SHANMUKHA VELLAMCHETI

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EDUCATION

Masters in *Intelligent, Systems, Robotics and Controls* at *UC San Diego,* *USA, Sept 2021 – current* ***(GPA – 3.36/4)***

- Computer Vision, Sensing & Estimation, Motion & Planning in Robotics, Visual Learning, Statistical Learning, 3D Computer Vision, Recommendation systems etc.

Bachelors in *Computer Science and Engineering* from *NIT Raipur,* *India, Aug 2016 - June 2020* ***(GPA – 9.09/10)***

- Data Structures & Algorithms, Object Oriented Programming C++, Software Engineering, Artificial Intelligence, Database Management SQL etc.

Skills

- Python, C++, Pytorch, OpenCV, Tensorflow, NumPy, Matplotlib, Sklearn, Pandas, Git, Linux, HTML OpenAI gym, Flask

PUBLICATIONS

Class Imbalance Deep Learning for Bankruptcy Prediction, 2020

- Shanmukha Vellamcheti, Pradeep Singh
- First International Conference on Power, Control and Computing Technologies (IEEE ICPC2T 2020)
- We present an application of sampling techniques like SMOTE on Neural Networks when highly imbalanced data is used. We also show the effectiveness of this on our model.
- https://shanmukha-mail.github.io/publication/2020-01-05-class-imb-dl-bank

WORK EXPERIENCE

Graduate Student Researcher, *February 2022-August 2022*
Advanced Robotics & Control (ARC) lab, UCSD, USA

- Worked under the supervision of Prof. Michael Yip on detection and control of sutures for enabling autonomous robotic surgery.
- I performed literature survey to study current baselines and then worked on a combination of edge detection neural networks, Segmentation neural networks and tangent based local grid search algorithm to improve the existing state of the art baseline.
- I also labelled the data for suture segmentation model to create the dataset.

Computer Vision Intern, *August 2020-November 2020*
Omnipresent RobotTech, India

- Worked on real time deployment of social distancing & mask monitoring Software and helped the team in optimizing the performance of DNN models, ensuring scalability of the no. of parallel CCTV streams that can be processed from 15 to 30, thereby cutting the deployment cost.
- I also ported an entire existing TensorFlow model to Pytorch model from end to end.

Deep Learning Intern, *May 2019-July 2019*
Optum Global Solutions (UHG), India

- I prepared a proof of concept and added a Machine Learning feature to the Medical Benefit Management System (MBMS) to predict the probability of insurance claim approval by analyzing a large-scale patient database.

- I had to deal with and understand a large-scale database containing medical jargon in order to extract the features efficiently.

Computer Vision Intern, *September 2018-December 2018*
Pucho Technologies, India

- Dealt with Multilingual OCR as part of Computer Vision team and implemented a Neural Network model with character level CNN for Devanagari script.
- As this was a research internship, I had to perform a lot of literature survey in order to combine and use various benchmark architectures on this topic to obtain an accuracy of around 70%.

PROJECT EXPERIENCE

A Combined Approach for Pose Detection using DARK with UniPose , *May 2022*

- We tried to combine two different novel techniques introduced for Pose Detection – UniPose and Distribution Aware Keypoint (DARK) representation. The latter will generate refined heatmaps which can improve the performance of base UniPose model on Leeds Sports Dataset.
- In our ablation study we found that with DARK the average increase in Percentage of Correct Points (PCK) is around 4% after just 20 epochs which is significant.

Particle Filter SLAM and Visual Inertial SLAM using EKF on Autonomous Car Dataset, *March 2022*

- Wrote the entire Particle Filter SLAM & Extended Kalman Filter Visual SLAM procedure from scratch as part of the course ECE 276A – Sensing & Estimation in Robotics at UCSD.
- I also implemented Occupancy Grid Mapping and Texture Mapping from scratch.
- Data: LIDAR, Encoder, IMU and RGB Stereo camera from KITTI dataset

Face Mask Detector in Wild, December *2020*

- Trained RetinaNet with ResNet-50 as backbone using Wobot intelligence's face mask dataset on Kaggle
- Though the amount of training time was limited by GPU hours on Kaggle kernels, the detection of boxes on the test set was impressive with accuracy of 72%
- https://shanmukha-mail.github.io/portfolio/2 Face mask det/

Aspect Based Sentiment Analysis using ELMo and Coattention, *June 2020*

- Developed a NN architecture with CoAttention mechanism at its core in order to tackle the problem of Aspect Based Sentiment Analysis (ABSA) and experimented its effectiveness on laptops and restaurant reviews datasets using ELMo embeddings.
- We found that our model performed better on laptop reviews with an improvement of 5% on baseline accuracy while the performance was reduced by 4% on restaurant reviews.
- We also tested our model on the combined datasets to see the effects of data on the results and found that the accuracy is a bit less than the individual accuracies probably because of the slang words in restaurant reviews as opposed to technical words in laptop reviews.

ACTIVITIES

- Finalist in multiple hackathons like SKY Hack (A govt. hackathon), Optum Global Hackathon, HCL Machine Learning Hackathon etc. where we worked on ML applications like Chatbots, License plate detector etc.
- Successfully cleared 1st level of Junior Science Olympiad (JSO) - a National wide Olympiad
- Was an active Member of Research and Development Team of Association of Computer Engineers (ACE), India where we organized conferences and workshops on latest technologies and trends
- Was member of Unnat Bharat Abhiyaan, which is an Indian government initiative for social cause to help the development of rural areas