# Vedant Bhasin

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## EDUCATION

**Carnegie Mellon University** May 2024
Master of Science in Electrical & Computer Engineering *Pittsburgh, PA*
AI/ML Systems Concentration
*Coursework:* Multimodal Machine Learning, Advanced Natural Language Processing, Machine Learning for Signal Processing

**Carnegie Mellon University** May 2023
Bachelor of Science in Electrical & Computer Engineering *Pittsburgh, PA*
Software Systems Concentration [CGPA: 3.39/4.00]
Dean's List Fall '19, Fall '22
*Coursework:* Deep Reinforcement Learning & Control, Introduction to Deep Learning, Introduction to Machine Learning

## EXPERIENCE

**Carnegie Mellon University, Language Technologies Institute** January 2023 - May 2023
**Teaching Assistant - Deep Learning** *Pittsburgh, PA*

- Teaching Assistant for Carnegie Mellon University's flagship deep learning course with Professor Bhiksha Raj.
- Lead TA for two of the four major projects in the course; responsible for preparing data sets, developing starter notebooks, and conducting experiments to discover high-performing architectures and optimization specifications.
- Conducting recitations and lectures on Vision Transformers, Deep Reinforcement Learning, and project workflow fundamentals.

**Axaitech** July 2022 - August 2022
**AI & Data Science Intern** *Cape Town, South Africa*

- Developed a random forest classifier to distinguish between 11 different cancer types using gene expression data.
- Utilized feature selection techniques such as Mean Absolute Deviation, Recursive Feature Elimination, and Random Forest Feature Importance to reduce the number of features from 58,440 to 20 while maintaining a classification accuracy higher than 95%.
- Prototyped, evaluated, and optimized different models using Scikit-Learn and PyTorch; fine tuned hyper-parameters through random grid search. Attained a classification accuracy of 95.20%.

## LEADERSHIP

**Sigma Chi Fraternity, Lambda Pi Chapter** May 2022 - May 2023
**Vice President** *Pittsburgh, PA*

- Managed the executive committee and spearheaded the planning, organization, and execution of social and philanthropic events.
- Successfully generated $18,950 in funds for the Huntsman Cancer Foundation by coordinating and hosting *Derby Days*.

## PROJECTS

**Football Tracker** Jan 2023 - May 2023

- Built a full stack web application that allows users to select their favorite football team and view statistics such as top scorers, top play-makers, recent games, and live games.
- Collaborated with a team of two other members to conceptualize, design, and implement the application over the course of three separate sprints; following agile software development methodology.
- Implemented the web scraping algorithm for live games using Beautiful Soup and integrated it with the Django back end.
- Leveraged bootstrap to design the front end; deployed the application on an AWS EC2 instance using Apache.

**Attention-based Automatic Speech Recognition** Aug 2022 - Dec 2022

- Devised an end-to-end speech-to-text model based on Listen-Attend-Spell architecture to transcribe speech, using MFCC coefficients from the LibriSpeech dataset.
- Implemented scaled dot product attention from scratch. Incorporated data augmentation techniques such as time and frequency masking in addition to regularization techniques such as weight tying, locked dropout, and weight decay.
- Designed a custom teacher-forcing schedule to boost the performance of the auto-regressive decoder module.
- Achieved a promising Levenshtein distance of 9.54 on the test set.

**Face Classification and Verification using CNNs** Aug 2022 - Dec 2022

- Performed ablation studies with MobileNetV2, ResNet-50, and ConvNeXt from scratch for face classification and verification on the VGG Face 2 dataset.
- Experimented with different deep metric learning approaches such as ArcFace loss, triplet margin loss, and circle loss to maximize verification accuracy. Independently implemented ArcFace loss using the research paper as a reference.
- Implemented data augmentation techniques, including Random Augment, Random Perspective, and Random Erasing to mitigate overfitting. Applied regularization methods, including label smoothing, stochastic depth, and weight decay.
- The model correctly classified a satisfactory 92.83% of faces during testing.

## SKILLS

**Programming Languages:** Python, C, JavaScript, HTML/CSS, SQL
**Libraries and Frameworks:** PyTorch, Scikit-Learn, Pandas, NumPy, Seaborn, Django, AWS, Google Cloud Platform, Git
**Application Software:** MATLAB, Visual Studio Code, Jupyter Notebooks, Google Colab