Swasti Shreya Mishra

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Education

2017-2022 **Integrated Master of Technology**
CGPA : 3.75/4, International Institute Of Information Technology Bangalore, India
B.Tech in Computer Science Engineering
M.Tech specialization in Artificial Intelligence and Machine Learning

Peer-Reviewed Publications

June'23 **SketchBuddy: Context-Aware Sketch Enrichment and Enhancement**
[Link to paper] A. Agarwal, A. Srivastava, I. Nair, **S. S. Mishra**, V. Dorna, S. R. Nangi, B. V. Srinivasan.
MMSys '23: Proceedings of the 14th Conference on ACM Multimedia Systems
We introduce SketchBuddy, a framework for enhancing sketch-based ideation and illustration by suggesting diverse fine-grained objects and seamlessly integrating them into the scene. This innovative system uses multi-modal transformers for context-aware recommendations and employs a CNN-based classifier to determine suitable insertion locations. Comparative evaluations highlight SketchBuddy's unique scene-level assistance capabilities and its value in enhancing sketch workflows. [Note: The first 5 authors have equal contributions.]

December'22 **A Hybrid Rigid and Non-Rigid Motion Approximation for Generating Realistic Listening Behavior Videos**
[Link to paper] **Swasti S. Mishra**, Kumar Shubham and Dinesh Babu Jayagopi.
ICVGIP '22: Proceedings of the Thirteenth Indian Conference on Computer Vision, Graphics and Image Processing
Utilizing generated behavioural videos, particularly in controlled settings, is an emerging area in multi-modal interaction research. This includes understanding listening behaviours, crucial in dyadic conversations. While models like the first-order motion model (FOMM) can transfer actor behaviour onto facial images, they have limitations, such as artefacts. Our proposed hybrid model combines first-order and zero-order motion, improving output quality and preventing distortion, especially in non-rigid body motions.[Note: This is my Master's Thesis work. Link to the full paper.]

December'21 **Firm Dynamics and Employee Performance Management in Duopoly Markets**
[Link to paper] Udhayanan, Prateksha, **Swasti S. Mishra**, and Shrisha Rao.
Physica A: Statistical Mechanics and its Applications (2021): 126298.
Our model captures real-world firm dynamics such as employee motivation and CEO characteristics. We find that a non-standard vitality curve setting leads to an efficiency gain over the standard one. We also study the effects of Peter Principle on firms competing in Stackelberg and Cournot games. [Note: The first 2 authors have equal contributions.]

Work Experience

July'22-Present **Research Associate @ Adobe Research Bangalore, India**
Working in the Collaborative Creativity Team, where our research explorations broadly lie in computer vision and multimodal perception. Worked on content-aware layout generation for graphic designs. Building a text-to-video generation framework for generating cinemagraphs. Some of these works are currently under review.

January'22-April'22 **Research Intern @ AWL Japan**
Extensively analyzed multi-object tracking models and their evaluation metrics. Worked on adapting the SOTA model for a client use case.

August'21-October'21 **Mitacs Globalink Research Intern @ University of Waterloo**
Worked under the supervision of *Prof. Dr. Chul Min Yeum* [Link] on building-height estimation using Deep Learning for Flood Risk Analysis in CViSS Lab [Link].

May'21-August'21 **Research Intern @ Adobe Research Bangalore, India**
Worked on context-aware sketch enrichment and enhancement using Deep Learning techniques. We explored sketch representation, contextual recommendation and salient region generation. Worked with various deep learning architectures like Transformers for the image domain, Variational AutoEncoders for image reconstruction, and U-Net for saliency-map generation for contextual placement.

May-July'20 **Research Intern @ BIOTEC, TU Dresden, Germany**
Machine learning and database integration for network-based biological pathway enrichment analysis. This included implementing basic text-mining based approaches that search for lipid signatures and biological pathways present in the published literature and populate a graph database. [Link to **LIPEA**]

June-July'19 **Software Engineering Intern @ Microsoft, Bangalore, India**
Automated the process of interview scheduling for organizations by developing a web and mobile app using React/React Native, Django frameworks and Azure Services (such as Notification Hub and SQL Server). Used Microsoft Graph APIs such as Outlook Calendar API and Teams API to personalize the app for users. Made the app production-ready.

Notable Projects

Computer Vision **Image Deblurring**, *Supervisor: Dr. Dinesh Babu Jayagopi* [Link]
Built a Generative Adversarial Network that can learn to deblur images, scene text and text documents. The objective was to use non kernel estimation-based method to tackle this task.

Visual Recognition **Object detection and attire classification on video dataset**
Built a transfer learning-based model using YOLO for object detection and coupled it with a ResNet classifier for attire classification on humans. [Link to repository]

Machine Learning **Travel duration prediction for BMTC buses**
Built a travel duration prediction model for Bangalore Metropolitan Transport Corporation (BMTC) buses. This involved cleaning up the raw data (15GB), exploratory data analysis and feature extraction. Experiments were conducted to find out the best-fitting machine learning model.

Natural Language Processing **Building agent capable of playing text-based games**
Built a reinforcement learning agent that can navigate and interact within a text environment, using language understanding, dealing with a combinatorial actions space, efficient exploration, memory, and sequential decision-making. [Link to repository]

Full Stack Development	**Building full stack application using DevOps methodology** Built a simple app, where the frontend was built using React and the backend was built using Django. Testing was done using PyTest. Continuous integration was done using Jenkins, containerization with Docker and DockerHub, continuous deployment using Ansible and continuous monitoring using the ELK stack. [Link to repository]

Tools and Technologies

Languages	Python, C/C++, JavaScript, Java, CypherQL, SQL
Python Libraries	Pytorch, Numpy, Pandas, Scikit-learn, Scipy, Seaborn, Matplotlib
Others	Jupyter, LaTeX, React/React Native, Git, Neo4j, HTML, CSS

Relevant Courses Completed

AI/ML	Artificial Intelligence, Visual Recognition, Natural Language Processing, Multi-Agent Systems, Machine Learning, Mathematics for Machine Learning
Computer Science	Data Visualization, Computer Graphics, Graph Theory, Software Production Engineering, Programming Languages, Operating Systems, Introduction to Automata Theory and Computability , Discrete Mathematics, Data Structures and Algorithms, Design and Analysis of Algorithms, Database Systems, Programming (Python, C, Java, C++), Software Engineering

Achievements

2022	Awarded **Late Sri. N. Rama Rao Medal for All-Rounder of the Year**, International Institute Of Information Technology, Bangalore
2017-22	Awarded **Dean's Merit List**, International Institute Of Information Technology, Bangalore
2021	Awarded **Adobe Women in Technology Scholarship** (1 among 6 scholars in India)
2018	Qualified for **ACM-ICPC (Association for Computing Machinery - International Collegiate Programming Contest)**, India Regionals (Kharagpur and Amritapuri)
2018	Won **Google 'Build For India' Hackathon**, Google Bangalore, secured 1st position in the Android Track

Extra Curriculars

2023	Published a poetry book **"Dimensional Thoughts"**.
2021	Took up Teaching Assistant-ship for the **Machine Learning** and **Visual Recognition** courses under Dr. Dinesh Babu Jayagopi [Link]
2021	Volunteered as a mentor for the **Women in Machine Learning & Data Science**, New Delhi Chapter
2018-Present	**Dance Club IIIT Bangalore** founder and core team member