Mohammad K. Ebrahimpour

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Research Interests

Deep Learning	Computer Vision	Defusion Models	Generative AI
LLM	Machine learning	3D Vision	Speech Processing
RAG	Multi-Modal Perception	Automatic Speech Recognition	Deep Metric Learning

Education

- **University of California** — Merced, CA
  PhD of Electrical Engineering and Computer Science — *Aug. 2016 – Aug 2020*
- **Shahid Bahonar University of Kerman** — Kerman, Iran
  MSc of Artificial Intelligence — *Sep. 2013 – Dec. 2015*
- **Shahid Bahonar University of Kerman** — Kerman, Iran
  BSc of Computer Engineering — *Sep. 2008 – Dec. 2013*

Professional Positions

- **Apple** — Cupertino, CA
  AI/ML Scientist — *Dec 2023 – Now*
- **Ericsson Inc.** — Santa Clara, CA
  Sr. Research Scientist — *May 2021 – Dec 2023*
  - **Speech Style Transfer**
    As the lead scientist of the voice conversion project, I spearheaded the development of a groundbreaking voice conversion model. This model effectively converted the voice of the source speaker into that of the target speaker, maintaining the essential linguistic and emotional traits. Through rigorous research and experimentation, I dedicated myself to enhancing the quality and naturalness of the converted voices. Moreover, I successfully delivered a highly scalable multi-language model capable of supporting over 100 languages. Additionally, I collaborated closely with the engineering team to ensure the swift deployment of the model, fostering seamless cross-team cooperation.
  - **3D Avatar Talking**
    Science lead for 3D avatar talking to predict the face behind the voice. Building a model that maps an arbitrary speech input to 3D face in 130 languages. Created science roadmaps for the project from data collection, in-house cleaning, model development, and model deployment. Delivered a highly scalable multi-language model supporting 130 languages with faithful lip movement. Cross-team collaboration with the engineering team to build an efficient deployment interface that reduced model deployment time from months to less than a week.
  - **Dubbing in 2D**
    Lead scientist on avatar talking project. Developed an end-to-end model for video dubbing given an audio input. Created a customized syncnet and audio encoder to condition the GAN model, ensuring accurate lip movement synchronization.
- **OV Labs - Alarm.com** — MClean, VA
  Research Scientist — *June 2020 – May 2021*
  - **Fast Similarity Search Retreival**
    I developed several metric learning algorithms that understand the contents of the images and videos for semantically meaningful image and video retrievals.
- **Accenture Labs** — San Francisco, CA
  Research Scientist — *Aug 2019 – May 2020*
- **Ancestry Inc.** — Lehi, UT
  Computer Vision Scientist — *May 2018 – Aug 2018*

Intellectual Properties

- M.K. Ebrahimpour, G. Qian, A. Beach. "Multi-head deep metric machine-learning architecture". *U.S. Patent Application 7/527,917, 2022*
- M.K. Ebrahimpour,., Y.Y Yu,J. Li, ,J. Reese, and A. Moghtaderi, "Ventral-Dorsal Neural Networks: Object Detection via Selective Attention". *U.S. Patent Application 16/573,180 (2020).*
- J. Li, M.K. Ebrahimpour, A. Moghtaderi, and Y.Y Yu, "Captioning with Weakly-Supervised Attention Penalty". *U.S. Patent Application 16/596,063 (2020).*

Publications

Preprints, software and data are available from my web page or from Google Scholar.

