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Alon Albalak

About Me

I am a Ph.D candidate in the Computer Science Department at the University of California, Santa Barbara, and a member of the NLP Group, co-advised by William Yang Wang and Xifeng Yan.
My primary research focus is on applying ML methods to NLP to improve data efficiency and model performance. In my research I have explored the use of methods including multi-armed bandits, data selection, multitask learning, transfer learning, reinforcement learning, and neuro-symbolic methods. Additionally, I have a wide array of interests in other topics including model efficiency, logic and reasoning, conversational AI, and multilingual models.

Education

2018–present *Ph.D, Computer Science*, *University of California, Santa Barbara*.
UCSB NLP Group
Advisors: William Yang Wang and Xifeng Yan

2016–2018 *B.S., Mathematics*, *Wayne State University*.

Selected Publications (Full publication list)

2023 *Efficient Online Data Mixing For Language Model Pre-Training*.
Alon Albalak, Liangming Pan, Colin Raffel, William Yang Wang
Preprint

2023 *Improving Few-Shot Generalization by Exploring and Exploiting Auxiliary Data*.
Alon Albalak, Colin Raffel, William Yang Wang
NeurIPS, Main Conference, Paper [code]

2023 *RWKV: Reinventing RNNs for the Transformer Era*.
Bo Peng*, Eric Alcaide*, Quentin Anthony*, Alon Albalak, ...
EMNLP, Findings, Paper [code]

2023 *Logic-LM: Empowering Large Language Models with Symbolic Solvers for Faithful Logical Reasoning*.
Liangming Pan, Alon Albalak, Xinyi Wang, William Yang Wang
EMNLP, Findings, Paper [code]

2023 *CausalDialogue: Modeling Utterance-level Causality in Conversations*.
Yi-Lin Tuan, Alon Albalak, Wenda Xu, Michael Saxon, Connor Pryor, Lise Getoor, William Yang Wang
ACL, Findings, Paper [code]

2023 *Addressing Issues of Cross-Linguality in Open-Retrieval Question Answering Systems For Emergent Domains*.
Alon Albalak, Sharon Levy, William Yang Wang.
EACL, Demonstration Track. Paper [code]

2023 *NeuPSL: Neural Probabilistic Soft Logic*.
Connor Pryor, Charles Dickens, Eriq Augustine, Alon Albalak, William Wang, L. Getoor
IJCAI, Main Conference, Paper [code]

2022 *FETA: A Benchmark for Few-Sample Task Transfer in Open-Domain Dialogue*.
Alon Albalak, Yi-Lin Tuan, Pegah Jandaghi, Connor Pryor, Luke Yoffe, Deepak Ramachandran, Lise Getoor, Jay Pujara, William Yang Wang.
EMNLP, Main Conference. Paper [code]

2022 *An Exploration of Methods for Zero-shot Transfer in Small Language Models*.
Alon Albalak, Akshat Shrivastava, Chinnadhurai Sankar, Adithya Sagar, Mike Ross
NeurIPS, Efficient Natural Language and Speech Processing Workshop. Paper

2022 *Efficient Learning Losses for Deep Hinge-Loss Markov Random Fields*.
Charles Dickens, Connor Pryor, Eriq Augustine, Alon Albalak, Lise Getoor
UAI, Workshop on Tractable Probabilistic Modeling. Paper

2022 *Making Something out of Nothing: Building Robust Task-oriented Dialogue Systems from Scratch*.
Zekun Li, Hong Wang, Alon Albalak, Yingrui Yang, Jing Qian, Shiyang Li, Xifeng Yan
Alexa Prize Taskbot Challenge 2022. Paper

2022 *D-REX: Dialogue Relation Extraction with Explanations*.
Alon Albalak, Varun Embar, Yi-Lin Tuan, Lise Getoor, William Yang Wang.
ACL, NLP for Conversational AI Workshop. Paper [code]

2021 *Systems and methods for determining and using semantic relatedness to classify segments of text*.
Rohit Jain, Devin H. Redmond, Richard B. Sutton, Alon Albalak, Sharon Huffner.
US Patent US20210279420A1

