

Mohamed Malek Abid

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Education

University of Waterloo

Waterloo, Ontario, CA

B.C.S. IN COMPUTER SCIENCE, SPECIALIZATION IN ARTIFICIAL INTELLIGENCE

Sep. 2020 - Aug. 2024

- **Specialization in Artificial Intelligence, Minor in Cognitive Science**
- **Graduate Coursework:** Neural Networks, Computational Sound, Machine Learning, Artificial Intelligence
- **Skills:** Machine Learning, Signal Processing, Python, C/C++, React, JS, PyTorch/Keras/JAX, SQL, Apache Spark

Experience

Cisco Systems, Inc.

San Jose, California

MACHINE LEARNING ENGINEER, CO-OP

Dec. 2021 - Sept 2022

- Researched deep learning models for **Cisco WebEx's Automatic Speech Recognition (ASR) engine**.
- **Invented and patented two novel machine learning techniques**(US20230267918A1, US20240144911A1) in the domains of speech recognition and natural language processing.
- Implemented and evaluated Grapheme-to-Phoneme (G2P) Models using **PyTorch and OpenFST/C++**.
- Trained/deployed English and Japanese language models with **Airflow, Docker, and Kubernetes**.
- **Improved Out-of-Vocabulary WER by 40% through OCR and online learning of unknown proper nouns.**

Computational Neuroscience Research Group, University of Waterloo

Waterloo, Ontario

COMPUTER VISION RESEARCH ENGINEER

Jan. 2024 - present

- Designing, implementing, and training **Hyperspherical Variational Auto-Encoders and Vision Transformers** for **latent representations** on images, sound, and text.
- Investigating the effects of **directional statistics** and **sampling from the Von-Mises-Fisher distribution** on the quality of **learned representations in latent spaces**.

Datamuse Corporation

San Francisco, California

MACHINE LEARNING ENGINEER, CONTRACT

Sep. 2022 - Sep. 2023

- **Researched quantized implementations of LLaMa, GPT-2/J, Mistral7B, BLOOM, and roBERTa** for OneLook Thesaurus.
- Designed and trained **low-latency LMs** for descriptive queries, **outperforming GPT-3 in accuracy by > 5%**.
- **Reduced OpenAI API costs by over 70%** through **prompt-engineering** for GPT 3.5/4.

Cisco Systems, Inc.

San Jose, California

SOFTWARE ENGINEER, CO-OP

May. 2021 - Dec. 2021

- **Improved medical word error rate (WER) by 45%** with lexicons & language models trained on MIMIC-III.
- **Invented and implemented** a neural **data-engineering** system for context-sensitive dataset autocorrection using **FastText and PyTorch**.

Patents & Projects

AUTOMATIC OUT-OF-VOCABULARY WORD DETECTION

San Jose, California

FIRST INVENTOR (1/2): CISCO SYSTEMS, SPEECH AI LAB

2022

- A novel approach to **detect and correct the presence of misspelt Out-of-Vocabulary words in audio and during pre-training** (on labelled datasets). Utilizes graph-based online learning for streaming ASRs built on Kaldi. Prototyped using **FastText** and **PyTorch**.

ABBREVIATION CLASSIFICATION FOR SPEECH SYNTHESIS AND RECOGNITION

San Jose, California

FIRST INVENTOR (1/2): CISCO SYSTEMS, SPEECH AI LAB

2022

- A neural system comprising of **a novel classifier for unknown abbreviations** and a custom G2P processing flow. **Prototyped with character-level transformers and LSTM RNNs using PyTorch and Fairseq**.