- **Deep Metric Learning**
  - F. Saberi Movahed, **M.K Ebrahimpour**, F. Saberi-Movahed, M. Moshavash, D. Rahmatian, M. Mohazzebi, M. Shariatzadeh, M. Eftekhari,"Deep Metric Learning with Soft Orthogonal Proxies" *BayLearn 2023.*
  - M.K.Ebrahimpour,G. Qian, A. Beach,"Multi-head deep metric machine-learning architecture" *IEEE Winter Conf. on Applications of Computer Vision (WACV 2022).*
- **Auditory Object Recognition**
  - M.K.Ebrahimpour,S. Schneider, D.C.Noelle, and C.T. Kello,"InfantNet: A Deep Neural Network for Analyzing Infant Vocalizations." *In Interspeech 2020.*
  - M.K.Ebrahimpour, T.M.Shea, A.Danielescu, D.C.Noelle, and C.Kello, "End-to-End Auditory Object Recognition via Inception Nucleus.", *IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP 2020).*
  - M.K.Ebrahimpour, T.M.Shea, A.Danielescu, D.C.Noelle, and C.Kello, "End-to-End Auditory Object Recognition on Neuromorphic hardware chip." *Tiny ML 2020.*
- **Object Detection**
  - M.K. Ebrahimpour, J.B. Falandays, S. Spevack, M.H Yang, and D.C. Noelle, "WW-Nets: Dual Neural Networks for Object Detection." *Int. Joint Conf. on Neural Networks (IJCNN 2020).*
  - M.K. Ebrahimpour, J.B. Falandays, S. Spevack, and D.C. Noelle, "Do Humans Look Where Deep Convolutional Neural Networks 'Attend'?." *Proc. of the 41 Annual Meeting of the Cognitive Science Society (CosSci 2019).*
  - M.K. Ebrahimpour and D.C. Noelle, "Fast Object Localization via Sensitivity Analysis." *Int. Symp. on Visual Computing (ISVC 2019).*
  - M.K. Ebrahimpour, J.B. Falandays, S. Spevack, and D.C. Noelle, "Do Humans Look Where Deep Convolutional Neural Networks 'Attend'?." *Int. Symp. on Visual Computing (ISVC 2019).*
  - J.Li, M.K. Ebrahimpour, and Y.Y.Yu, "Image captioning with weakly-supervised attention penalty." *IEEE Computer Society Conf. Computer Vision and Pattern Recognition - Language and Vision Workshop (CVPRW 2019).*
  - M.K. Ebrahimpour, J.Li, M.H Yang, Y.Y.Yu, J.Reese, A,Moghtaderi, and D.C. Noelle, "Ventral-Dorsal Networks: Object Detection via Selective Attention." *IEEE Winter Conf. on Applications of Computer Vision (WACV 2019).*
  - M.K. Ebrahimpour and D.C. Noelle, "Weakly Supervised Object Localization via Sensitivity Analysis". *IEEE Computer Society Conf. Computer Vision and Pattern Recognition - Deep Vision Workshop (CVPRW 2018).*
- **Optimization**

- M.K. Ebrahimpour, H.Nezamabadi-pour, and M.Eftekhari, "CCFS: A Cooperation Coevolution Techniques for Large Scale Feature Selection on Microarray Datasets.", *Computational Biology and Chemistry (CBC 2018).*

- **Dimensionality Reduction**
  - M. K. Ebrahimpour, H. Mirvaziri, and V. Sattari-Naeini, "Improving breast cancer classification by dimensional reduction on mammograms", *Computer Methods in Biomechanics and Biomedical Engineering: Imaging and Visualization (CMBBE 2017).*

- **Feature Selection**
  - M.K. Ebrahimpour and M. Eftekhari, "MCMR: Maximum Consistency Minimum Redundancy for Microarray High-Dimensional Feature Selection." *Pattern Recognition (PR 2017).*
  - M.K. Ebrahimpour, M. Zare, M. Eftekhari, and G. Aghamolaei, "Occam's razor in dimension reduction: using reduced row Echelon form for finding linear independent features for high dimensional feature selection.", *Engineering Applications of Artificial Intelligence (EAAI 2017).*
  - M.K. Ebrahimpour and M. Eftekhari, "Ensemble of Feature Subset Selection Methods: A Hesitant Fuzzy Set Approach." *Applied Soft Computing (ASC 2017).*
  - M.K.Ebrahimpour and M.Eftekari, "Feature Subset selection using Information Energy and correlation coefficients of hesitant fuzzy sets.", *IEEE Int. Conf. on Information and Knowledge Technology (IKT 2015).*
  - · M.K. Ebrahimpour and M. Eftekhari, "Proposing a novel feature selection algorithm based on Hesitant Fuzzy Sets and correlation concepts.", *IEEE Int. Conf. on Artificial Intelligence and Signal Processing (AISP 2015).*

