Prakash Naikade

AI/ML Engineer

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prakash-naikade prakashknaikade Portfolio

Profile

I am passionate about Machine Learning, especially Computer Vision, Generative AI, and Data Science.
I have hands-on experience from academia and industry. My research interests span in the broad areas of Computer Vision, Computer Graphics, LLMs, GenAI, Digital Twins, Data Science, Deep Learning, and Machine Learning, to solve real-world problems with impactful AI-aided solutions.

Education

MSc Media Informatics — **Saarland University, Germany**
Grade: 1.6/5.0 (1.0 being the best possible score) — Oct 2020 – Aug 2024
Thesis: Novel View Synthesis of Structural Color Objects Created by Laser Markings. (1.3)
Relevant Courses: Computer Graphics, Image Processing & Computer Vision, Neural Networks: Theory & Implementation, High-Level Computer Vision, Statistics with R, Adversarial Reinforcement Learning, Human Computer Interaction, Games & Interactive Media. [Audited]: Geometric Modeling, Machine Learning, AI, Ethics for Nerds

BEng Computer Engineering — **Pune University, India**
Grade: 65% (First Class) — June 2011 – May 2015
Thesis: Secure Data Storage on Multi-Cloud Using DNA Based Cryptography.
Relevant Courses: Data Structures and Algorithms, Design & Analysis of Algorithms, Software Architecture, Software Engineering, Software Testing & Quality Assurance, Microprocessors & Microcontrollers

Professional Experience

Junior Researcher (HiWi) — **Saarbrücken, Germany**
August-Wilhelm Scheer Institute — Sept 2023 – Dec 2024
- Worked on several applied research projects, including MediHopps, iperMö, FläKI and VuLCAn.
- Implemented advanced deep learning methods for human action recognition (HAR) and body pose estimation (HPE), and delivered detailed performance evaluations of these models, along with a trained HAR model (ST-GCN++) for custom rehabilitation exercise data captured in the lab.
- Contributed significantly to the feature extraction, generation, and visualization of furniture functionalities in the Python codebase for the iperMö project, developing an AR application to turn individual furniture wishes into reality.
- Systematic Literature Research and Reviews, Project Proposals and Scientific Literature Writing.
- Generally worked on computer vision, computer graphics, and machine/deep learning tasks like human pose estimation, human action recognition, and some XR tasks.

Research Assistant — **Saarbrücken, Germany**
AIDAM, Max Planck Institute for Informatics Advisor: Dr Vahid Babaei — July 2023 – Aug 2024
- Worked on Radiance Field methods for Novel View Synthesis of structural color objects created by laser markings.
- Benchmarked SOTA radiance methods for synthetic scene involving Structural Color Object created in Blender.
- Developed capture setup to capture highly reflective and shiny structural color paintings on metal substrates.
- Improved the scene optimization using geometric prior and Anisotropy Regularizer in 3D Gaussian-Splatting method.
- Presented comprehensive experiments to demonstrate methods for simulating structural color objects before printing them using only captured images of laser-printed primaries.
- Facilitated interactive visualization of view-dependent structural color objects in web viewer.

Computer Vision Intern — **Münster, Germany**
BASF-Coatings GmbH — March 2023 – May 2023
- Developed dataset for adhesive test and corrosion detection on images of test panels of metal substrates.
- Developed framework and trained YOLOv8 model for adhesive tests' detection and UNet for corrosion detection using created dataset for automation project.

Computer Vision Intern — **Aachen, Germany**
Fenris GmbH — May 2022 – Sept 2022
- Contributed to markerless motion capture solutions using single and multiple cameras for athlete motion tracking and analysis.
- Conducted a comprehensive literature research and review focused on deep learning approaches for human pose estimation and benchmarked SOTA approaches for domain specific video data.
- Worked on different tasks such as camera calibration, deep learning based human pose estimation & golf sequence detection, estimating joint angles from 3D body poses, comparing two pose sequences and visualization of results in Blender and Unity.

