Shravan Balamurugan

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Education

University of California, Irvine — Irvine, CA
M.S. in Computer Science *GPA: 3.74/4.0* — Sep 2021 - December 2023 (Expected)

Relevant coursework: Machine Learning, Scientific Computing, Probabilistic Learning, Information Retrieval, Statistical NLP, Deep Neural Networks, Deep Generative Models, AI in Bio and Med, Computer Networks, Design and Analysis of Algorithms, Light and Geometry in Vision
Thesis Advisor: Dr. Xiaohui Xie

The Pennsylvania State University - Schreyer Honors College — University Park, PA
B.S. (Honors) in Computer Engineering *GPA: 3.50/4.0* — Aug 2016 - May 2020

Relevant coursework: Computer Vision, Digital Image Processing, Data Structure and Algorithms, OOPS Programming, Linear Algebra, Python Programming, Numerical Analysis, Calculus, Differential Equations
Undergraduate Honors Thesis: ***Hand Gesture Recognition Using Image Processing Techniques***
Thesis Advisor: Dr. Mahanth Gowda

Experience

UC Irvine - Xie Lab — Irvine, CA
Graduate Student Researcher — Jan 2023 - Present

- Pursuing a master's thesis centered on 3D hand pose and shape estimation, under the mentorship of Dr. Xiaohui Xie.
- Experimenting with various ML methods and paradigms in conjuction with MANO models to innovate and optimize predictions for 3D hand pose and shape estimation.

Digbi Health — Mountain View, CA
Product/Data Analyst Intern — May 2021 - July 2021

- Developed and validated ML algorithms for predictive analysis on the Digbi CARES program, leveraging user data and features to forecast outcomes of a genetics and gut biome-centered weight-loss strategy.
- Examined user data to gauge engagement levels and identified key parameters influencing app interaction; formulated strategies to enhance user engagement based on these insights.

Skills

Programming Languages:	Python, C++, SQL, MATLAB
Libraries and Frameworks:	Pandas, Numpy, PyTorch, Matplotlib, Seaborn, Scikit-learn, Scipy, NLTK
Tools:	Git, Vim, SSH, Linux, Jupyter Notebooks, AWS Quicksight, LaTeX

Projects

Predicting and analyzing hospital readmission rates for diabetic patients *Python, Jupyter Notebook*
Performed exploratory data analysis (EDA) and model exploration with the dataset and ailment history of patients who are re-admitted to hospitals. Cleaned and prepared the dataset to implement various ML algorithms by training and testing the data. Cross validated the results and found a balance between the training and test dataset to avoid overfitting or under-fitting.

Image Matching: Classical vs Learning-based Methods *Python, OpenCV, Kornia*
Implemented the SIFT algorithm for keypoint detection and optimized match quality using KNN search, Lowe's Ratio test, and RANSAC. Explored the LoFTR model, a deep learning method with a CNN and Transformer architecture. Testing on various image matching datasets showed LoFTR achieving about 3.8 times more matches than classical methods, underscoring the potential of ensemble approaches.

Image Captioning *Python, OpenCV*
Implemented an image captioning model using ResNet for feature extraction and a Transformer Decoder for caption generation. By harnessing the Flickr8K dataset, the model demonstrated proficiency in generating detailed captions, paving the way for advancements in multimedia content description and enhanced user accessibility.

Presidential Candidate Speech Classification *Python, Jupyter Notebook*
Implemented a logistic regression classifier combined with count vectorization for structured textual data representation. Amplified model robustness via semi-supervised learning methodologies, leveraging a tailored Word2Vec for optimal out-of-vocabulary word encapsulation, and applied pre-computed word probabilities for nuanced stylistic differentiation among presidential candidates.