- **Ensemble Learning**
  - N.A. Abolkarlou, A.A. Niknafs, and M.K. Ebrahimpour, "Ensemble Imbalanced Classification: Using data preprocessing, clustering algorithm and genetic algorithm.", *IEEE Inr. Conf. on Computer and Knowledge Engineering (CKE 2014).*
  - N.Afshari, M.K.Ebrahimpour, and A.A. Niknafs, "Improving the Ensemble classifiers based on clustering approaches and genetic algorithm.", *Int. Conf. on Information Technology and Computer (ITC 2014).*

- **Ontology Mapping**
  - I.Badrooh, M.K. Ebrahimpour, and R.Beheshtinezhad, "Utilizing an Optimization Method for Map Extraction on Ontology Alignments", *IEEE Int. Conf. on Electrical Engineering (ICEE 2010).*

Programming skills

- **Tiny Machine learning:** Intel Loihi hardware
- **Programming languages:** **Python, Julia**, C++, C#
- **Mathematical Analysis:** Matlab and SIMULINK
- **Selected libraries in python:** **Keras, Tensorflow, Pytorch scikit-learn**, numpy, scipy

Invited Talks and Lectures

- **Guest Lecturer at Introduction to Cognitive Science course, UC Merced.** CA, USA
  Subject: Introduction to Artificial Intelligence. *Summer 2020*
- **Accenture Labs.** CA, USA
  Subject: Object Detection with Selective Attention. *Fall 2019*

- **Guest Lecturer at Introduction to Artificial Intelligence course, UC Merced.** CA, USA
  Subject: Introduction to Computer Vision. *Fall 2018*
- **Dept. of Applied Mathematics, UC Merced.** CA, USA
  Subject: Object Detection with Sensitivity Analysis. *Fall 2018*
- **Ancestry Inc.** Lehi, UT
  Subject: What is wrong with current object detectors? *Summar 2018*
- **Guest Lecturer at Statistical Pattern Recognition course, SBUK.** Kerman, Iran
  Subject: Introduction to Deep Learning. *Fall 2017*

Professional Services

- Reviewer for the following conferences and journals:
  - Neural Information Processing Systems (NeurIPS).
  - Int. Conf. on Machine Learning (ICML).
  - IEEE Computer Society Conf. Computer Vision and Pattern Recognition (CVPR).
  - IEEE Computer Society Conf. on Winter Applications on Computer Vision (WACV).
  - IEEE Int. Conf. Acoustics, Speech, and Signal Possessing (ICASSP).
  - Cognitive System Research (CSR)
  - Engineering Applications of Artificial Intelligence (EAAI).
- Served on Graduate Dean's Advisory Council on Diversity for the Academic Year 2018-2019.

Honor and awards

- Summer 2020: Bobcat Fellowship Award, $3000, UC Merced.
- Spring 2020: Loihi - Neural Network on the chip Fellowship Award, $13000, UC Merced.
- Fall 2019: Loihi - Neural Network on the chip Fellowship Award, $13000, UC Merced.
- Fall 2019: Dr. Donald and Effie Godbold Fellowship Award, $2000, UC Merced.
- Summar 2019: Bobcat Fellowship Award, $8000, UC Merced.
- Fall 2015: Second-ranked in the M.Sc. program (selected as the Exceptional Talents of National Universities in Iran).
- Spring 2013: First ranked in the B.Sc. program (selected as the Exceptional Talents of National Universities in Iran).