Sandhanakrishnan Ravichandran

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SUMMARY

As a qualitatively skilled AI Engineer and Data Scientist, I have a strong passion for leveraging cutting-edge AI technology to address complex real-world challenges. My background includes specialized knowledge in generative AI, such as diffusion models and large language models (LLMs). I am dedicated to continuous learning and employ a strong analytical approach to problem-solving, grounded in first principle thinking. Committed, proactive, and motivated in pursuing ongoing personal and professional development. Adaptable and capable of thriving in diverse settings and challenges.

EXPERIENCE

Generative AI Engineer - Working Student

BMW Group

11/2023 - Present Munich, Germany

- Developed and implemented deep learning-based classification model for accurate and efficient evaluation of 3D car part CAD designs.
- Researched and **implementing diffusion models to generate 3D car parts (CAD)**.
- Collaborated with the design generation team to enhance the overall quality of 3D car parts, contributing to improved product offering.

ML Researcher | Data Scientist - Generative AI

Hexo

01/2023 - Present Santa Clara, United States (Remote)

- Developed **prompt-driven background generation model using Stable Diffusion that generated realistic product photography backgrounds based on user prompts.**
- Spearheaded the entire project, demonstrating expertise in all aspects from dataset creation (more than 10,000 images) to fine-tuning, evaluation resulting in a successful product.
- **Enhancing large language models' (LLMs) performance for different persona bots applications** (GPT-3.5) through fine-tuning(**LoRa, OpenAI**).
- **Built a RAG system** that can answer queries regarding debugging, writing training scripts using local code base, documentation to improve the productivity of ML Engineers and Data Scientists.

Research Assistant

Klinikum rechts der Isar, Technical University Munich

12/2022 - 10/2023 Munich

- Skilfully managed **patient study databases, ensuring seamless integration with AI pipelines for efficient post-processing tasks and enhanced clinical analysis.**
- Orchestrated the development and deployment of dockerized AI models, empowering clinicians with user-friendly tools for streamlined diagnostic processes.
- **Developed comprehensive whole-body MR datasets**, employing advanced image and 3D processing techniques to combine leg and abdomen patient DICOM.

Python Developer

European Union: ENSNARE Project, Technical University Munich

05/2022 - 09/2022 Munich

- Implemented automation of 3D model development from 2D images, using **computer vision**, image processing, and geometric processing techniques.
- Built Python-based plugins for FreeCAD, optimising the 3D model construction process and significantly enhancing workflow efficiency.

EDUCATION

M.Sc. Biomedical Engineering and Medical Physics (Focus: AI)

Technical University of Munich

Munich, Germany

GPA **1.3** / 4.0

- **Modules:** Biomedical Physics | **AI in medicine | Deep learning** | Physics of MRI | Mathematical methods in Imaging | Image Processing in Physics.
- **Master Thesis (Summa Cum Laude):** Developed **a novel complex-valued deep learning model** to **denoise MR images (improving SNR)** to facilitate improved detection and visualization of microcalcification (precursor to breast cancer) in breast scans.
- **Image processing | Python | PyTorch | Simulations | PyTorch | GitLab| CI/CD | bash.**

EDUCATION

B.E. Biomedical Engineering

SSN College of Engineering, Anna University

10/2020 Chennai, India

GPA
1.6 / 4.0

- **Bachelor Thesis:** Developed simulation algorithms for vocal fold imaging (kymogram) to assess different pathological conditions.
- Fabricated silicone-modelled vocal folds and investigated, compared their vibratory patterns with simulations.
- **Image Processing | Matlab | Data analysis | Simulations | 3D modelling | 3D printing.**

SKILLS

Python | **C++** | **Matlab** | **C** | **Computer Vision** | **Cuda** | **Mathematics** | **Machine Learning** | **devops** | **Debugging** | **Dataset handling** | **NLP** | **AWS** | **Git** | **CI/CD** | **Docker** | **Bash** | **Pandas** | **Numpy**

LANGUAGES

English ●●●●● **German** ●●○○○

PROJECTS

Deep learning-based facet joint segmentation in CT images for robot-assisted facet joint insertion

10/2022 - 03/2023 Computer Aided Medical Procedures, Technical University of Munich

- Utilised an nnU-Net-based architecture to segment 3D vertebrae and ribs in CT images.
- Developed image processing algorithms on the vertebrae labels to locate and automate annotations of facet joints in vertebrae (verified by an expert doctor).
- Trained a butterfly-network based on nnU-Net to accurately segment facet joint labels.

Prostate Segmentation in MR images using Vision Transformers

08/2022 Technical University of Munich

- Conducted collection and preprocessing of a prostate MRI dataset for training.
- Researched and implemented Vision Transformer (ViT) model and wrote training scripts.
- The trained model was able to achieve test dice score of 0.7.

Federated learning project

11/2022 Care-for-rare, TUM.ai Industry Phase

- Researched federated learning concepts, built a prototype framework that enables loading of trained weights from multiple sources (hospitals) to optimise a centralized model while preserving clinical data privacy.
- Improved communication and collaboration kills while working in the interdisciplinary student team
- Pitched the solution to audience of students and industry expert

PUBLICATIONS

Complex-valued deep learning-based denoising of gradient echo images in high-resolution quantitative susceptibility mapping

The International Society of Magnetic Resonance in Medicine (ISMRM), Singapore

05/2024

Improved visualization of breast micro-calcifications in high spatial resolution quantitative susceptibility mapping using deep learning-based denoising

The European Society of Magnetic Resonance in Medicine and Biology (ESMRMB), Basel, Switzerland

10/2023

Modelling of vocal folds and systematic investigation of their vibrations from kymogram

TENCON, Japan

2021

REFERENCES

Dr. Dimitrios Karampinos, Professor, TUM
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Mr. Vignesh Baskaran, Co-founder, HEXO
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