

Liam Dugan

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EDUCATION

UNIVERSITY OF PENNSYLVANIA	Philadelphia, PA
Ph.D, Computer Science <i>Advisor: Dr. Chris Callison-Burch</i>	<i>Aug. 2021 (Incoming)</i>
M.S.E, Robotics (GPA: 3.80/4.00)	<i>Aug. 2017 – Dec. 2020</i>
B.S.E, Computer Engineering & East Asian Studies (GPA: 3.63/4.00)	<i>Aug. 2015 – Aug. 2020</i>
DOSHISHA UNIVERSITY 同志社大学	Kyoto, Japan
Kyoto Consortium of Japanese Studies (GPA: 3.70/4.00)	<i>Jun. 2017 – Aug. 2017</i>

PUBLICATIONS

Liam Dugan. Learning Formality from Japanese-English Parallel Corpora. Master's thesis, University of Pennsylvania, December 2020

Liam Dugan*, Daphne Ippolito*, Arun Kirubakaran*, and Chris Callison-Burch. RoFT: A Tool for Evaluating Human Detection of Machine-Generated Text. In *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing: System Demonstrations*, pages 189–196, Online, October 2020. Association for Computational Linguistics

Zhengyi Luo, Austin Small, **Liam Dugan** and Stephen Lane. Cloud Chaser: Real Time Deep Learning Computer Vision on Low Computing Power Devices. *Eleventh International Conference on Machine Vision (ICMV 2018)*, Mar 2019

RESEARCH EXPERIENCE

John's Hopkins University Baltimore, MD
Visiting Research Scholar
Jun. 2021 (Incoming)

- Will be joining the Machine Translation team at HLTCOE for SCALE 2021.

University of Pennsylvania Philadelphia, PA
Graduate Research Assistant
Jun. 2019 – Present

- Leading the Real or Fake Text project <http://roft.io> which measures how well humans can detect generated text.
- Extensive experience with natural language generation systems such as GPT-2, GPT-3, CTRL, GROVER, and T5
- Used BERT classifiers and Adversarial Decomposition to predict English formality by training on Japanese
- Worked on the BETTER project using Machine Translation for Arabic-English cross-lingual event extraction

WORK EXPERIENCE

NVIDIA Corporation Santa Clara, CA
Autonomous Driving Software Intern
Jun. 2019 – Aug. 2019

- Assisted development of a platform for on-demand downloads of self-driving car software
- Custom docker images are requested by engineers through a Jenkins server and images come pre-installed with latest software and can then be flashed onto vehicle hardware
- Service was deployed to over 500 developers on the NVIDIA DRIVE Team

Robotic Research LLC Clarksburg, MD
Software Engineering Intern
Jun. 2018 – Aug. 2018

- Worked on Velodyne VLP-16 LIDAR at the driver level for Autonomous Ground Resupply convoys
- Developed and prototyped novel object classifiers for sun speckles, dust, and vegetation
- Used a PCA-based volumetric analysis to tag neighboring points in a point cloud as possible vegetation or humans

TECHNICAL SKILLS

Natural Languages: English (native), Japanese (advanced - 5+ years)

Programming Languages: Python, C/C++, bash, CUDA, Java, JavaScript, Go, HTML/CSS, Verilog, MATLAB

Frameworks: PyTorch, Tensorflow, OpenCV, DXR, Vulkan, OpenGL, WebGL, React, Node, Gatsby, Django

Developer Tools: Git, Docker, Google Cloud Platform, VS Code, emacs, Atom, tmux

TEACHING EXPERIENCE

Teaching Assistant

- CIS530 (Computational Linguistics) – Spring 2020, Fall 2020
- CIS380 (Operating Systems) – Fall 2018, Spring 2019, Fall 2019 (Head TA)
- CIS240 (Introduction to Computer Systems) – Spring 2017, Fall 2018, Spring 2018

Lectures

- CIS380: “Linux Page Replacement Algorithms and Belady’s Anomaly” – Fall 2019

Homework Assignments

- CIS530: “HW7: Transformers and State-of-the-Art Language Models” – Nov. 2020
- CIS530: “HW10: Neural Machine Translation” – Apr. 2020

FELLOWSHIPS, AWARDS AND HONORS

Fellowships

- (October 2018) FLAS: Foreign Language and Area Studies Undergraduate Fellowship (East Asia) – \$15,000

Certifications

- (May 2020) Penn Certificate of Japanese Proficiency
- (January 2018) Japanese Language Proficiency Test: N2

