SHANMUKHA VELLAMCHETI

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SUMMARY

Machine Learning Researcher who, in the last 5 years, gained experience in all the stages of ML pipeline including literature survey, data collection & annotation, data analysis, model development and deployment through research/course work at UCSD and NITRR, multiple internships and full-time jobs. Proficient in Python, PyTorch, OpenCV, TensorFlow, Computer Vision and Natural Language Processing. Looking forward to contributing to the Artificial General Intelligence (AGI) revolution

EDUCATION

University of California San Diego (UCSD), USA Apr 2023
Masters in Artificial Intelligence and Robotics *GPA – 3.42/4.0*
Coursework: Computer Vision, Sensing & Estimation, Motion & Planning in Robotics, Visual Learning, Statistical Learning, 3D Computer Vision, Recommendation systems etc.

National Institute of Technology Raipur (NITRR), India Jul 2020
Bachelors in Computer Science and Engineering *GPA – 9.09/10*
Coursework: Data Structures & Algorithms, Object Oriented Programming C++, Software Engineering, Artificial Intelligence, Database Management SQL etc.

SKILLS

Programming: Python, C++, HTML, MATLAB, Java
Machine Learning: PyTorch, OpenCV, TensorFlow, Huggingface, NumPy, Matplotlib, Scikit-learn, Pandas, OpenAI gym, Surprise, Beautiful soup
Data: SQL, MongoDB, Airflow, Spark, Kafka, Tableau
Cloud: AWS (S3, Redshift, Rekognition, Comprehend, Lambda, App runner), GCP, AutoML, Docker
Tools: Flask, Git, Linux, Django

PUBLICATION

Class Imbalance Deep Learning for Bankruptcy Prediction Jan 2020
IEEE International Conference on Power, Control and Computing Technologies (ICPC2T)

- Lead the research on this paper, as the first author, where we discussed the effects of highly imbalanced numerical data on Neural Networks and presented solutions to tackle this using sampling techniques like SMOTE
- Improved the AUC-ROC metric by 5%-10% over the previous baseline using our approach

WORK EXPEREINCE

Advanced Robotics & Control (ARC) lab UCSD Feb 2022-Aug 2022
Computer Vision Researcher

- Participated in the collection of 1000s of suturing images under surgical environments with help of medical experts using RGBD cameras
- Lead the preprocessing of all these images and annotation of a small diverse subsample with precise segmentation masks for quick initial experimentation and further synthetic data generation
- Brainstormed and executed several approaches combining edge detection neural networks like HED, Segmentation neural networks like UNet and our own variant of tangent based local grid search algorithm to improve the current baseline on automatic suture detection and achieved IoU scores ranging from around 0.2 to 0.9

NIT Raipur (NITRR) Jan 2021-Jun 2021
Machine Learning Associate

- Developed a NN architecture with CoAttention mechanism at its core to tackle the problem of Aspect Based Sentiment Analysis (ABSA) and experimented its effectiveness on laptops and restaurant reviews datasets using ELMo embeddings
- Improved the performance on laptop reviews by 5% on baseline accuracy but it dipped by 4% on restaurant reviews
- Analyzed our model on the combined dataset and found that a probable cause for reduced accuracy in restaurant reviews is the excessive use of informal slang words as opposed to technical words in laptop reviews

Omnipresent RobotTech Aug 2020-Dec 2020

Computer Vision Engineer

- Reduced the deployment cost by 50%, by doubling the no. of parallel CCTV streams that can be processed, using a combination of efficient Neural Network models (like YOLO, PeopleNet etc.) for social distancing & mask monitoring
- Ported the entire model codebase from TensorFlow to PyTorch using my proficiency with both the libraries
- Integrated our models with Apache Spark and Kafka to ensure scalability and low latency while processing higher number of parallel streams and to improve the ETL process

Optum Global Solutions (UHG) May 2019-Jul 2019

Deep Learning Intern

- Coordinated with domain experts to understand a large-scale database containing medical jargon to extract important features and use them to predict the probability of insurance claim approval in the Medical Benefit Management System (MBMS) by building and testing multiple ML models in an agile CI/CD life cycle on Jenkins
- Achieved 92% accuracy model after running multiple experiments and exposed it as a REST API using Flask

Pucho Technologies Sep 2018-Dec 2018

Computer Vision Intern

- Replicated and modified a character level CNN model to perform OCR on Devanagari script with an accuracy of around 70%

PROJECTS

A Pipeline to Solve Coding Problems from Images with LLM and OCR Oct 2023

- Built a pipeline to solve coding problems directly from its corresponding image using Tesseract for performing OCR of the problem text from the input image and python code LLAMA model for regressing the code. The overall accuracy depends on the accuracies of the individual models but at the very least the output can be a great starting point for solving the problem

Vision Transformer with Skip Connections May 2023

- Adapted skip connections from UNet to Vision Transformer (ViT) for our ablation study with 4 blocks and improved the accuracy of image classification by around 5% on a subset of ImageNet dataset with 10 classes after training for only 1000 epochs from scratch

Combined Approach for Pose Detection using DARK with UniPose May 2022

- Increased the Percentage of Correct Points (PCK) for our Pose Detection model on Leeds Sports Dataset by 4% after just 20 epochs by combining two different techniques – UniPose and Distribution Aware Keypoint (DARK) representation where the latter will generate refined heatmaps to improve the performance of the former

Particle Filter SLAM and Visual Inertial SLAM using EKF on Autonomous Car Dataset Mar 2022

- Implemented Particle Filter SLAM, Extended Kalman Filter Visual SLAM, Occupancy Grid Mapping and Texture Mapping from scratch on KITTI dataset using LIDAR, Encoder, IMU and RGB Stereo camera data as part of the course ECE 276A – Sensing & Estimation in Robotics at UCSD

ACHIEVEMENTS & ACTIVITIES

- One of the only 3 recipients of Education Future scholarship through merit out of 8000 people in 2021
- Played a lead role in planning and executing projects to get to the finals and win out of 100s of teams at multiple hackathons like SKY Hack, Optum Global Hackathon, HCL Machine Learning Hackathon etc. where we worked on ML applications like Chatbots, License plate detector etc.
- Was an active Member of Research and Development Team of Association of Computer Engineers (ACE) where we organized conferences and workshops on latest technologies and trends
- Was member of Unnat Bharat Abhiyaan, which is a government initiative for social cause to help the development of literacy in rural areas