

# Shivam Tripathi

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## Research Interests

Representation learning for image, video, 3D, and multi-modal data; creative editing/manipulation using generative AI; working with probabilistic models such as GANs, VAEs, and denoising diffusion models

## Education

(\*)-Academic Excellence, (†)-I-Div Hons

### Indian Institute of Technology, Kanpur

July 2021 - Present

MS (Research) in Computer Science

GPA: 9.5\*/10

Advisor: Prof. Gaurav Sharma [✉](#)

### Pranveer Singh Institute of Technology, Kanpur

July 2016 - July 2020

B.Tech in Computer Science

GPA: 7.66†/10

## Professional Experience

### Samsung R&D Institute Bangalore, India

Bangalore, India

Senior Engineer (Research)

July 2024 - Present

- Working on Camera Hardware Abstraction Layer (HAL)

## Research Experience

### Audio-Guided Image Manipulation

Kanpur, India

MS Thesis, IIT Kanpur

Jan 2022 - Present

- Advisor: Prof. Gaurav Sharma [✉](#)
- Developing an audio-visual stylization framework that transforms image styles based on audio semantics
- Hierarchical VQVAE and StyleGAN2 are used for feature learning and image generation respectively
- Working on StyleGAN2 inversion, audio-feature alignment, and stylization
- Building an innovative data processing pipeline to extract training data for audio-visual feature learning utilizing large-scale audio-visual datasets

### TensorTour (acquired by Typeface.ai [✉](#))

Remote

Research Intern

May 2022 - July 2022

- Image Retrieval System: Managed image metadata using SQLite, performed CRUD operations, and built a Flask API for content-based image retrieval, providing top-k similar images from user queries
- Explored and conducted a comparative study of available neural image compression models

### Indian Statistical Institute, Kolkata

Kolkata, India

Research Intern

Jan 2019 - Sep 2019

- Advisor: Prof. Nikhil R. Pal [✉](#) ; Internship Letter: [✉](#)
- Unsupervised Feature Selection: Conducted experiments leveraging self-organizing maps (SOMs) for 2D lattice projection with Sammon's structure-preserving loss, selecting significant features while preserving lattice visualization
- Manifold Learning for Data Visualization: Experimented on t-distributed stochastic neighbor embedding (t-SNE) and autoencoder-based latent representation methods to enhance visualization for datasets with complex manifolds

## Projects

### Image Colorization with conditional GANs

[github](#) [✉](#)

Mentor: Prof. Priyanka Bagade

- Worked on pix2pix image colorization model with deep residual UNet and generator pre-training
- Experimented with generator designs and regularizers; assessed on ImageNet and MSCOCO using PSNR

and FID score

### Analysis of India's Census Data and COVID-19 Data

[github](#) 

Mentor: Prof. Arnab Bhattacharya

- Extracted and analyzed data from government-provided APIs for generating insights into COVID-19 trends, identifying peaks for waves, vaccination status, and forecasted dosing milestones
- Analyzed 2011 Census language data, conducting detailed linguistic demography by gender, age, literacy, and geography. Calculated state-wise language distribution, top regional languages, and gender-based distribution of multi-lingual speakers
- Employed Numpy, Pandas, and JSON for wave analysis, vaccinated prediction, and forecasting

### Safe Vehicle System using Internet of Things

[github](#) 

Mentor: Prof. Priyanka Bagade

- Built drowsy driver detection system, utilizing YOLO, EYENET, and CNNs for face masks, seatbelts, and gaze detection
- End-to-end testing was done on Proteus simulator using Raspberry Pi

### Analyzing Various Factors Affecting Climate Change

[github](#) 

Mentor: Prof. Arnab Bhattacharya

- Comprehensive analysis of climate change factors: emissions, temperature rise, glacier melt, sea-level rise, plastic, deforestation, linking to disasters and species endangerment; processed 40+ datasets, revealing climate change insights through meticulous data preprocessing and analysis

### IoT-based Smart Irrigation System

[github](#) 

Mentor: Prof. Priyanka Bagade

- Simulated Arduino Mega 2560-based irrigation system on Wokwi, gathering temperature and humidity from DHT22 sensors; trained neural network to predict water needs, whose flow is controlled via servo motors






### Suspicious Activity Detection

[github](#) 

- Developed a video classification system using convolutional and recurrent neural networks (CNNs & RNNs) to detect suspicious and safe activities, automating real-time monitoring for enhanced security
- Employed a pre-trained Inception-v3 model for high-level feature extraction from video frames, followed by LSTM for sequence understanding

## Scholastic Achievements and Extra-Curricular

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- Cleared Samsung Professional Level Software Certification (SWC Professional) for Software Competency
- Served as Department Placement Coordinator at Student's Placement Office, IIT Kanpur; helping the placement team connect with recruiters for the Fall 2023 placements
- Received [Academic Excellence Award](#)  (2021 & 2022) at **IIT Kanpur**, ranking in top 10% GPA
- Ministry of Human Resource Development (MHRD) Assistantship for GATE Qualified Candidates (2021-2023)
- Secured **All India Rank 231** in **GATE CS 2021** out of 101, 922 candidates that appeared for the examination
- Qualified in CodeChef SnackDown 2019 upto Round 1B 
- Qualifier in DST (Department of Science and Technology) & Texas Instruments India Innovation Challenge Design Contest 2018, Anchored by IIM, Bangalore 
- Participated in [IIT Bombay's e-Yantra Robotics Competition \(eYRC-2017\)](#) , reaching Semi-Finals; utilized Arduino IDE, OpenCV, and V-REP for programming, marker detection, and implementing PID controller for path following of a fruit-collector robot
- Certification Course on Machine Learning Specialization at [CloudXLab](#) 

## Teaching Assistant

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**CS771:** Introduction to Machine Learning

*Jan 2023 - May 2023*

**CS300:** Technical Communication

*July 2022 - Nov 2022*

**ESC101:** Fundamentals of Computing

*Dec 2021 - July 2022*

## Technical Skills and Relevant Coursework

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*(\*)-Awarded Grade 'A'*

**Languages:** C, C++, Python, SQL, L<sup>A</sup>T<sub>E</sub>X

**Frameworks/Libraries/Tools:** PyTorch, TensorFlow, OpenCV, Scikit-Learn, Numpy, Pandas, Git, L<sup>A</sup>T<sub>E</sub>X

**MS Coursework:** Introduction to Machine Learning\*, Deep Learning for Computer Vision\*, Data Mining\*, Introduction to IoT

**B.Tech Coursework:** Data Structures & Algorithms, Operating Systems, Computer Networks, Database Management Systems, Software Engineering, Agile Software Development, Web Technologies, Image Processing\*, Data Compression, Artificial Intelligence, Distributed Systems, Data Warehousing & Data Mining