Academic Honors

- (2016-2017; 2017-2018) Dean’s List x2

Academic Awards

- (May 2020) Penn Engineering Exceptional Service Award
- (May 2020) Moore School Council Cwikla Award (Nominated)
- (May 2019) Penn Engineering Computer Science Senior Design Award Third Prize

Hackathon Awards

- (February 2018) Most Innovative Use of Technology: WUFT Hacks
- (January 2018) Grand Prize: PennApps XVII
- (January 2018) Best use of Cloud Hosting: PennApps XVII
- (September 2017) Third Prize: PennApps XVI

PRESENTATIONS, POSTERS AND TALKS

Posters

- “RoFT: A Tool for Evaluating Human Detection of Machine Generated Text” - Poster Presentation EMNLP 2020

Presentations

- “Learning Formality from Japanese-English Parallel Corpora” - Live Presentation, Master’s Thesis ([video](#))
- “Scene++ VR” - Live Presentation, Penn Engineering Senior Design Demo Day ([video](#))
- “Cloud Chaser” - Live Presentation, PennApps XVII Closing Ceremony ([video](#))
- “Todd: The Inter-Dimensional Robot” - Live Presentation, PennApps XVI Closing Ceremony ([video](#))

PROJECTS

SCENE++ VR | *Oculus Rift, ZED Mini, Unity 3D, Python, YOLOv3, Paperspace*

May 2019

- **Won 3rd Prize in Penn Computer Science Senior Design Competition**
- Hardware: Oculus Rift headset with head-mounted ZED mini depth camera for pass-through Augmented Reality
- We introduce a cloud-based Unity API that allows VR Developers to query for objects around the user
- We use Spatial Feature Mapping of environment to allow localization and stabilization of queried objects in depth
- Use of cloud server allows Scene++ to run on any platform with *virtually no drop in FPS*

RTX EXPLORE | *C++, DirectX Raytracing, NVIDIA TitanV*

December 2018

- Built the first open-source path tracer in the DirectX Raytracing GPU framework (**40+ stars on GitHub**)
- Features include: Dynamic model loading from .glTF and .obj, support for texture and normal maps, live editing of scene transformations through GUI interface, specular/refractive/dispersive/transmissive materials, subsurface scattering, anti-aliasing, depth of field

- **Won Most Innovative use of Technology at WUFT Hacks**

- Use facial key-point mapping algorithm to perform face recognition through front facing webcam
- Faces are used to access database of customer information to save bank tellers having to pull up user information

CLOUD CHASER | *Python, C, TCP, AWS, YOLOv3, Alexa, Raspberry Pi, 3D Printing*

January 2018

- **Won Grand Prize and Best use of Cloud Hosting at PennApps XVII**

- Hardware: Raspberry Pi + camera, 3D printed robot chassis & camera mount, 4 servo motors, Amazon Echo Dot
- Presented a platform that allows low resource IoT devices to do high level image processing on the cloud
- Built robot “Chase” to demonstrate our platform. Commands are given to Chase through Echo Dot
- Paper outlining our techniques to reduce latency of image streaming accepted to ICMV 2018

TODD: THE INTER-DIMENSIONAL ROBOT | *C, HC-05 Bluetooth, Arduino, Unity 3D*

September 2017

- **Won Third Prize at PennApps XVI**

- Hardware: Arduino, breadboard, 2 servo motors, Bluetooth HC-05 controller
- USB connected Bluetooth controller allows Unity to communicate with “Todd” the robot
- Made multiplayer game where player controlling Todd has to dodge objects only visible in virtual world

FIX YOURSELF | *C, Photon Microcontroller, Node.js, Heroku, Vibration Motor, Accelerometer*

May 2017

- Introduced a low-power posture tracker device that attaches to a user’s back and vibrates when posture is off
- Posture data is transmitted to a web server via WiFi so that users can track their posture over time
- This idea would later be taken separately to market by startups such as Upright and Lumo Lift

DOKUSHA | *Javascript, React, Express, Mongoose, Node.js*

April 2017

- Dokusha is a full-stack web app that allows users to find appropriate reading material when studying languages
- Users read books through the site interface and vocabulary profiles are made based off read material.
- Once vocabulary profiles are made, books can be sorted by highest percentage of known words

REFERENCES

Chris Callison-Burch, Associate Professor
Natural Language Processing
ccb@cis.upenn.edu

Boon Thau Loo, RCA Professor of Computer Science
Director - UPenn Distributed Systems Lab
boonloo@seas.upenn.edu