Liam Dugan

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EDUCATION

UNIVERSITY OF PENNSYLVANIA — Philadelphia, PA
M.S.E, Robotics (GPA: 3.80/4.00) — *Aug. 2017 – Dec. 2020*
Master's Thesis: Learning Formality from Japanese-English Parallel Corpora

UNIVERSITY OF PENNSYLVANIA — Philadelphia, PA
B.S.E, Computer Engineering & East Asian Studies (GPA: 3.63/4.00) — *Aug. 2015 – Aug. 2020*

DOSHISHA UNIVERSITY — Kyoto, Japan
Kyoto Consortium of Japanese Studies (GPA: 3.70/4.00) — *Jun. 2017 – Aug. 2017*

RESEARCH EXPERIENCE

Graduate Research Assistant — Jan. 2019 – Present
University of Pennsylvania — *Philadelphia, PA*

- Worked under Dr. Chris Callison-Burch in the NLP group at Penn:
- Developed a method for semi-supervised formality estimation using Japanese-English parallel corpora
- Developed a Web-Based annotation tool for evaluating the human detection of generated text
- Wrote a tool to project entities across machine translated articles for Arabic-English cross-lingual event extraction

PUBLICATIONS

Referred Conference Papers

1. Liam Dugan, Daphne Ippolito, Arun Kirubarajan, 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

2. 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

In Submission

1. Liam Dugan and Chris Callison-Burch. Predicting english formality with japanese honorifics. In *Proceedings of the 2021 Annual Conference of the North American Chapter of the Association for Computational Linguistics*, Online, February 2021. Association for Computational Linguistics

Other

1. Liam Dugan. Learning formality from japanese-english parallel corpora. Master's thesis, University of Pennsylvania, December 2020

WORK EXPERIENCE

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

- 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

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

Teaching Experience

Teaching Assistant
- CIS530: Computational Linguistics – Fall 2020
- CIS530: Computational Linguistics – Spring 2020
- CIS380: Operating Systems **Head TA** – Fall 2019
- CIS548: Operating Systems Design and Implementation – Spring 2019
- CIS380: Operating Systems – Fall 2018
- CIS240: Introduction to Computer Systems – Spring 2018
- CIS240: Introduction to Computer Systems – Fall 2018
- CIS240: Introduction to Computer Systems – Spring 2017

Lectures
- CIS380: Operating Systems "Linux Page Replacement Algorithms and Belady's Anomaly" – Fall 2019

Homework Assignments
- CIS530: Computational Linguistics "HW7: Transformers and State-of-the-Art Language Models" – Nov. 2020
- CIS530: Computational Linguistics "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
- (2017-2018) Dean's List
- (2016-2017) Dean's List

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

Banking with a Vision | *Python, Javascript, TCP, Bootstrap*   February 2018
- **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

Technical Skills

Languages: English (native), Japanese (advanced - 5+ years), Spanish (elementary - 2 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

References

Boon Thau Loo, RCA Professor of Computer Science
Director - UPenn Distributed Systems Lab
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Chris Callison-Burch, Associate Professor
Natural Language Processing
ccb@cis.upenn.edu