Mostafa Ghorbandoost

Applied Machine Learning Research Scientist

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Professional links: PersonalWebsite | LinkedIn | GoogleScholar | StackOverflow | GitHub

Experience

- **Applied Speech Machine Learning Research Scientist** Sep. 2021 - Dec. 2022
  Sanas *Palo Alto, California, United States*
  - **Accent Conversion**: Devised novel real-time accent conversion methods based on CNNs, RNNs and made these models robust against noise and able to generalize well using pre-training and proper loss functions
  - **Voice Conversion**: Designed a real-time voice conversion method using VQ-VAE and different concatenative and multiplicative speaker embedding strategies
  - **Speech Synthesis**: Explored various neural nets to reconstruct speech spectrogram or waveform from prosodic features and self-supervised features e.g. Hu-BERT
  - **Vocoders**: Experimented with modern GAN-based vocoders e.g. HiFi-GAN to perform high-quality speech spectrogram to waveform inversion
  - **Transformers**: Used transformers to convert self-supervised discrete codes from one accent to another by correcting the codes in a similar way to a spell-checker
  - **Machine Learning Engineering**: Organized and prepared data for machine learning models and evaluate their performance using objective and subjective measures
- **Data Scientist** Dec. 2020 - Sep. 2021
  Bama *Tehran, Iran*
  - **Probabilistic Price Estimation**: Designed a probabilistic regression model using LightGBM and NGBoost to estimate used cars' prices using their make, age, mileage, and body status with a confidence interval
  - **Robust Regression**: Made use of Laplace and t-distribution and robust loss functions to make regression models robust against outliers
  - **Feature Engineering**: Massively mined, manipulated and combined millions of adverts in order to build proper features from their attributes to train more accurate regression models
- **Applied Industrial Machine Learning Research Scientist** Sep. 2017 - Dec. 2020
  Mapna *Karaj, Iran*
  - **Representation Learning**: Used probabilistic ML methods e.g. beta-VAE to obtain meaningful and disentangled representations of plant's high dimensional sensor data for anomaly detection and fault classification
  - **Transfer Learning**: Employed Domain Adversarial Neural Nets which is a type of GAN to adapt anomaly detection and fault classification models to unseen plants
  - **Continuous Domain Adaptation**: Deployed Domain-invariant VAEs to isolate environmental factors like temperature from sensors and make it possible to compare sensor values in different seasons
- **Applied NLP Machine Learning Research Scientist** May. 2017 - Sep. 2017
  Kavosh *Tehran, Iran*
  - **Multi-label Text Classification**: Used RNNs to classify medical texts for the task of Automated Medical Coding to predict a patient's health issues based on their discharge diagnosis
  - **Word Embedding Models**: Trained Skip-Gram and CBOW on thousands of medical texts to better suit the medical applications than pre-trained word2vecs
- **Digital Designer** Oct. 2016 - May. 2017
  Fana *Tehran, Iran*
  - **Forward Error Correction**: Implemented Reed-Solomon error correction for Optical Transport Network to enhance the effective range of transmission using Verilog and Altera Stratix-V FPGAs
- **Machine Learning Practitioner** Mar. 2016 - Oct. 2016
  Freelancing *Tehran, Iran*
  - **Human Gesture Recognition**: Designed a system to classify sequences of 12 gestures captured through Microsoft Kinect using left-to-right Hidden Markov Models with high accuracy
  - **Speaker Verification**: Devised a method to authenticate the identity of a person through his voice using speech spectral features and Universal Background Model which is a type of GMM

- **Machine Learning Researcher** Sep. 2012 - Jan. 2015
  Multimedia Signal Processing Research Lab at Amirkabir University of Technology *Tehran, Iran*
  - **Voice Conversion**: Explored different spectral features (MFCC, LSF, MCC) and combined them towards having a high-quality voice conversion system that is capable of being trained with a limited amount of training data
  - **Mixture Models**: Employed a variety of mixture models from Bayesian GMMs to Mixture Density Networks to better capture the multi-modal nature of speech signal while doing regression
  - **Dynamic Bayesian Networks**: Deployed dynamic linear Gaussian models (with Kalman filtering) to model sequential relationships in speech and convert the speech without loss of continuity

Education

- **M.Sc. in Electrical Engineering, Communication Systems** Sep. 2011 – Oct. 2013
  School of Electrical Engineering, Amirkabir University of Technology *Tehran, Iran*
- **B.Sc. in Electrical Engineering, Electronics** Sep. 2007 – Sep. 2011
  School of Electrical Engineering, Amirkabir University of Technology *Tehran, Iran*

Awards and Honors

- **Ranked 193 among 122,000 Data Scientists** Dec. 2022
  Data Science Q&A website | User: pythinker *Stack Exchange*
- **Winner of Bronze Medal** Sep. 2006
  National Physics Olympiad *Tehran, Iran*

Software Skills

Programming	Cloud Services	Database	Vesrion Control	Documentation
Python | Bash	Google Cloud Platform	SQL	Git	LaTeX | Markdown

Deep Learning	Machine Learning	Data Science	Plotting
PyTorch | TensorFlow	Scikit-learn | XGBoost	Pandas | Numpy	Matplotlib | Seaborn

Journal publications

[1] **Mostafa Ghorbandoost**, V Saba, "Non-parallel training for voice conversion using background-based alignment of GMMs and INCA algorithm", IET Signal Processing 11.8, 2017. link

[2] **Mostafa Ghorbandoost**, A Sayadiyan, M Ahangar, H Sheikhzadeh, A S Shahrebabaki, J Amini, "Voice conversion based on feature combination with limited training data", Speech Communication 67, 2015. link

Conference Proceedings

[1] M Ahangar, **Mostafa Ghorbandoost**, S Sharma, M JT Smith, "Voice conversion based on a mixture density network", IEEE WASPAA, New Paltz, NY, USA, 2017. link

[2] M Ahangar, **Mostafa Ghorbandoost**, H Sheikhzadeh, K Raahemifar, A S Shahrebabaki, J Amini, "Voice conversion based on state space model and considering global variance", IEEE ISSPIT, Greece, 2013. link

[3] A S Shahrebabaki, J Amini, H Sheikhzadeh, **Mostafa Ghorbandoost**, N Faraji, "Reduced search space frame alignment based on Kullback-Leibler Divergence for voice conversion", NOLISP, Belgium, 2013. link

References

The list of references will be provided to recruiters on demand.