Deepan Roy

https://github.com/droy824

Email : f20220004@pilani.bits-pilani.ac.in
Mobile : +91 9620932863
Nationality : U.S.A.

SUMMARY

Aspiring researcher focused on **computer vision** and **generative AI**, with research experience in **computational photography** and **crime detection**, and work experience at experience at **Stripe**. Skilled in **2D/3D computer vision**, **federated learning**, and **generative modeling** through hands-on research and implementations.

EDUCATION

- **Birla Institute of Technology and Science**   Pilani, India
  Bachelor of Engineering in Computer Science; CGPA: 8.75/10.0   *Oct. 2022 – Present*
    - **Core Coursework:** Data Structures and Algorithms, Database Systems, Object Oriented Programming, Operating Systems
    - **Relevant Coursework:** Generative AI, Introduction to LLMs, Natural Language Processing, Deep Learning, Linear Algebra, Probability & Statistics
- **Deens Academy, ECC Road**   Bengaluru, India
  Grade XII - Computer Science; SAT: 1550/1600, CBSE Examinations: 97.6%   *Mar. 2021 – Jul. 2022*

EXPERIENCE

- **Stripe**   Bengaluru, India
  Software Developer Intern   *May. 2025 – Jul. 2025*
    - Saved **$200K** per annum by reducing **700K** manual verifications for merchant addresses using LLMs.
    - Conducted prompt engineering experiments with **1,000** user addresses to reduce the LLM's false rejection rate to **<2%**.
    - Created an abstract framework to reduce time to create new LLM verification systems from $\sim$ **2 weeks** to $\sim$ **1 day**.
    - **Utilised**: Ruby, Typescript, Mongo, Splunk.
- **CarScan.AI**   Pune, India
  Computer Vision Engineer   *Jun. 2024 – Jul. 2024*
    - Used transfer learning on Ultralytics YOLOv8 to recognise **32** car parts for Carscan.ai's vehicle damage detection app.
    - Refined Instance Segmentation by annotating **400+** multi-angle vehicle images using the Computer Vision Annotation Tool.
    - **Utilised**: Computer Vision Annotation Tool (CVAT), PyTorch, Python, Kaggle, YOLOv8, and Matplotlib.
- **Research on Computational Photography using Federated Learning**   Pilani, India
  Research Assistant under Dr. Pratik Narang, Dept. of Computer Science, BITS Pilani   *Aug. 2024 – Present*
    - Developing a federated learning solution for advanced digital image processing on RAW images while preserving data privacy.
    - Evaluated federated denoising using **7** noise models, based on **20+** studies, across **13** architectures including DBSN, DnCNN.
    - Trained Blind2Unblind architecture using federated clients on custom noise models, achieving **47.28 dB** PSNR, **0.98** SSIM.
    - **Utilised**: PyTorch, Python, WandB, Linux, and Matplotlib.
- **Research on Crime Detection in Surveillance Videos**   Pilani, India
  Research Assistant   *Nov. 2023 – May 2024*
    - Detected and classified **10** crime types in UCF-Crime dataset using YOLOv3 and DeepSORT; preprocessed **1000+** videos.
    - Designed, trained, and tuned an LSTM model, achieving an AUC score of **62.5%**, approaching state-of-the-art performance.
    - **Utilised**: Python, PyTorch, Pandas, Scikit-learn, Google Colab, Seaborn, Matplotlib, Numpy, OpenCV, and PIL.

PROJECTS

- **3D Semantic Segmentation of EPFL Electron Microscopy Dataset**   *May. 2025 – Jul. 2025*
    - Experimented with 3D segmentation task using Morphological Post-Processing, nnU-Net, and Foundation Models.
    - Pre-trained PCT-Net using Volume Fusion on unannotated volume, achieving Dice of **99.93%** on pretext task.
    - Analysed and experimented with preprocessing, Focal Dice, schedulers, postprocessing, increasing Dice from **42%** to **93%**.
    - **Utilised**: Python, PyMIC, PyTorch, Linux.
- **Implementation of Conditional PixelVAE, PixelCNN for Handwritten Digit Generation**   *Feb. 2025*
    - Reproduced PixelCNN, conditional PixelCNN, PixelVAE architectures; extended PixelVAE by creating a conditional variant.
    - Achieved strong quantitative performance on binarised MNIST dataset with average NLL of **0.169** nats per pixel.
    - **Utilised**: Python, Google Colab, Numpy, and Matplotlib.
- **From-Scratch Neural Learning in NumPy via Adam Optimisation**   *Jan. 2025*
    - Built forward/backward passes with analytical gradients and gradient descent to study neural learning without frameworks.
    - Constructed Adam optimiser from scratch, yielding **100%** test accuracy; visualised model behaviour via decision boundaries.
    - **Utilised**: Python, Pandas, Scikit-learn, Google Colab, Numpy, Matplotlib, and Seaborn.
- **Analysis of Smoking and Drinking Effects on Health Metrics**   *Sep. 2023*
    - Performed rigorous preprocessing on **10,000+** health records and conducted EDA to identify trends across **15+** metrics.
    - Boosted accuracy from **54%** to **72%** by evaluating models like Logistic Regression, Random Forest; gained **33%** via tuning.
    - **Utilised**: Python, Pandas, Scikit-learn, Google Colab, Numpy, Matplotlib, and Seaborn.

PROGRAMMING SKILLS

- **Languages**: Python, Ruby, Java, C/C++, SQL   **Technologies**: PyTorch, NumPy, Matplotlib, Keras, TensorFlow