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Satya Karthik Ramachandrapurapu

Intro:

I have a total experience of **9+ Years** which encapsulates **Python programming, deep learning, Generative AI, NLP, ADAS, System engineering** and **CAD modelling**. I have a strong understanding of deep learning architectures, including FFN, CNN, GAN, RNN, LSTM, GRU, Diffusion and Transformers. In my free time I write technical blogs.

Skills

Machine learning	Python	C++	Numpy	AWS/cloud	VSCode	Tensorflow	HuggingFace
Pandas	PyTorch	Git	Matplotlib	AWS Bedrock	Generative AI	LLMs	SQL
MS office	Linux	NNabla	LoRa/QLoRa	Ollama	ONNX	TensorRT	LangChain
RAG	Librosa	FaiSS	Vector database	SageMaker studio	Gradio	Docker	PySpark

Project Details:

Technical Specialist / Sony India Software Centre

Aug-2021 to Present

Generative Ai: local LLMs for auto-code completion and codebase review

Used **OLLaMA**, **VSCode** and **CONTINUE** to provide **GitHub Co-pilot** like code auto completion environment on local server. Multiple people can access it simultaneously.

SLLURM job optimisation

Designed and implemented **a novel system** leveraging gaps in the SLURM job scheduler to optimise job scheduling and maximise computational resources utilisation. Resulted in an 8x reduction in time required for the **inference of 2 billion images**, significantly improving efficiency and throughput

PII removal for Large scale dataset

Led data filtering efforts for a vast dataset containing over **2 billion entries**, focusing on the identification and removal of **personally identifiable information** (PII) such as faces and license plates. Employed advanced techniques to efficiently sift through the data

Data filtering for fine tuning of Gen AI

Developed an image filtering system to identify **aesthetically pleasing images** for fine-tuning purposes, utilising the Aesthetics model provided by the Laion dataset creators, enabling efficient selection of high-quality data subsets for further model refinement.

Removal of near-duplicates from large scale datasets

Implemented a near-duplicate removal system for the Laion dataset, employing state-of-the-art (SOTA) models for feature extraction. Leveraged the **FAISS** library to construct a file-based vector database and perform efficient image

similarity queries. This project resulted in the removal of redundant data instances, enhancing dataset quality and reducing computational overhead for downstream tasks.

Age based CSAM filtering for large scale datasets

Developed and implemented an age-based filtering system to identify and remove images containing young children and teenagers from the dataset. This proactive measure aimed to mitigate the risk of including Child Sexual Abuse Material (CSAM) in the dataset. Utilised the MiVOLO model, a leading solution in the field, for age-prediction to identify and eliminate images featuring young children and teenagers within the dataset.

ControlNet implementation for Transformed based Gen AI model

Implemented controlNet Architecture for a transformer based **text to image** model. Conditioned it on **Semantic segmentation**.

Foundation model (BERT) pre-training implementation in NNabla

Implementation of foundation models or **NNabla** framework including **BERT-pre-training**.

This project involved understanding and adapting the architecture of BERT to NNabla's framework, ensuring compatibility and efficiency. Developed a Mix-pression manager using NNabla to facilitate half-precision training for BERT-pre-training.

Best practices adoption for AI/ML team

Spearheaded the adoption of **remote Docker container-based** development within the team, streamlining ML/DL development processes and improving collaboration efficiency including adapting **VSCode remote Development** Architecture.

Optimisation of LSTM and GAN-base model

Profiled and optimised **LSTM** and **GAN-based** models, achieving a **2.35x** performance gain for small temporal steps and a **30%** performance gain for large temporal steps, demonstrating expertise in model optimisation.

Developer / L&T Technology services

October 2014 to July 2021

Traffic Sign Detection and Classification for Autonomous Vehicles

Developed and implemented **traffic sign detection and classification** algorithms for autonomous vehicles. Ensured adherence to current safety standards and requirements for autonomous driving.

Collaborated with suppliers to integrate linear actuators for mechanising forklift lateral and longitudinal controls.

Designed and tested various machine learning model architectures to optimise problem-solving. Utilised **ROS** for basic messaging functionalities. Deployed models using the **ONNX** framework for scalability and performance.

off-highway vehicle Development team

Created Conceptual design of sheet metal brackets in **Creo**. Created electrical modules for agriculture and off-highway vehicles, including the design of the electrical schematics. Worked on Harness routing, flattening, and drawing creation in Creo. System engineering for electrical components, including the placement and packaging of components Load balance calculation, fuse selection, and circuit logic for electrical systems. Leadership of a team of 7 people and responsibility for the delivery of projects on time Developed a **Python-based automation tool** for comparing bills of materials from different sources, which reduced the time for the process from 15 minutes to 1 minute and resulted in annual savings of **$23,000**

Education:

B.Tech from BITS Pilani (WILP)