

# SUMIT MANTRI

Mountain House, CA  
669-268-7993 smantri@ucdavis.edu GitHub

## Education

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### University of California, Davis

*Computer Science and Statistics, Machine Learning Track*

## Experience

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### UC Davis Research - Dr. Tagkopoulos Lab

May 2025 – Present

*Researcher*

- Accomplished the implementation of classification models for peptides by utilizing transformers, 1D Convolution, and other RNN layers for sequences of data, resulting in enhanced model accuracy
- Gained in-depth understanding of the D3PM model implementation and fine-tuning of the model, leading to the creation of synthetic sequences that can be tested in real-world scenarios

### Artificial Intelligence Student Collective

October 2024 – Present

*SWE in Objected Detection*

- Successfully gathered data for the test set by applying web-scraping techniques using Selenium and Chrome Web Driver, resulting in a substantial increase in dataset size
- Achieved real-time object detection by utilizing the You Only Look Once (YOLO) model through the TensorFlow framework, providing live haptic feedback to the user and enhancing user experience
- Implemented customizable volume output based on the proximity of objects in focus, resulting in improved user interaction and engagement

### Deep Learning.AI

June 2024 – October 2024

*Student*

- Acquired extensive knowledge of supervised learning techniques, resulting in a solid foundation for future machine learning projects
- Developed and optimized neural network architectures, including Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), LSTMs, and Transformers Network, leading to improved model performance and efficiency
- Enhanced model performance by applying techniques such as Dropout, Batch Normalization, and Xavier/He initialization, resulting in improved model generalization and accuracy
- Gained practical experience in applying theoretical concepts to real-world problems in Python and TensorFlow, including speech recognition, music synthesis, chatbots, machine translation, and Natural Language Processing (NLP), leading to a deeper understanding of machine learning applications

### Cisco

June 2022 – July 2022

*Programmer/Marketer (Job Shadow)*

- Expanded industry knowledge and professional network by engaging with Cisco employees, gaining valuable insights into the company's organizational structure and best practices
- Developed a comprehensive marketing strategy during a hackathon, conducting surveys with Cisco employees on mental health to inform solution implementation and resulting in a well-rounded approach to addressing user needs
- Served as programming lead for the hackathon team, developing a personalized mental health Webex chatbot named Carely using Javascript and Express, resulting in a functional and user-friendly solution

## Projects

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Image Segmentation | *TensorFlow/Keras*

June 2024 – July 2024

- Built a U-Net convolutional neural network in TensorFlow/Keras for semantic image segmentation on a self-driving car dataset, achieving a high level of accuracy
- Preprocessed image and mask data using tf.data pipelines and custom augmentation functions, resulting in improved model performance and reduced overfitting
- Achieved 90% accuracy by designing and testing modular U-Net blocks, ensuring correct architecture and resulting in a reliable and efficient model

Chronic Kidney Disease Detection | *Various ML Techniques*

March 2025 – April 2025

- Built machine learning models to classify Chronic Kidney Disease stages using patient lab data, resulting in a high level of accuracy and reliability
- Preprocessed features with imputation, scaling, and one-hot encoding through scikit-learn pipelines, resulting in improved model performance and reduced error
- Performed detailed error analysis and adjusted model complexity and tuned hyperparameters using GridSearchCV and RandomizedSearchCV, resulting in improved model generalization and accuracy
- Boosted test accuracy from 61% with logistic regression to 75% with Random Forest, and finally 98% accuracy with XGBoost, verified through StratifiedKFold learning curves and resulting in a highly accurate and reliable model

## Technical Skills

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**Languages:** Python 3, C++, Java, R, MATLAB, HTML, CSS, Node.JS, Javascript, MongoDB

**Frameworks:** TensorFlow, Keras, NumPy, Pandas, Skikit Learn, React, Express

**Developer Tools:** Visual Studio Code, R Studio, Jupyter, Git, GitHub, Compass