Praneet Bomma

Portfolio | GitHub | LinkedIn | Medium
Email: praneetbomma@gmail.com

Education:

- M.Sc. in Autonomous and Intelligent Systems, University of Sheffield, UK, 2022 - 23, Pursuing
- B.E. in Computer Science, Mumbai University, India, 2015-2019 - 7.23 CGPA.

Experience:

- **Machine Learning Engineer** at DL Analytics - [August 2021 - September 2022]
- **Data Scientist** at Blackstraw.ai - [September 2019 - August 2021]
- **Machine Learning Engineer** at Vidgyor Media Technologies - [June 2019 - August 2019]
- **Assisted Ph.D. research** project - [July 2018 - December 2021]

Skills:

- **Development**: Python, C, C++, CUDA, SQL, Flask, Django, Redis, Kafka, MongoDB, ROS, Bash Scripting
- **Machine Learning and Deep Learning**: PyTorch, Tensorflow, Scikit Learn, OpenCV, NLTK, Libtorch, cuDF, HuggingFace, Deepstream, GStreamer, PyTorch Distributed
- **Deployment**: TensorRT, Triton, ONNX, OpenVINO, Docker, AWS

Projects:

- **Real-time Sports Video Analytics (DLA)**
  (Real-time video analytics of streams with 4K cameras across the field)
  - Designed architecture to achieve results in real-time from 5 different models processing 4K streams simultaneously in Deepstream.
  - Developed custom post-processing for all models in Libtorch and CUDA to process on GPU.
  - Identified structural problems with Deepstream source code and implemented custom alternatives.
  - Vectorized pandas-based processing and optimized the processing by 8x to cut down the processing time from 2 hours to 15 minutes using cuDF.
  - Programmed CUDA kernels for instance segmentation postprocessing on GPU.

- **Rain Attenuation Prediction (DLA)**
  (System to predict signal attenuation based on temporal and visual information)
  - Designed and trained branched architecture with 3D Convolutions and LSTMs.
  - Incorporated skip connections and priors for better results.
  - Developed data preparation and ingestion pipeline for training and inference.

- **Pufferfish Ventilator (Blackstraw)**
  (Open source fully featured ICU ventilator designed with rapid manufacturability in mind)
  - Implemented bash scripts to set up environments of the backend, frontend, and other components on Raspberry Pi for one-click setup.
  - Designed custom system services to automate the functioning of the software components.
  - Customized Pi OS functionality for manual control over all components.
  - Secured Raspberry Pi for system integrity and failure handling.

- **Autonomous Navigation (Blackstraw)**
  (Autonomously navigating Maini using Stereo Camera and LIDAR)
  - Developed real-time instance segmentation using Yolact++ and improved segmentation results by augmenting data to handle camera lighting issues.
  - Formulated and implemented Neural Path Planner to achieve intermediate waypoints independent of GPS.
  - Optimized Occupancy Grid generation speed by 5x from 4 FPS to 20 FPS.
  - Integrated all components and implemented inter-process communication between components using Robot Operating System (ROS).

- **Real-time Risk Monitoring Video Analytics (Blackstraw)**
  (CCTV stream analytics to detect Facemask and Social Distancing violations)
  - Built facemask and social distancing violations detector using Yolov3 and optimized model using TensorRT to achieve 2x speed throughput.
  - Developed an algorithm to estimate the approximate distance between 2 persons that takes into account the vertical axis.
  - Dockerized components and deployed 40 cameras on multiple instances using Deepstream 5.0.

- **ReLIE - Paper Implementation**
  (Implemented paper by Google Research - Representation Learning for Information Extraction from Form-like Documents) - Link to paper
  - Built the neural network described in the paper from scratch and filled up the gaps/unknown things left out in the paper during implementation
  - Used a publicly available dataset in addition to the self-annotated dataset.
  - Improved results by using Focal Loss for imbalanced data.

Certifications:

- Deep Learning Specialisation on Coursera

Publications & Blogs:

- “Disorder Detection of Tomato plant using IoT & Ensemble Techniques” AFITA conference at IIT Bombay, Maharashtra, India. Link to paper.
- Indian Financial Markets in Pandemic - Open Report
- Blogs under Towards Data Science and Analytics Vidhya publications

Achievements:

- **23rd Globally** in the MAFAT Challenge, organized by The Israeli Ministry of Defence. Only 25 teams out of 300 got AUC above 0.90.
- **Outstanding Performer** for Q2, Q3 - 2020 & Q1 - 2021 in Blackstraw.ai
- Selected for **Grand Finale** of Smart India National Level Hackathon, 2018
- **1st Runner-Up** in KJSCE State Level Hackathon, India, 2017
- **1st Runner-Up** in ITSA State Level Hackathon, India, 2017

Extra Activities:

- Head of the committee named Programmers’ Club for 2 years during UG degree
- Lead Organizer of ERR_404 2.0 State Level Hackathon during UG degree