YUSHI HU

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EDUCATION

University of Washington — Seattle, WA
Ph.D. candidate, Electrical & Computer Engineering Department — 2021 – Present
Advisor: Prof. Mari Ostendorf (UW NLP group)
Research interests: Natural Language Processing, Speech Processing, Machine Learning

University of Chicago — Chicago, IL
B.S. in Computer Science, Mathematics, B.A. in Economics — 2017 – 2021
summa cum laude, Phi Beta Kappa

PREPRINT & PUBLICATIONS

1. **Yushi Hu,** Chia-Hsuan Lee, Tianbao Xie, Tao Yu, Noah A, Smith, Mari Ostendorf. 2022. In-Context Learning for Dialogue State Tracking. *Preprint 2022.*
2. **Yushi Hu,** Shane Settle, and Karen Livescu. 2021. Acoustic Span Embeddings for Multilingual Query-by-Example Search. In *IEEE Spoken Language Technology Workshop (SLT 2021).*
3. **Yushi Hu,** Shane Settle, and Karen Livescu. 2020. Multilingual Jointly Trained Acoustic and Written Word Embeddings. In *Proc. of Interspeech 2020*.
4. S. R. Bakaul, S. Prokhorenko, Q. Zhang, Y. Nahas, **Y. Hu**, A. K. Petford-Long, L. Bellaiche, N. Valanoor. 2021. Freestanding Ferroelectric Bubble Domains. In *Advanced Materials.*
5. **Yushi Hu,** Tianye Wang, Yefeng Mei, Zhao Zhang and Chuangang Ning. 2016. A simple setup to measure muon lifetime and electron energy spectrum of muon decay and its Monte Carlo simulation. In *物理与工程, 2016.05*

RESEARCH EXPERIENCE

University of Washington — Seattle, WA
Graduate Research Assistant, UW NLP group — Sep 2021 – Present
Advisor: Prof. Mari Ostendorf

- **In-Context Learning for Dialogue State Tracking:** First to successfully apply in-context learning for DST, achieving state-of-the-art in low-resource scenario.

Toyota Technological Institute at Chicago — Chicago, IL
Research Assistant, Speech and Language group — Sep 2019 – Present
Advisor: Prof. Karen Livescu

- **Multilingual Jointly Trained Acoustic and Written Word Embeddings [Interspeech 2020]:** Propose and implement a method to jointly train acoustic and written word neural embedding models using phonetically transcribed data from multiple languages.
- **Acoustic Span Embeddings for Multilingual Query-by-Example Search [IEEE SLT 2021]:** Generalize multilingual acoustic word embeddings to acoustic span embeddings (ASE) and apply ASE to Query-by-Example task on unseen languages. Outperforms the best prior results while being 100x faster.

Argonne National Laboratory — Lemont, IL
Research Intern, Materials Science Division — July 2018 – Aug 2018
Advisor: Dr. Saidur R. Bakaul

- Modeled and simulated electromagnetic field in ferroelectric materials via MATLAB and Python. The simulation successfully explained the observed phenomena in ferroelectric-dielectric-ferroelectric heterostructure. Results published on top journal in materials science. [Advanced Materials]

Tsinghua University — Beijing, China
Research Assistant, Department of Physics — Mar 2015 – Feb 2017
Advisor: Prof. Chuangang Ning

- Introduced a way to measure the muon decay events via self-designed coincidental circuits, digital oscilloscope, and self-designed visual real-time control software. This resulted in $100k savings compared to expensive nuclear physics modules. Constructed simulation of muons via C++ library GEANT4 by CERN.

INDUSTRY EXPERIENCE

Learnable.ai Boston, MA
Machine Learning Engineer Intern Jun 2019 – Sep 2019

- Devised and implemented a new method for de-warping cell-shot document images based on single-view 3D-reconstruction and conformal mapping. Improved OCR performance in products.
- Designed and implemented models to automatically grade students' answers (in LaTeX). Devised a BERT-based system and a rule-based pattern matching system. Achieved 80% accuracy on real data. Proposed a semantic parsing-based system to further improve the performance.

Open-Sourced Projects

Embedding-based query-by-example search
Implementation of the paper *Acoustic Span Embeddings for Multilingual Query-by-Example search* (Hu et al., 2021)
https://github.com/Yushi-Hu/Query-by-Example

Multilingual acoustic word embeddings (developed with Shane Settle)
Implementation of the paper *Multilingual Jointly Trained Acoustic and Word Embeddings* (Hu et al., 2020)
https://github.com/Yushi-Hu/Multilingual-AWE

Awards & Honors

University of Washington Top Scholar Recruitment Award	2021
University of Washington ECE PhD Fellowship	2021
summa cum laude, University of Chicago	2021
Gary Becker Scholar, University of Chicago	2020-2021
ACM-ICPC Mid-Central Regional Finalist	2019
1st Prize, 33rd Chinese Physics Olympiad	2016
2nd Place, China Team Captain, 29th International Young Physicists' Tournament	2016

Skills

Programming Languages (proficient): Python, C/C++, MATLAB, bash
Programming Languages (capable): Java, JavaScript, Node.js
Frameworks and tools: PyTorch, TensorFlow, HuggingFace, OpenCV, NLTK, Spark
Database Management: SQL, Pandas
Natural Languages: Mandarin (native), English (fluent)