2021 *Modeling Disclosive Transparency in NLP Application Descriptions*.
Michael Saxon, Sharon Levy, Alon Albalak, Xinyi Wang, William Yang Wang
EMNLP, Main Conference. Paper

Selected Projects

February 2021 – present *Recommender Dialogue Systems*, *in collaboration with UCSC, USC, Google*.
- Actively collaborating with researchers across institutions to solve problems in dialogue systems such as explainability, information extraction, and zero- or few-shot dialogue classification tasks
- **Resulting Publications**: FLAD, FETA, NeuPSL, D-REX

Advisors : Industry - William W. Cohen and Tania Bedrax-Weiss
Academic - William Yang Wang (UCSB), Lise Getoor (UCSC), and Jay Pujara (USC)

June 2021 – June 2022 *Alexa Prize Taskbot Challenge*, *Team Lead*.
- 8% acceptance rate
- Led and advised UCSB's "Team GauchoBot" in developing an agent that assists real Alexa customers to complete cooking and do-it-yourself projects that require multiple steps and complex decision making
- Designed algorithms for intent classification and question answering as well as the communication architecture between modules
- **Resulting Publication**: Making Something out of Nothing

May 2021 – October 2021 *COVID(ATACK)*, *in collaboration with IARPA and Peraton Labs*.
- Mentored a visiting undergraduate researcher
- Built a multilingual open-retrieval question answering system for COVID-related journal articles and a clinical trials database
- Designed and implemented:
  - a multilingual deep semantic indexing method to retrieve relevant documents
  - a multilingual reading comprehension system to find answers within a document
- **Resulting Publication**: Paper/code

Professional Experience

June 2022 – September 2022 — *Research Science Intern*, *Meta AI*.
- Directed and executed on 2 projects in collaboration with researchers across the company
- Explored data-efficiency through the use of multi-task learning and various prompting methods for small language models
- Explored the use of parameter-efficient methods for zero-shot generalization
- **Resulting Publications**: Data-Efficiency with a Single GPU

June 2019 – September 2020 — *Research Associate*, *Theta Lake*.
- Built classifiers for automated risk detection in regulated industries through the use of natural language processing and other machine learning techniques
- Took multiple projects from inception to production, and developed 2 patent pending methods along the way
- **Resulting Patent**: US Patent US20210279420A1

December 2017 – September 2018 — *Machine Learning Research Associate*, *Machine Vision and Pattern Recognition Lab*, Wayne State University.
- Research funded by the Epilepsy Foundation, titled "The Sound of Seizures"
- Built computer vision based CNN-LSTM model predicting the onset of seizures with 91% accuracy
- Optimized neural network in Keras/TensorFlow for portability to mobile devices

Fellowships & Awards

2018 — *Integrative Graduate Education and Research Traineeship (IGERT) Fellow*, *University of California, Santa Barbara*.

2018 — *Academic Excellence Fellowship*, *University of California, Santa Barbara*.

2018 — *Chia Kuei Tsao Award*, *Wayne State University*.
For outstanding academic achievement in the undergraduate mathematics program

Service & Outreach

ACL 2023 — Workshop Organizer - NLP For Conversational AI (NLP4ConvAI)

ACL 2023 — Social Organizer - Mindfulness meditation in a time of NLP hyperactivity

NeurIPS 2022 — Workshop Organizer - Transfer Learning for NLP (TL4NLP): Insights and Advances on Positive and Negative Transfer

2022-2023 — Program Committee: ACL, NAACL, EMNLP, AAAI

Technical skills

Tools — Python, C++, Shell, AWS, Azure

Packages — PyTorch, TensorFlow, Keras, NumPy, SciPy

Machine Learning — Natural language processing (NLP), computer vision (CV), transformers, sequence to sequence models, statistical analysis, regression, clustering

Teaching Experience

Spring, 2020 — *CS 165a: Artificial Intelligence - Lead TA*.

Fall 2020 – Spring 2021 — *CS 9: Object Oriented Programming*.

Military Experience

2012 – 2015 — *Reconnaissance Sabotage Unit*, *Israel Defense Forces*.
- Engineering, demolitions, and reconnaissance specialty training
- Battalion lead navigator