ANKUR GARG

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EDUCATION

University of Southern California, Los Angeles, CA, USA **January 2020-December 2021**
Master of Science, Computer Science **GPA: 4.0/4.0**
Courses - Machine Learning, Deep Learning, Natural Language Processing, Web Tech, Information Retrieval, Database, Algorithms

SRM Institute of Science and Technology, Chennai, TN, India **May 2015–June 2019**
Bachelor of Technology, Computer Science and Engineering **Percentage: 90.97/100**

PUBLICATIONS AND RESEARCH EXPERIENCE

Handwritten Text Recognition **May 2020**

Guide - Prof. D. Malathi

- **Lead author** of "Handwritten Text to Editable Text Document" published in International Journal of Advanced Science and Technology (Vol. 29, No. 2, 2020, pp. 4707-4712)
- Developed an innovative image preprocessing pipeline utilizing adaptive thresholding, morphological operations, and skew correction to significantly enhance the quality of hand-captured text images
- Implemented **novel** line and word segmentation techniques, coupled with baseline estimation and slant correction algorithms for words
- Custom-trained a Pytesseract model for word recognition, achieving 84% accuracy on a 1,000-word test dataset

AutoCorrect for MultiLingual Text **February 2021-April 2021**

Guide - Prof. Saty Raghavachary

- **Led research** on Autocorrect tools for Transliterated Hindi-English Code-mixed text addressing spelling variation challenges
- Engineered a novel two-stage model - a Conditional Random Field for language identification and BiLSTM-BERT model for auto-correction
- Created 6,000-word custom dataset and implemented multilingual embeddings, achieving 69.3% F1 score

Multi-Media Morse Code Recognition **October 2020-December 2020**

- Developed a **novel** application of Morse Code Recognizer trained on multiple sound mediums for patient-caregiver communication
- Trained a CRNN-CTC model on 60 hours of Morse Code audio from 13 diverse sound mediums(e.g., finger taps, claps), enhanced with gaussian noise.
- Achieved 98.37% F1 score on an untrained medium in healthcare, significantly surpassing the 2% baseline of single-medium systems

PROFESSIONAL EXPERIENCE

Software Engineer | Salesforce | San Francisco, CA, USA **January 2022 – March 2023**

- Worked on various stages of domains and certificate lifecycle. Added and supported features to control certificate renewal in specific DC
- Aided in the company's transition into Hyperforce by adding features to allow security-sensitive customers to stay on 1st party data center
- Integrated Cloudflare API like Web Application Firewall into the workflow to enhance security against incoming traffic
- Took initiative to write unit and integrated test cases in spring for various classes and increased the code coverage by 60-75%

Computer Scientist Trainee | Harvard University | Boston, MA, USA **September 2021 – December 2021**

- Implemented scripts for easy access to Docker THOMAS Container command using Boutiques resulting in 200% decreased workload

Machine Learning Intern | Apple | Cupertino, CA, USA **May 2021–August 2021**

- Worked on a multi-class classification problem of assigning user reported issues to the appropriate response team in Apple
- Performed initial data analysis by determining class skewness and feature availability to narrow the problem statement scope
- Used Sentence Embedding and TF-IDF on text and embedding similarity-based scope reduction on logs to extract important information to be used as features
- Using a Random Forest model, achieved 88% F1 Score on in-team/out-team, 95% crash/non-crash, and 88% on 5 out-team bucket

Computer Vision Intern | Carma Cam | Los Angeles, CA, USA **May 2020–August 2020**

- Improved accuracy of the YOLO model from 25% to 90% by eliminating false positives of stop signs from a video of a moving vehicle under different lighting conditions using HSV color space and 5 image processing techniques
- Preprocessed a large vehicle dataset and applied transfer learning to it to train a YOLO Model for a truck recognition problem

Artificial Neural Networks and Big Data Trainee | National University of Singapore | Singapore **May 2018**

- Implemented an end-to-end sentiment analysis classifier to classify reviews given to a grocery store into positive, negative, or neutral
- Performed text preprocessing using stop words removal and word embeddings to extract features
- Experimented using RNN, CNN, naïve bayes and decision trees; RNN performed the best and achieved an accuracy of 91.76%

ACADEMIC PROJECTS

Skin Cancer MNIST (Kaggle Dataset) **November 2023**

- Developed a Convolutional Neural Network (CNN) model to classify 7 types of skin cancer using the HAM10000 dataset
- Implemented comprehensive data preprocessing pipeline including image resizing, normalization, and augmentation techniques
- Engineered a CNN architecture with multiple Conv2D-MaxPool-Dropout blocks and Dense layers, achieving test set 75.4% accuracy

Kaggle Competitions (Python, Pandas, Tensorflow, Sklearn, Bayesian optimization) **January 2024-May 2024**

- Steel Plate Defect Detection: Ranked 5th out of 2201 with an AUC/ROC score of 0.0899. Responsibilities included data cleaning, feature engineering, and experimenting with bagging and boosting models, optimized using Bayesian techniques.
- Automated Essay Scoring: Achieved a quadratic weighted kappa score of 0.789. Focused on data cleaning, feature extraction (TF-IDF, embeddings), feature reduction (SVD), and algorithm tuning (LightGBM, XGBoost, CatBoost) with Bayesian optimization.
- Preprocessed a class-imbalanced credit card fraud dataset using under-sampling and custom weighted loss function, and achieved an F1 score of 86.33% with an XGBoost classifier on 85,400 entries.

AI-Powered Poetry Generator **September 2018**

- Developed LSTM-based neural network for poem generation, using PyTorch and custom word embeddings
- Implemented character-level prediction with temperature-controlled dynamic beam-width decoding to adjust creativity.
- Used bayesian optimization to search for hyperparameters including learning rate, batch size, and network depth for best performance

Traffic Sign Recognition (Matlab) **August 2018-October 2018**

- Categorized traffic signs into red and blue categories using YCbCr color space and filtered potential signs in respective categories
- Performed shape segmentation on potential blobs by correlating with template images and classified signs using predefined templates

YouTube Video Synopsis Generator **April 2023**

- Developed an efficient YouTube Video Text Summarizer that condenses content into concise summaries using OpenAI and LangChain APIs.
- Implemented optimal prompting strategies (zero/few-shot) and LLM chaining (stuff, map_reduce, refine) for effective text generation
- Deployed the application on Streamlit as a user-friendly web app.

The Movie Database Web Application (Tech stack – Java, Angular, TypeScript, Node.js, HTML5, CSS3, Android Studios) **March 2021-April 2021**

- Developed a single page responsive website using Angular and Node.js to search movies/TV shows and look up all their details.
- Used Local Storage to allow users to create custom watchlists with their favorite Movies/TV Shows.
- Created an android application with the same set of functionalities as above.

TEACHING EXPERIENCE

Course Produce in Database System **January 2021-May2021**

- Assessed and provided feedback on students' assignments and papers in the Database Systems course, ensuring a thorough understanding of their academic performance and areas for improvement.
- Conducted dedicated office hours to address and clarify students' queries, fostering a deeper comprehension of Database Systems concepts and principles

Student Mentor at Robotics Coding Academy **March 2020-May 2020**

- RCA is a part of USC STEM outreach program aimed to ignite curiosity among middle school students in the field of Science.
- I worked as a mentor in the Academy to teach middle School Students basics of Programming through concepts of C programming