

Ajeet Kumar Yadav

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EDUCATION

- **Indian Institute of Science: Master of Technology in Signal Processing (7.8/10)** Bangalore, India
Courses: Advanced Image Processing, Pattern Recognition and Neural Networks, Advanced Deep Neural Networks. Aug 22-June 24
- **Institute of Engineering and Technology: Bachelor of Technology in ECE (7.8/10)** Lucknow, India
Courses: Digital Image Processing, Machine Learning, Introduction to Cloud Computing, and core courses Aug 2018 - June 2022

PUBLICATION

Generation of Indian Sign Language Letters, Numbers and Words: IACIS 2024 Publication (Accepted, Aug 24)
Developed a GAN variant combining ProGAN and SAGAN models to generate feature-rich, high-resolution, class-conditional images of Indian Sign Language letters, numbers, and words. This model outperforms traditional ProGAN in Inception Score and Fréchet Inception Distance. A large dataset of high-quality images of Indian Sign Language was also published.

INTERNSHIP AND EXPERIENCE

- Unistring Tech Solution Pvt.Ltd: Machine Learning Engineer**, Hyderabad, India. (July 2024 - Present)
 - **Marine Threat:** Working on submarine threat detection by underwater acoustic signal processing and classification.
- Tata Elxsi Limited: Artificial Intelligence Developer**, Bangalore, India. (May 2023 - July 2023)
 - **Image and text embedding:** Trained ClipCap model on a self-prepared dataset containing trailers and their descriptions to extract the description of a trailer. Extended it to generate the description of activities in a movie along with its genre.
 - **Video Context Summarization:** Fine-tuned a Bi-modal Transformer model to summarise a movie and trailer on the SYMON dataset. Visual and audio feature extraction were performed using the I3D and VGGish models, respectively.
- RoboSlog Pvt.Ltd: Robotics Developer**, Online. (Jun 2020 - Sept 2020)
 - **Deployable DL models:** Developed face recognition and specific object recognition models to implement on Raspberry Pi using the TensorFlow module. Used a deep CNN for face recognition and fine-tuned Faster-RCNN for object recognition.
 - **Complexity compression of models:** Enhanced the efficiency of models by optimizing their time and memory complexity, making them suitable for hardware implementation. Utilized Gazebo and Proteus software for virtual simulations.

PROJECTS

- **Enhancing Clustering Performance through Hybrid Dimensionality Reduction Techniques: A Comparative Study on Datasets:** Addressing the curse of dimensionality in Gaussian Mixture Models(GMMs), the project aims to explore the potential of hybrid techniques by combining Variational Autoencoders (VAEs) and GMMs to enhance clustering performance. A comprehensive study of the clustering effectiveness of the VAE+GMM hybrid approach against traditional clustering methods, such as Principal Component Analysis + GMM and t-distributed Stochastic Neighbor Embedding + GMM, across multiple datasets is done. It gives insights into the scenarios where the hybrid approach excels along with its limitations. (Aug 2023 - Oct 2023)
- **Optimization of Accurate Image Super-Resolution using Very Deep Convolutional Networks(VDSR) for real-time application on mobile devices:** VDSR uses a very deep convolutional network and performs very well on image super-resolution tasks, but its implementation on Android for real-time use is challenging due to the large time and memory complexity. Improved metrics and reduced computational complexity by removing the sparse parameters from the model. (Feb 2023 - Apr 2023)
- **Cell image segmentation using Watershed and U-net algorithm:** Created a collaborative model that combines U-net and Watershed algorithms to define instances of overlapping cells. The model utilized a pre-trained U-net network for accurate cell detection, complemented by the precise contour delineation enabled by the Watershed algorithm for better outcomes. (Dec 2022)
- **Intelligent Security and Information management system using video analysis:** An intelligence surveillance system which can trim a useful part of a live surveillance stream and store the part of the video containing personnel appearance. MTCNN is used to detect the face of the person, and FaceNet is used to recognise the person present in the video. The collected data is managed by the Database Management System for future analysis in a structured manner. It has a user-friendly interface that enables the admin to access the collected data and real-time video stream from any location via the Internet. (Nov 2021- May 2022)

PROGRAMMING LANGUAGES AND TOOLS

- **Languages:** Python, C
- **Frameworks:** PyTorch, Tensorflow, OpenCV
- **Operating system:** Ubuntu

TRAINING AND COURSES

- Practical Machine Learning with Tensorflow, Instructor - Prof. Ashish Tendulkar from NPTEL – (Nov 2020)
- Python Programming - A Practical Approach from E & ICT Academy, IIT Kanpur – (July 2020 - Dec 2020)
- Machine Learning of Stanford University, Instructor - Andrew Ng from Coursera Online – (Jul 2019 - Jan 2020)
- Enhancing Soft Skills and Personality, Instructor - Prof. T. Ravichandran from NPTEL – (Feb 2019 - April 2019)

EXTRA CURRICULAR & HONORS

- Worked as a Teaching Assistant under Dr. Pratosh A.P. for PRNN course at IISc Bangalore during winter fall - 2024
- Secretary of IET Robotics Club at Institute of Engineering and Technology, Lucknow – (July 2020 - June 2021)
- Secured international rank 5 in Techkriti International Autonomous Robotics Competition IIT Kanpur (IARC) – 2019