 – May 2013

- First Class Honors, cGPA: 4.94/5.00 (Dean's List AY 2009-2013)

Publications

What it Thinks is Important is Important: Robustness Transfers through Input Gradients

Alvin Chan, Yi Tay, Yew Soon Ong (arXiv:1912.05699)

Dec 2019

- Appeared in Conference on Computer Vision and Pattern Recognition (**CVPR 2020, Oral**)
- TL;DR: By regularizing for similar input gradients, we can transfer adversarial robustness from a teacher to a student classifier even with different training dataset and model architecture

Jacobian Adversarially Regularized Networks for Robustness

Alvin Chan, Yi Tay, Yew Soon Ong, Jie Fu (arXiv:1912.10185)

Sep 2019

- Appeared in International Conference on Learning Representations (**ICLR 2020**)
- TL;DR: We show that training classifiers to produce salient input Jacobian matrices with a GAN-like regularization can boost adversarial robustness

Poison Attacks against Text Datasets with Conditional Adversarially Regularized Autoencoder

Alvin Chan, Yi Tay, Yew Soon Ong, Aston Zhang (arXiv:2010.02684)

Oct 2020

- Appeared in Findings of Empirical Methods in Natural Language Processing 2020 (**EMNLP-Findings 2020**)
- TL;DR: We propose Conditional Adversarially Regularized Autoencoder to imbue poison signature and generate natural-looking poisoned text, to demonstrate models' vulnerability to backdoor poisoning.

Would you Rather? A New Benchmark for Learning Machine Alignment with Cultural Values and Social Preferences

Yi Tay, Donovan Ong, Jie Fu, Alvin Chan, Nancy Chen, Anh Tuan Luu, Christopher Pal

Jun 2020

- Appeared in Annual Meeting of the Association for Computational Linguistics (**ACL 2020**)
- TL;DR: We curate a dataset to evaluate models on natural language understanding of social, cultural, ethical, or moral situations

Deep learning for fabrication and maturation of 3D bioprinted tissues and organs

Wei Long Ng, Alvin Chan*, Yew Soon Ong, Chee Kai Chua*

May 2020

- Published in **Virtual and Physical Prototyping** Journal
- TL;DR: Perceptive paper on how deep learning can improve 3D bioprinting.

Ultrashort Peptide Nanofibrous Hydrogels for the Acceleration of Healing of Burn Wounds

Jun 2014

Loo Yihua, Wong Yong-Chiat, Cai Elijah Z, Ang Chuan-Han, Raju Ashvin, Lakshmanan Anupama, **Alvin Chan**, Zhou Hui J, Lim Thiam-Chye, Moochhala Shabbir

- Published in **Biomaterials** Journal
- TL;DR: We show that self-assembled ultrashort peptides form hydrogels that accelerate wound closure for burn wounds in animal models.

RNA Alternative Splicing Prediction with Discrete Compositional Energy Network

Alvin Chan, Anna Korsakova, Yew Soon Ong, Fernaldo R. Winnerdy, Kah Wai Lim, Anh Tuan Phan

- Under Review, manuscript available upon request
- TL;DR: We construct an RNA alternative splicing regression dataset (CAPD) and propose DCEN to predict splicing outcomes by modeling mRNA transcript probabilities through its constituent splice junctions' energy.

CoCon: A Self-Supervised Approach for Controlled Text Generation

Alvin Chan, Yew-Soon Ong, Bill Pung, Aston Zhang, Jie Fu (arXiv:2006.03535)

Jun 2020

- TL;DR: We propose a novel self-supervised approach to exert fine-grained control over text generations from LM-based models (e.g., GPT-2)

Poison as a Cure: Detecting & Neutralizing Variable-Sized Backdoor Attacks

Alvin Chan, Yew Soon Ong (arXiv:1911.08040)

Nov 2019

- TL;DR: We propose a comprehensive defense to detect and neutralize backdoor poisoning attacks of different sizes in neural networks

Awards

NISTH Ideas Challenge 2019

Mar 2019

- My team's multi-disciplinary research proposal "Living with AI: A Smart Nation's Ethical Framework" won the Commendation Award for the "AI for Humanity" idea challenge

