ARJUN ASHOK RAO

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RESEARCH INTERESTS

DNN Robustness, Adversarial Examples, Generalization and Theory

EDUCATION

The Chinese University of Hong Kong (CUHK) Expected Graduation: 07/2022
Bachelor of Engineering in Financial Technology
Minor in Computer Science
GPA: 3.5 — Latest Term: 3.82
Selected Coursework: Stochastic Models, Optimization Methods, Discrete Mathematics, Data Structures, Investment Science, Linear Algebra and Vector Calculus

PUBLICATIONS

Conference Papers

- Qi Sun, **Arjun Ashok Rao**, Xufeng Yao, Bei Yu, Shiyan Hu.
  "Counteracting Adversarial Attacks in Autonomous Driving"
  IEEE/ACM International Conference on Computer-Aided Design (**ICCAD**), Westminster, CO, Nov. 2–5, 2020. (Invited Paper)

RESEARCH EXPERIENCE

The Chinese University of Hong Kong May 2020 – Present
Undergraduate Researcher – Professor Bei Yu's Group

- Studied the effect of adversarial perturbations (PGD, FGSM) on stereo-based object detection in autonomous systems. Adversarial examples compromise stereo disparity perception and cause large and inaccurate region proposals on background elements.
- Our stereo-adversarial training algorithm *SmoothStereo* improves model robustness by regularizing left-right stereo pair regression feature maps $f_l(x_l)$ and $f_r(x_r)$.
- *SmoothStereo* exhibits greater adversarial robustness within a moderate perturbation set $\delta \in \Delta_\epsilon$ with comparatively lesser gradient obfuscation and beats standard adversarial training for stereo-image based 3D object detection in autonomous driving.

WORK EXPERIENCE

LSCM R&D Centre June 2019 – August 2019
Summer Intern, Financial Technology R&D Dept Cyberport, Hong Kong

- Built an attention-transformer model for Chinese to English legal document translation
- Our machine translation model demonstrated significant BLEU score improvements and captured essential context in legal documents.

Asiabots Limited April 2020 – June 2020
Summer Intern, Asiabots Voice AI Hong Kong Science and Technology Park, Hong Kong

- Developed a semi-supervised Ladder-VAE based TTS Model For emotion and speech generation
- Improved model understanding by developing algorithms to sample latent space of VAEs and generate speech prosody changes with alteration in high-dimensional latent variables.

ACADEMIC AWARDS & ACHIEVEMENTS

- CUHK Admission Scholarship (2018 – Present) Awarded for Outstanding Academic Performance
- Faculty of Engineering Admission Scholarship, CUHK (2018 – Present)
- CUHK Outstanding Student Award for community service at the International Student Association ISA-CUHK
- Dean's List (2019-20): Awarded for year GPA = 3.8, top 10% of cohort
- Microsoft Learn Student Ambassador: Selected to the Microsoft Developer network for excellent research and project experience

EXTRACURRICULARS, OUTREACH

- International Student Association at CUHK - Information Technology Officer (Feb 2019 - Feb 2020)
- Treasury Officer, Hong Kong Institute of Engineers
- Finalist - Cyberport University Partnership Program (CUPP) For Flux - A Reinforcement Learning based Financial Planner
- Volunteer Educator, Sri Ramana Maharishi School for the Blind - Spent two years as a volunteer part-time computer science instructor for visually disabled students in Bangalore, India. Helped teach concepts in data structures, algorithms, and basic computing.