

# Jiazhen Hong

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**CURRENTLY:** Ph.D. candidate in Computer Engineering at Rutgers University. 02/2020 – Present

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**EDUCATION:** **Rutgers, The State University of New Jersey, New Brunswick, NJ**  
*Ph.D. in Computer Engineering* GPA:3.9 02/2020 – Present  
**Stevens Institute of Technology, Hoboken, NJ**  
*Master of Science in Electrical Engineering* GPA:3.9 09/2017 – 01/2019  
**Jimei & Chung Yuan Christian University, China**  
*Bachelor of Engineering in Communication Engineering* GPA: 3.5 08/2012 – 06/2016

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**SKILLS:** **Programming Languages:** Python, MATLAB, R  
**Software & Tools:** EEGLAB, GitHub, Anaconda, Google Colab  
**Hardware:** Brain Products, actiCAP, Raspberry Pi, Arduino, VEX-brain  
**Deep Learning Frameworks:** TensorFlow, PyTorch

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**ACADEMIC PROJECTS:** **Human-Computer Interaction Speller using Neural Language Model, Rutgers University, NJ, USA**  
*Research Assistant* 01/2023 – Present  
Developed a speller system to assist individuals with disabilities who are unable to communicate verbally.

- Acquired Electroencephalogram (EEG) signals using brain devices such as actiCAP and BrainAmp.
- Developed a real-time speller system and established communication between two devices using the TCP/IP protocol. One device serves as a graphical user interface (GUI) while the other handles data.
- Analyzed subject brain activity through the oddball paradigm to identify their target characters.
- Integrated NLP models with the speller system to enhance its efficiency.

**Motor Imagery Tasks for Brain Computer Interfaces (BCI), Rutgers University, NJ, USA**  
*Research Assistant* 01/2021 – 12/2022  
Designed a reliable model for the BCI system to assist people in controlling prosthetic devices.

- Acquired an Electroencephalogram (EEG) competition dataset online.
- Pre-processed signals using EEGLAB/ MATLAB, employing denoising techniques such as ICA and STFT.
- Analyzed neural activities to extract critical information from the brain's spatial/temporal domain.
- Implemented deep learning models for the classification of motor imagery tasks.

**Machine Learning Algorithm Optimization, Rutgers University, NJ, USA**  
*Research Assistant* 02/2020 – 01/2021  
Optimized the k-means algorithm to mitigate issues related to local minima.

- Explored a geometric approach to k-means to address local minimum challenges.
- Validated our proposed k-means algorithm variant through mathematical and theoretical derivation.
- Conducted experiments on both benchmark datasets and real-world datasets to prove our algorithm.

**Biostatistics related to Cancer Prediction, Harvard Medical School, MA, USA**  
*Research Assistant* 05/2019 – 11/2019  
Enabled early cancer detection with protein analysis, minimizing reliance on Magnetic Resonance Elastography.

- Conducted protein analysis of patient samples provided by hospitals, employing the Benjamini-Hochberg statistical technique to identify significant proteins for cancer prediction.
- Utilized selected proteins to apply machine learning techniques for predicting patient health status.
- Emphasized precision over recall in the model evaluation phase due to the critical importance of early cancer detection. A false positive is preferable to a false negative.

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**RELATED EXPERIENCE:** **Rutgers, The State University of New Jersey, New Brunswick, NJ, USA**  
**Course Instructor & Teaching Assistant**

- Course Instructor: Linear Systems & Signals. 05/2022 – 07/2022
- Teaching Assistant: Digital Signal Processing Lab 02/2020 – Present