



IISER Bhopal

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH BHOPAL

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Personal Statement

I am a Computer Science Junior at IISER Bhopal with a strong interest in **Deep Generative Models and Computer Vision**. I have worked with **Diffusion Models**, especially the score and SDE based approaches, and have built them from scratch for image generation tasks in astronomy as well as for downstream vision problems. This Summer, I was a Research Intern at **CVIT, IIIT Hyderabad**, where I worked on **conditional (part level awareness) Diffusion models for semantic object generation**. I am now looking for new research opportunities in **image and video generation, editing, and understanding** using generative vision methods.

Research Experience

Research Intern at CVIT, IIIT Hyderabad, India

Apr, 2025 - Present

CVIT is one of the leading Academic labs for research in Computer Vision in India

- Working under [Prof. Ravi Kiran](#) at CVIT
- I am broadly working on semantic image generation techniques using Diffusion Models, that translate structured layouts or object level specifications into realistic and diverse images.
- We generate structured layouts for images with part specifications, then using Conditional Diffusion based Modeling (conditioned on the generated layout) we generate diverse images.

Project Intern at JINR, Dubna

Feb, 2025 - Apr, 2025

Selected for the INTEREST Program

- Worked on application of CNNs to Particle Physics experiment (OPERA) carried out at CERN and JINR
- Built Visual Tools for the same and analysed of the Experiment Data.

Education and Achievements

Indian Institute of Science Education and Research, Bhopal (IISER-B)

Aug 2023 - Present

BS in Computer Science

- GPA: 8.98/10.0
- **Coursework:** Data Structures and Algorithms, Discrete Mathematics, Linear Algebra, Single Variable Calculus, Multivariable Calculus, Probability and Statistics, Programming with C, Complex Variables, Economics, Basic Electronics, Signals and Systems.
- **Activities:**
 - Recipient of Prestigious **Reliance UG Scholarship**
 - Winner of Institute wide Competitive Coding Contest
 - Member of IISERB Coding Community

Technologies and Skills

Languages : C++, C, Java, Python, Lua

Machine Learning : Supervised Learning, Unsupervised Learning, Deep Learning

Frameworks/Libraries: PyTorch, Numpy, Matplotlib, Scikit-learn, Tensorflow (beginner)

Software & Tools : Git, Github, LaTeX, AutoCAD, VS Code, Visual Studio

Web Development : HTML, CSS, JavaScript

Scientific Computing : MATLAB, Simulink

Projects

DiffuseSeg : Synthetic Data and Segmentation from a Single Diffusion Model

[github](#) 

- The project demonstrates how a single, unconditionally trained DDPM can serve as a backbone for both high fidelity image generation and label-efficient semantic segmentation.
- Implemented a two stage pipeline: (i) training an unconditional DDPM for image synthesis, (ii) freezing the UNet to extract multiscale features and training lightweight pixel-wise segmentation heads.
- Achieved strong segmentation performance on CelebAHQ with very few labeled samples (mIOU > 0.35 using only 100 images).
- Designed efficient feature extraction from specific decoder blocks and timesteps to construct rich pixel descriptors for semantic part segmentation.
- Released trained models, a starter synthetic dataset with masks, and reproducible training/inference scripts. Find these from the Github repo.
- Tools Used: Python, PyTorch, Diffusers, HuggingFace Datasets, Colab

GravLensDiffusion

[github](#) 

- The Project aims to generate high quality images of Strong Gravitational Lensing.
- Implemented the DDPM model from scratch and trained it to generate images of Strong Gravitational Lensing.
- Achieved high accuracy in the Generation task despite limited compute resources. Evaluated using standard metric FID between the source images and generated images.
- Tools Used: Python, PyTorch, Root Software

GravLensNet

[github](#) 

- The Project aims to achieve high accuracy in classifying images of Strong Gravitational Lensing.
- Implemented custom ResNET architecture after reading the seminal paper "Deep Residual Learning for Image Recognition".
- Achieved high accuracy in Classifying Astronomical Data. Evaluated using standard metrics like ROC and AUC.
- Tools Used: Python, PyTorch, Root Software

Mystery_Maze : 2D Game in Java

[github](#) 

- A 2D Maze Navigation Game written in Java.
- Uses Depth First Search Algorithm to generate a new Maze in every Game.
- Timed Bomb mechanic
- AI enemy agent following the player
- Tools Used: Java