Indian Civil Services Exam Preparation Jun 2015 – July 2019
During the preparation of this exam, I gained undergraduate level knowledge of Anthropology, Polity, Governance, Indian Constitution, Social Justice, International Relations, Economics (Macro), Indian & World Geography, Indian & World History, Indian Culture & Society, Environment, and Ethics. (Overall pass percentage of candidates $\approx$ 0.1%)

SKILLS

- **Programming:** Python, C#, C++, R, SQL, Matlab
- **Frameworks:** PyTorch, TensorFlow, NumPy, Pandas, scikit-learn, OpenCV, Open3D, Matplotlib, HuggingFace
- **Tools:** Conda, Jupyter Notebook, Git, Unity, Blender, Metashape, Colmap, Meshlab, Docker, Slurm/HPC, DevOps
- **OS:** Linux, Windows, Shell/Dos Scripting
- **Concepts:** Regression, k-NN, k-Means Clustering, PCA, SVM, Neural Networks, CNN, RNN, LSTM, Transformers, ViT, CLIP, Autoencoders, VAE, GAN, Diffusion Models, LLMs, VLM, NLP, GPT, Prompt Engineering, LangChain, SciPy, 2D/3D Image Processing, scikit-image, Object Detection, Classification, Localization, Segmentation, NeRF, 3DGS, 3D Reconstruction, Scene Understanding, Scene Interaction, HCI, XR, Reinforcement Learning, Database Design, Data Collection, Data Warehousing, Data Transformation, ETL, CI/CD

PROJECTS

Learn-LLMs *GenAI, Information Retrieval*
Getting a hands-on experience of using different LLM models and tools, to understand the finetuning, data preparation, evaluation & other techniques related to LLMs such as RAG and AI Agents.

Diffusion Models *Computer Vision, GenAI*
This Project is a basic implementation of Diffusion Model to understand how diffusion works.

Human Action Recognition (HAR) *Computer Vision*
Investigating the performance of different deep learning models and their ensembles used for HAR in still images.

Image Segmentation on PASCAL VOC and Cityscapes Datasets *Computer Vision*
Training and Evaluation of CNNs like UNet, RU-Net and R2U-Net for Image Segmentation.

COVID-19 Detection *Computer Vision*
TensorFlow implementation of model based on ResNet50 architecture for COVID-19 detection on Chest X-rays using dataset sourced from Kaggle.

Object Detection *Computer Vision*
Training an object detection model on custom dataset (Oxford Pets dataset) using TensorFlow Object Detection API 2.

Easy Flappy Bird *Game Development*
An simple implementation of Flappy Bird game using Unity and C#.

Roman Villa Nennig Bot - Your virtual guide to Roman Villa Nennig *NLP*
This chatbot helps the user throughout their journey of visiting a museum of the Roman Villa Nennig, developed using Google Cloud, Dialogflow Essentials and Telegram.

Ludwig Palette - an AR painting game *AR/VR*
App developed in Unity and C# allows visitors of Ludwigskirche to explore its architecture by painting on its surfaces and understand the intricacies of sculptures inside the church.

Mini-RayTracer *Computer Graphics*
Simple ray tracing engine developed in C++.

Synthetic Dataset *Computer Graphics*
Generate simple 3D rendered datasets in Blender and Unity.

PUBLICATIONS

- **Secure Data Storage on Multi-Cloud Using DNA Based Cryptography.** D Zingade, S Dhuri, **P Naikade**, N Gade, A Teke, International Journal of Advance Engineering and Research Development March 2015

CERTIFICATIONS

- **Kaggle:** Python, ML, Pandas, Feature Engineering, Data Visualization, Data Cleaning, SQL, Reinforcement Learning & Game AI, Time Series
- **Udacity:** C++, AWS ML Foundations
- **Coursera:** Mathematics for Machine Learning and Data Science, Structuring ML Project, Neural Network and Deep Learning, Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
- **Udemy:** Foundations of MR, XR, VR Development on Quest headsets with Meta's Presence Platform and Unity
- **DataCamp:** Intermediate R, Data in R **Memgraph:** Graph Analytics

LANGUAGES

English (Fluent), **Hindi** (Fluent), **Marathi** (Native), **German** (Elementary)

HOBBIES

Biking, Running, Hiking, Movies, Music