Shivam Tripathi

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EDUCATION

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

Year	Degree/Certificate	Institute	CPI/%
2021-Present	MS (Research)/Computer Science & Engg.	Indian Institute of Technology, Kanpur	**9.5***/10
2016-2020	B.Tech/Computer Science & Engg.	Pranveer Singh Institute of Technology, Kanpur	7.66†/10
2014	XII (CBSE)	Prabhat Sr. Sec. Public School, Kanpur	82.8%
2012	X (CBSE)	Prabhat Sr. Sec. Public School, Kanpur	8.8/10

RESEARCH EXPERIENCE

- **Audio-guided Image Manipulation** (MS Thesis) *(Jan'22 - Present)*
  Supervisors: *Prof. Gaurav Sharma & Prof. Surender Baswana*
  - Developing an innovative **audio-visual stylization** framework that transforms image styles based on audio semantics
  - **ResNet** and **Instance-conditioned GAN (ICGAN)** are used for feature learning and image generation respectively
  - Studied **text-guided manipulation** methods based on **denoising-diffusion models (DDPMs) and GANs**
  - **Research Areas:** Computer Vision, Audio-Visual Learning, Image Stylization

- **TensorTour** (Research Internship) *(May'22 - Jul'22)*
  - **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
  - **Neural Image Compression**: Conducted in-depth comparative study of state-of-the-art neural image compression models

- **Indian Statistical Institute, Kolkata** (Research Internship) *(Jan'19 - Mar'19 & Jun'19 - Sep'19)*
  Supervisor: *Prof. Nikhil R. Pal*
  - **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** methods to enhance visualization for datasets with complex manifolds

PROJECTS

- **Image Colorization with conditional GANs** (CS776A) Guide: *Prof. Priyanka Bagade* *(Feb'22 - Apr'22)*
  - Enhanced **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

- **Classification and Object Detection** (Self-Project) *(Feb'22 - Mar'22)*
  - **Object Detection:** Created an object detection model with **ResNet50** on **VOC2007**, achieving **mean average precision (mAP) of 0.27**; implemented **mAP, non-maximum suppression (NMS), and intersection over union (IoU)** from scratch
  - **Classification:** Employed a CNN for classifying **CIFAR10**; using **convolution** and **pooling** functions written from scratch

- **Core Machine Learning Algorithms [Implementation]** (CS771A) Guide: *Prof. Nisheeth Srivastava* *(Aug'21 - Nov'21)*
  - **Supervised Algorithms:** KNN, decision tree, perceptron algorithm; **optimization:** simple and stochastic gradient descent
  - **Unsupervised Algorithms:** Kernel K-means (Gaussian RBF) and K-Means++
  - **Probabilistic:** MCMC sampling for approximating Bayesian posteriors; Expectation-Maximization (EM) for GMMs

- **Analyzing Various Factors Affecting Climate Change** (CS685A) Guide: *Prof. Arnab Bhattacharya* *(Aug'21 - Nov'21)*
  - Comprehensive **analysis of climate change factors**, linking to disasters and species endangerment
  - Processed 40+ datasets, revealing climate change insights through meticulous **data preprocessing and analysis**

- **Safe Vehicle System using Internet of Things** (CS698T) Guide: *Prof. Priyanka Bagade* *(Aug'21 - Nov'21)*
  - 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**

- **IoT-based Smart Irrigation System** (CS698T) Guide: *Prof. Priyanka Bagade* *(Aug'21 - Nov'21)*
  - 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

SCHOLASTIC ACHIEVEMENTS AND EXTRA-CURRICULAR

- Received **Academic Excellence Award** (Academic Year 2021-22) at **IIT Kanpur**
- Secured **All India Rank 231** in **GATE CS 2021** out of 101, 922 candidates that appeared for the examination
- Participated in **IIT Bombay's e-Yantra Robotics Competition (eYRC-2017)**, reaching **Semi-Finals**

POSITIONS OF RESPONSIBILITY

- **Department Placement Coordinator (Student's Placement Office, IIT Kanpur):** Computer Science & Engg. *(May'23 - Present)*
- **Teaching Assistant:** Introduction To Machine Learning (CS771A), Fundamentals of Computing (ESC101) *(Dec'21 - Apr'23)*

RELEVANT COURSES AND TECHNICAL SKILLS

(*)-Awarded Grade 'A'

- **MS (Research) Courses:** Intro to Machine Learning*, Deep Learning for Computer Vision*, Data Mining*, Intro to IoT
- **BTech Courses:** Data Structures & Algorithms, Operating Systems, Computer Networks, Database, Agile, Image Processing*, AI
- **Languages/ML Libraries/Utilities:** C, C++, Python, PyTorch, Scikit-Learn, Numpy, Pandas, SQL, Git, LaTeX