Animesh
Computer Science & Engineering
Indian Institute of Technology Bombay

21Q050015
M.S. by Research
Gender: Male
DOB: 09/02/1998

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2024	
Graduation	Gurukula Kangri Vishwavidyalaya, Haridwar	Faculty of Engineering and Technology	2020	
Graduation Specialization: Computer Science & Engineering				
Intermediate	CBSE	Kendriya Vidyalaya, N.E.R. Bareilly	2015	95.60%
Matriculation	CBSE	Kendriya Vidyalaya, N.E.R. Bareilly	2013	9.8

MS THESIS & SEMINAR

- **Neural Rendering for Augmented Reality**
  *(MS Thesis | Guide: **Prof. Parag Kumar Chaudhuri**)* *(Jul'22-Present)*
  Objective:
  - Optimizing augmented reality using neural radiance fields for realistic augmented scenes.
  - Extending **individual NeRFs** as building blocks for merged AR renderings.

  Current work:
  - Developing a novel approach to address occlusion and illumination challenges in augmented reality (AR) scene augmentation using NeRF models.
  - Extending innovative methods, including **inferring individual NeRFs** and using **intermediate merged NeRFs** with a *Generalizing module* to enhance realism and immersion in AR scenes.
- **Advancements in Neural Rendering**
  *(MS Seminar | Guide: **Prof. Parag Kumar Chaudhuri**)* *(Jan'22-May'22)*
  - Analyzed limitations of naive NeRF method: *relighting, texture editing, and dynamic scene rendering*.
  - Explored follow-up works that enhance neural rendering techniques.
  - Provided **quantitative comparison** of discussed methods, offering insights into recent advancements in the field of neural rendering.

COURSE PROJECTS

- **Pianos are hard? VAEs to the rescue!**
  *(CS 726: Advanced Machine Learning, Instructor: **Prof. Sunita Sarawagi**)* *(Jan'22-Jun'22)*
  - Developed and open-sourced a **CNN-based Variational AutoEncoder (VAE)** architecture for musical notes generation specifically piano notes in **MIDI** file format.
  - Utilized **Lakh Pianoroll Dataset (LPD)** for model training, which encompasses musical sequences from five instruments: *Drums, Piano, Guitar, Bass, and Strings*. We focused on piano sequences for the scope of this project which can later be extended to generate sequences for other instruments.
- **Gameplay with moving hand gestures**
  *(CS 763: Computer Vision, Instructor: **Prof. Sharat Chandran**)* *(Jan'22-Jun'22)*
  - Engineered an efficient system enabling video game character movements through **dynamic hand gestures**.
  - Leveraged Google's *MediaPipe Hands* for precise extraction of hand features and integrated of **Optical Flow Data** and **Decision Trees** for reduced gesture prediction times as compared to other complex methods such as *neural network*, thus **optimizing real-time control**.
- **Anime Recommender System**
  *(CS 725: Foundations of Machine Learning, Instructor: **Prof. Preethi Jyothi**)* *(Jul'21-Nov'21)*
  - Employed *Kaggle's anime recommendations dataset* encompassing **13k** anime and **7.2M** user reviews, with a keen emphasis on harnessing genre data for effective recommendations.
  - Employed a diverse array of recommendation techniques, such as **popularity-based**, **collaborative filtering** (both memory and model-based), and **content-based approaches**. Also addressed challenges including the *cold start* scenario and personalized suggestions.
- **Character Animation and VFX in Blender (Assignment)**
  *(CS 775: Advanced Computer Graphics, Instructor: **Prof. Parag Kumar Chaudhuri**)* *(Jan'23-Jun'23)*
  - Utilized **character rigging** techniques in **Blender** to animate fictional character *Spiderman*, showcasing proficiency in character animation.
  - Seamlessly integrated the character into a video shot on mobile via Blender's **camera tracking**.
  - Further enhanced augmented visual effects realism via **strategic lighting** in Blender viewport.