Nanyang President's Graduate Scholarship

Aug 2018

- Fully funded research scholarship awarded to top PhD candidates in Singapore

The Change Agent

Nov 2012

- Won Best Team (S\$3,000) and Best Change Agent (S\$5,000) in a 2-month business case competition

SCBE Chair Award (Colors Award)

Oct 2012

- Recognized for academic excellence, contributions to school/society and leadership/organizational skills

Abbott Innovation University Challenge 2012

May 2012

- Led a team in this international competition (USA, UK, India & Singapore) and conceptualized a wearable Stroke-early detection device over a period of 5 months and was awarded 1st in Singapore, 3rd overall (US\$5,000)

A*STAR Pre-Graduate Scholarship

May 2010

- Awarded for excellent academic performance

Technical Skills

Deep Learning

- Pytorch, Tensorflow, Keras

Full-stack Web Development

- Ruby on Rails for Backend, Reactjs (Javascript) for Frontend, PostgreSQL, AWS for infrastructure
- Linux/Unix OS, Git version control

Programming Languages

- Python, Javascript, Ruby, HTML/CSS

Work Experience

Machine Learning Engineer

Cloak Apps, Singapore

Jan 2018 – Aug 2018

- Developed privacy-preserving platform for automatic histopathological image segmentation

Founder

Hordespot, Singapore

Dec 2016 – Aug 2018

- Conceptualized and developed hordespot.com, an event aggregation platform

Product Specialist

Medtronic, Singapore

May 2016 – Dec 2016

- Convinced medical Key-Opinion Leaders of neuro-interventional devices

Specialist Medical Representative

Servier Laboratories, Singapore

Sep 2014 – Apr 2016

- Convinced medical Key-Opinion Leaders of pharmaceutical products

Overseas Sales Manager

Le Forme Furniture, China

Feb 2014 – Sep 2014

- Short-term position to kick-start a relative's business in the export market

Operations Professional Development Program (QA)

Abbott Manufacturing Singapore, Singapore

Jul 2013 – Feb 2014

- Conducted investigation in Quality issues & led improvement projects in the plant

Technology Transfer Intern

*Exploit Technologies Pte Ltd (A*STAR), Singapore*

Jun 2012 – Aug 2012

- Evaluated the commercialization of 4 new A*STAR biomedical technologies through interviews with scientists and market research

Research Intern

*Institute of Bioengineering and Nanotechnology (A*STAR), Singapore*

Jan 2012 – Jun 2012

- Carried out presentations and experiments on a hydrogel-based biomaterial

Temp Staff

Half Moon Enterprises, NH, USA

May 2010 – Aug 2010

- Worked with customers and colleagues in USA's service industry

Teaching

Computational Thinking (RE1016)

Nanyang Technological University, Singapore

Jan 2019 – May 2019, Jan 2020 – May 2020

Invited Talks

Controlled Text Generation

DSO National Laboratories

Aug 2020

AI: Why It Matters and What is It?

Technical University of Munich (TUM Asia)

Jul 2020

Jacobian Adversarially Regularized Networks for Robustness

DSO National Laboratories

Mar 2020

Get Started on Deep Learning

Python meetup @ Zendesk

May 2019

Deep Learning Jumpstart

Nanyang Technological University, Singapore

Feb 2019

TensorFlow.js: Machine Learning in the Browser

talk.js meetup @ Singapore Power

Jun 2018

Academic Services

NeurIPS

Program Committee

2020

EMNLP

Program Committee

2020

ICLR

Program Committee

2021

AAAI

Program Committee

2021

List of References

Prof Ong Yew Soon

Nanyang Technological University, Ph.D Supervisor

asysong@ntu.edu.sg

Dr Hwee Kuan Lee

*Bioinformatics Institute (A*Star), Head of Division, Previous supervisor*

leehk@bii.a-star.edu.sg

Dr Yi Tay

Google AI, Collaborator

ytay017@gmail.com

Prof Phan Anh Tuan

Nanyang Technological University, Collaborator

phantuan@ntu.edu.sg