Isabelle Lee

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Education

MS, Computer Science	**University of Washington, 2020-2021**
MS, Aeronautics and Astronautics (Fellow)	**University of Washington, 2017**
BS, Physics (Honors) and Applied Mathematics	**College of William and Mary, 2014**

Research Interest

Natural Language Processing, Deep Learning, Computational Linguistics, Active Learning

Professional Experience

Research Scientist II at Alexa AI/Communications   2018 -
Amazon

- Reseraching and developing algorithms to reduce error from frictional and low resource utterance through active learning aided training of NER and Intent Classification model. Based on frictional metrics, determine ambiguous utterances and generate samples with transformers and seq2seq models to be added to the training. Additionally, developing annotation correction scheme for data accuracy and augmentation.

- Researched how to formulate perspectives in spoken utterances/chat messages (Point-of-Views, POV) and how to convert the POV in terms of the virtual assistant for a more natural sounding message delivery. Explored both functional linguistic rule based approaches and deep learning based machine translation models. Experiments and prototypes done in PyTorch and Java. Patent filed, publication accepted at Findings of EMNLP 2020. Productionalization in progress for 2021 and beyond.

- Delivering machine learning software products by designing deterministic and statistical methods. Recent projects include music and photo sharing, group calling with Alexa, announcements in households, and "drop in" on Alexa.

Code-switching Dialog Generation Project   2020 -
with Debanjan Mahata at BloombergLP, Anish Acharya at UT Austin

- Hindi-English (Hinglish) Code Switching Dataset "GupShup": as initial phase, created a large dataset, explored benchmarking models and metrics for Hinglish conversations and corresponding English summaries. NAACL publication in progress.

- Dialog generation: currently scoping methods to generate Hinglish conversations using GupShup dataset.

Data Scientist Intern   2017 - 2018
CityBldr

- Built legal zoning code processing framework through webscraping using Requests, Selenium, and BeaufitulSoup and extracted zoning data using topic modeling with LDA and other NLP techniques.

- Maintained geographical and real estate database with SQL and QGIS aided webscraping.

Graduate Researcher in Computational Fluid Physics and Turbulence   2016 - 2017
University of Washington, Aeronautics and Astronautics

- Used computational methods for Particle Tracking Velocimetry turbulence applications, primarily with Matlab statistical and optimization toolboxes. Generated randomized particle motion datasets and developed mechanisms to filter, statistically fit (regression, spline smoothing, global search, constrained fits with convex optimization).

Undergraduate Researcher in Plasma Physics   2011 - 2014
College of William and Mary

- Analyzed tokamak camera image data for Culham Centre for Fusion Energy (Culham, Oxford).

- Found boundary patterns of plasma instability by extracting signal data from noise with visualization using fourier filtering algorithms and gradient descent method with Matlab, C++, and Python. Conference publication and presentation at American Physical Society.

Undergraduate Researcher in Atomic Physics   2010 - 2014
College of William and Mary

- Computationally modeled Feshbach Resonances in ultracold atoms with Matlab and Python. Honors thesis complete with conference publication and presentation at American Physical Society.

PUBLICATIONS

[1] **Lee, Isabelle G.**, Vera Zu, S. Buddi, D. Liang and Jack G. M. FitzGerald. Converting the Point of View of Messages Spoken to Virtual Assistants. Findings of EMNLP (2020). *Presented at CODI 2020*

[2] C. Nagaraju, C. Kuzma, **I. G. Lee**, J. FitzGerald, D. Liang, and V. Zu. (2018). Point of View Conversion Model for Messages Spoken to Voice Assistants. US patent No. 83358766. Seattle, WA: U.S. Patent and Trademark Office (status: filed)

[3] **Lee, G.** (2013). Feshbach Resonances in Ultracold Atoms.

[4] **Lee, I.**, Mordijck, S., Kirk, A., Harrison, J., WM Team, & CCFE Team. (2013). Minimal ad-hoc screening coefficient from RMP x-point lobe-structures in MAST. APS, 2013, JP8-030.

HONORS AND AWARDS

Awarded, Alexa Communication hackathon "Most Customer Obsessed" project. (2019)
Awarded, University of Washington Theodore and Marie Sarchin Endowed Fellowship. (2014-15)
Awarded, SUNY Stony Brook's travel grant. (2013)
Awarded, the College of William and Mary's student leadership travel grant. (2013)

LANGUAGES

Native - English, Korean
Intermediate - Spanish, German