- **FMX Modelling, Rendering and Animation in OpenGL (Assignment)**
  *(CS 675: Computer Graphics, Instructor: **Prof. Parag Kumar Chaudhuri**)* *(Jul'22-Nov'22)*
  - Leveraged OpenGL (in **C++**) to develop **hierarchical models** for humanoid, motorbike, and track with defined degrees of freedom. Later integrated all in a final scene within a **cubemap-rendered skybox**.
  - Implemented **dynamic lighting**, including **shadow mapping** for two toggleable *global lights*, a *spotlight* for the rider, and a *motorbike headlight*.
- **Image Quilting for Texture Synthesis**
  *(CS 663: Fundamentals of Digital Image Processing, Instructor: **Prof. Ajit Rajwade**)* *(Jul'21-Nov'21)*
  - Successfully implemented the **paper** "Image Quilting for Texture Synthesis and Transfer" in **MATLAB** to perform **texture synthesis** through image quilting.
  - Leveraged **image quilting** as a simple yet effective method for generating novel visual appearance, seamlessly stitching together small patches from existing images to synthesize a new image.
- **XYZ News Portal**
  *(CS 699: Software Lab, Instructor: **Prof. Kavi Arya**)* *(Jul'21-Nov'21)*
  - Developed *XYZ News Portal*, a dynamic web application using **PHP, Bootstrap & mysql**.
  - Employed **python web-scrapping** to scrap various news articles from various local news portals.
  - Established a **robust database** to store and manage news article information, complemented by an efficient admin portal for content editing and management.

TECHNICAL SKILLS AND COURSES

- **Programming & Scripting Languages**: C, C++, Python, HTML, CSS, Javascript
- **Tools & Libraries**: MATLAB, LaTeX, OpenCV, PyTorch, OpenGL, mysql, git
- **Key Courses**: Computer Graphics, Advanced Computer Graphics, Foundations of Machine Learning, Advanced Machine Learning, Computer Vision, Fundamentals of Digital Image Processing

POSITIONS OF RESPONSIBILITY

- **Interview Coordinator** *(Sep'21-Dec'21)*
  - Coordinated with a team of **250+** members for interviews of **1800+** students.
  - Assisted in conducting Tests for **20+** firms and handling student queries.
- **Teaching Assistantship**
  - **CS475/CS675: Computer Graphics**
    *(Instructor: **Prof. Parag Kumar Chaudhuri**)* *(Jul'23-Nov'23)*
    - Assisted the instructor in smooth operations of all course related activities.
  - **CS 449: Topics in Artificial Intelligence Programming**
    *(Instructor: **Prof. G Sivakumar**)* *(Jul'22-Nov'22)*
    - Helped the instructor to efficiently conduct and evaluate the mid-semester, end-semester exams and project evaluations.
  - **CS 763: Computer Vision**
    *(Instructor: **Prof. Sharat Chandran**)* *(Jan'23-Jun'23)*
    - Facilitated course assignment creation and evaluation for a class of **60+** students.
    - Supported instructor in conducting efficient end-semester exams and project evaluations.
  - **CS 101: Computer Programming and Utilization**
    *(Instructor: **Prof. Parag Kumar Chaudhuri**)* *(Dec'21-Mar'22)*
    - Coordinated with a team of **50+** TAs to administer weekly quizzes and coding assignments for a class of **750+** students.
    - Conducted doubts clearing sessions and provided student support.
- **Organizing Committee Member - Jnagani 2017**
  Annual Techno and Cultural festival of Gurukula Kangri Vishwavidyalaya *(Mar'17)*
  - Successfully managed a 3-day college fest with **2000+** footfall.
  - Coordinated and executed diverse technical and nontechnical events.
  - Secured sponsorships from multiple firms to support the event.

ACHIEVEMENTS & HOBBIES

- Managed to secure **99.56** percentile in GATE CSE 2021, among **1 lakh+** candidates.
- Presented the research work as a *poster presentation* in **CSE Research Symposium 2023** at IIT Bombay.
- Achieved **top rank** in the CBSE Board Class 12th examination **within the entire school cohort**.
- Passionate **electric guitar player** and an avid consumer of **psychological and philosophical** media content.