

# Zetian (Neal) Wu

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## EDUCATION

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### Oregon State University

*PhD in CS & AI (Dual-major with OSP Fellowship), Advisor: Prof. Liang Huang*

Corvallis, OR, USA

*Sept. 2022 –*

### Johns Hopkins University

*MSE in Data Science*

Baltimore, MD, USA

*Jan. 2020 – Dec. 2021*

### Zhejiang University

*BS in Physics | Minor in Finance*

Hangzhou, China

*Sept. 2015 – Jun. 2019*

## RESEARCH EXPERIENCE

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### Research Assistant

*with Prof. João Sedoc, Prof. Lyle Ungar*

Jun. 2020 – Apr. 2022

*NYU/UPenn, USA*

#### Investigation in Explainability Method for Lexicon creation

- **Problem:** Trying to understand how deep network models take advantage of language data and how we are supposed to interpret models so that they can aid us in explaining the world.
- **Techniques:** Used diverse methods to compute scores for all the words in each sentence, i.e. creation at the instance level, and evaluated the results from the human interpretation side. Trying to find out the reason why unexpected results came to birth, and to implement better methods based on current algorithms and observations.

#### Inducing Generalizable and Interpretable Lexica [1]

- **Problem:** Compared the quality of lexica generated from different model-method pairs and made conclusions concerning explainability features of different models and methods accordingly.
- **Techniques:** Built FFN, SVM, RoBERTa, DistilBERT models and implemented lexicon generation methods including single token importance, masking, and Partition Shap to create lexicon. Evaluated lexica in terms of generalization ability and human annotation.
- **Results:** Context-sensitive models generalized better to different datasets in similar domains while lexica created from them on the contrary performed worse compared to that created from context-oblivious models.

### Research Assistant

*with Prof. Louis-Philippe Morency*

Mar. 2021 – Sep. 2021

*CMU, USA*

#### MultiBench: Multiscale Benchmarks for Multimodal Representation Learning [2]

- **Problem:** Built a benchmark for multimodal fusion models and datasets.
- **Techniques:** Implemented several multimodal fusion methods including early/late fusion, LRTF, Mutual Information Matrix, CCA, RefNet, MFM, and RMFE. Built a universal codebase to train and evaluate each model under different datasets according to metrics and robustness.

### Research Assistant

*Center for Language and Speech Processing, with Prof. Benjamin Van Durme*

Apr. 2020 – Jan. 2021

*JHU, USA*

#### Span Identification and Representation for Information Extraction

- **Problem:** Formulated entity mention detection problem under partially annotated datasets.
- **Techniques:** Built an LSTM-based model to detect spans by conditioning on given spans. Introduced a ranking loss to rank gold spans higher while not fully ablating unlabelled spans. Took the SpanBERT-based coreference model as span proposal model to detect entity mentions.
- **Results:** Achieved recall above 0.9 and F1 score above 0.8 when conducting few-shot finetuning.

### Research Assistant

*Intelligent Computing & System Lab, with Prof. Qinming He*

Apr. 2018 – Aug. 2019

*ZJU, China*

#### Anti-fraud Model for New Financial Leasing Services

*(Top Prize in China Collegiate Computing Contest-AI Innovation Contest)*

- **Problem:** Built an anti-fraud model for online financial leasing services.
- **Techniques:** Constructed two kinds of features: statistical features from Bipartite Graph and the node representations from Unipartite Graph using DeepWalk. Implemented DeepFM as the supervised learning model.
- **Results:** Increased AUC by 6% compared to the best baseline (GBDT Tree with Logistic Regression).

## Interactive Rare-Category-of-Interest Mining from Large Datasets [3]

- **Problem:** Built a model for rare category detection which supported real-time interactions according to categories' interestingness to users.
- **Techniques:** Implemented a Rare Category Detection (RCD) model using a combined method of offline phase inference and high-level knowledge abstractions, reducing the time complexity of query answering from quadratic to logarithmic. Built a Rare Category Exploration (RCE) model using a collaborative-reconstruction approach.
- **Results:** Obtained at least 11.75% improvement in accuracy compared with baseline algorithms including kNN, Interleave, NNDM, Clover, and FRANK.

## WORK EXPERIENCE

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### Applied Scientist Intern

May. 2022 – Aug. 2022

Amazon

Seattle, WA, USA

- Fine-grained Multi-lingual Disentangled Autoencoder for Language-agnostic Representation Learning [4]

### Machine Learning Engineer

Aug. 2019 – Mar. 2020

Hangzhou Enjoymusic Technology Co. Ltd.

Hangzhou, China

- Built a sequence-to-sequence model for music style transferring using TransformerXL and Discriminator.
- Formulated automatic music piece generation problem as a conditional sequence generation task that decodes MIDI sequence from drum beats, and modelled with VAE architecture.
- Refactored Typescript Midi-me codes using Python for integration with our own platform and application.

## PUBLICATIONS

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- [1] \*Yilin Geng, \*Zetian Wu, Roshan Santhosh, Tejas Srivastava, Lyle Ungar, and João Sedoc. Inducing generalizable and interpretable lexica. In *Findings of the Association for Computational Linguistics: EMNLP 2022*, pages 4430–4448, Abu Dhabi, United Arab Emirates, December 2022. Association for Computational Linguistics.
- [2] Paul Pu Liang, Yiwei Lyu, Xiang Fan, Zetian Wu, Yun Cheng, Jason Wu, Leslie Yufan Chen, Peter Wu, Michelle A Lee, Yuke Zhu, Russ Salakhutdinov, and Louis-Philippe Morency. Multibench: Multiscale benchmarks for multimodal representation learning. In *Thirty-fifth Conference on Neural Information Processing Systems Datasets and Benchmarks Track (Round 1)*, 2021.
- [3] Zhenguang Liu, Sihao Hu, Yifang Yin, Jianhai Chen, Kevin Chiew, Luming Zhang, and Zetian Wu. Interactive rare-category-of-interest mining from large datasets. *Proceedings of the AAAI Conference on Artificial Intelligence*, 34(04):4965–4972, Apr. 2020.
- [4] Zetian Wu, Zhongkai Sun, Zhengyang Zhao, Sixing Lu, Chengyuan Ma, and Chenlei Guo. Fine-grained multi-lingual disentangled autoencoder for language-agnostic representation learning. In *Proceedings of the Massively Multilingual Natural Language Understanding Workshop (MMNLU-22)*, pages 12–24, Abu Dhabi, United Arab Emirates (Hybrid), December 2022. Association for Computational Linguistics.

## SKILLS AND ADDITIONAL INFORMATION

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**Programming/Framework:** Python, PyTorch, TensorFlow, AllenNLP, Linux, C/C++, MATLAB, R, SQL

**Awards:** Top Prize in China Collegiate Computing Contest-AI Innovation Contest, Honorable Award in COMAP

**Honors:** Outstanding Scholar Program (OSU), 2nd Level in Training Plan of the National Basic Subject Top-notch Talent Scholarship (ZJU)