Geet Khatri

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Education

North Carolina State University — Raleigh, NC
Ph.D. in Electrical Engineering · GPA: 4.00/4.00 — Fall 2021–Present

Delhi Technological University — New Delhi, India
B.Tech. in Electronics and Communication Engineering · CGPA: 8.45/10.00 — 2014–2018

Experience

Department of Electrical and Computer Engineering, NC State University — Raleigh, NC
Graduate Teaching Assistant — August 2022–Present

- "ECE 308: Elements of Control Systems" in Fall 2022
- "ECE 542: Neural Networks" in Spring 2023

Advanced Diagnosis, Automation, and Control (ADAC) Lab, NC State University — Raleigh, NC
Research Assistant — August 2021–August 2022

- Applied signal processing and machine learning algorithms to ultrasonic fault detection for nuclear reactor shells as part of a research project for the Department of Energy's Nuclear Energy Enabling Technologies (NEET) program
- Modeled the open-circuit voltage of a battery using a neural network

UBS — Pune, India
Software Engineer — 2018–2021

- Worked on data visualization, identification of trends in data, and predictive modeling
- Developed tools for enforcement and tracking of organizational controls

Academic Projects

- **Parkinson's Disease Detection from Speech Data**
  The classification algorithm detects signs of Parkinson's disease based on features extracted from a patient's speech recording. The algorithm uses a neural network.
- **Trigger Word Detection**
  The trigger word detection model comprises a recurrent neural network (RNN). The STFT of an audio is fed to the network, and the model triggers an action when it detects the trigger word in the audio.
- **Speech Enhancement Using Wiener Filtering and Pitch-Synchronous STFT Phase Reconstruction** *(Undergraduate Thesis)*
  The algorithm reconstructs the phase spectrum of the pitch-synchronous STFT of the speech signal. Certain properties of the pitch-synchronous STFT of harmonic signals make estimation of the phase spectrum faster and more robust to noise compared to phase reconstruction of constant–window size STFT. The magnitude spectrum is estimated using Wiener filtering.
- **Speech Enhancement Based on Maximization of Mutual Information**
  This method of speech enhancement involves maximization of the mutual information between the message spoken by the speaker at the far-end and the message perceived by the listener at the near-end.
- **Onset Detection in Audio Signals**
  The algorithm uses a measure similar to the spectral flatness measure in order to normalize the spectral flux of the audio signal for peak picking. This was applied to adaptive window size selection for a more accurate time-frequency representation of audio signals.
- **Lossy Audio Compression Using a Statistical Sub-Band Model of Quantization Noise**
  The algorithm, which is based on MPEG AAC, minimizes the perceived distortion due to compression. This distortion is related to the quantization noise over frequency sub-bands. A key step in the algorithm is computation of the optimal sub-band scalefactors using a statistical model of quantization noise.

Skills and Coursework

- **Languages:** Python, MATLAB, R, C, C++, Bash, SQL, HTML, CSS
- **Frameworks:** TensorFlow
- **Software and Tools:** MATLAB/Octave, Git, Tableau, Excel, LaTeX
- **Relevant Coursework:** Deep Learning, Pattern Recognition, Data Science, Computer Vision, Optimization, Statistics, Digital Signal Processing, Image Processing, Probability & Random Processes, Functional Analysis, Harmonic Analysis, Detection & Estimation Theory, Information Theory & Coding, Analog & Digital Communication, Control Systems, Optimal Control, Audio Signal Processing