

MADHAV AGARWAL

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EDUCATION

PhD, Computer Science University of Edinburgh, UK	Jan 2025 - Present
MS by Research, Computer Science and Engineering International Institute of Information Technology Hyderabad, India	Jan 2021 - June 2023 CGPA: 9.17
Bachelor of Technology (Hons.), Information Technology Dr. A.P.J. Abdul Kalam Technical University, Lucknow, India	Aug 2014 - June 2018 Percentage: 76.00

PUBLICATIONS

- Understanding the Generalization of Pretrained Diffusion Models on Out-of-Distribution Data. *AAAI Conference on Artificial Intelligence (AAAI)*, 2024. **(Oral)**. Sai Niranjan Ramachandran*, Rudrabha Mukhopadhyay*, **Madhav Agarwal***, C.V. Jawahar & Vinay Namboodiri. ([Link](#))
- Audio-Visual Face Reenactment. *Winter Conference on Applications of Computer Vision (WACV)*, 2023. **Madhav Agarwal**, Rudrabha Mukhopadhyay, Vinay Namboodiri & C. V. Jawahar. ([Link](#))
- Compressing Video Calls using Synthetic Talking Heads. *33rd British Machine Vision Conference (BMVC)*, 2022. **Madhav Agarwal**, Anchit Gupta, Rudrabha Mukhopadhyay, Vinay Namboodiri & C. V. Jawahar. ([Link](#))
- Dataset Agnostic Document Object Detection. *Pattern Recognition*, 2023. Ajoy Mondal, **Madhav Agarwal** & C. V. Jawahar. ([Link](#))
- CDeC-Net: Composite Deformable Cascade Network for Table Detection in Document Images. *25th International Conference on Pattern Recognition (ICPR)*, 2020. **(Oral)**. **Madhav Agarwal**, Ajoy Mondal & C. V. Jawahar. ([Link](#))

WORK EXPERIENCE

Applied Machine Learning Engineer VidLab7 GmbH	April 2024 - Nov 2024
• Synthetic Avatar Generation, LipSync, Voice Cloning, Deep Fake Detection	
Computer Vision Consultant Gradient Ascent AI	Jan 2024 - Feb 2024
• Computer Vision, Deep Learning, Image and Video Segmentation.	
Scientific Researcher Technical University of Munich	Sept 2023 - Dec 2023
• 3D Motion Modelling and Generation, Face and Full Body Reenactment.	
Research Fellow International Institute of Information Technology Hyderabad	Nov 2019 - June 2023
• Computer Vision, Deep Learning, Face Reenactment, Document Understanding	
Senior Data Scientist CAW Studios	Dec 2019 - Aug 2020
• Document information extraction and digitalization of the tabular data using deep learning and OCR.	
Data Scientist Innefu Labs Pvt. Ltd.	Jul 2018 - Sept 2019
• Smart Security and Surveillance Solutions using deep learning, deployed at multiple large-scale locations.	
Data Scientist Tidyquant Pvt. Ltd.	Jan 2018 - April 2018
• Predictive analytics and forecasting using Machine Learning.	

SKILLS

Technical Skills	Computer Vision, Deep Learning, Machine Learning, Pattern Recognition, Natural Language Processing
Programming Languages	Python, C, C++
Deep Learning Framework	PyTorch, Keras, TensorFlow
Generative AI	Diffusion Models, Large Language Models (LLM), Attention & Transformers, GAN, NeRF, CNN

PROJECTS

Image Manipulation using Diffusion Models Image synthesis and out-of-distribution image inversion using spherical interpolation in latent space of diffusion models.

Face Reenactment and Talking Heads Transfer motion and expression information on a static image from a video. Proposed various novel techniques to use audio and visual modalities along with facial cues. Generate state-of-the-art synthetic avatars with lip-sync. Build a pipeline to use these methods with face super-resolution and frame interpolation for efficient transmission.

Page Object Detection and Localization Detect Tables, Figures, Charts, etc., in unstructured document images using a cascade architecture and deformable convolutions with high accuracy. Extended this work to incorporate NLP and OCR for end-to-end document digitalization.

Smart Security and Surveillance Solutions Developed AI enabled modules like Facial Recognition, Trespassing Detection, Person Count, Abandon Objects, Group Formation, Heat- Map Generation, etc. These modules have custom object detection and tracking capabilities to handle objects like Weapons, Persons, Faces, Helmets, Shoes, Safety Harnesses, etc.

Person Attribute Recognition and Classification Classifying the attributes of person like age, gender, clothes etc. for identifying customer behavior in retail markets and provide them with personalized experience.

Satellite Images Detection and classification of ships, submarines using real-time satellite images.

ACHIEVEMENTS & EXTRA-CURRICULAR ACTIVITIES

- Graduate Scholarship from IIIT-Hyderabad to cover the full tuition fee for the MS degree.
- Coordinator in 6th Summer School of AI (2022) organized by IIIT-Hyderabad.
- Recipient of IIIT-Hyderabad's Non-Academic Award for spreading Mental Health Awareness on campus.
- Member and Student Head Coordinator (2017-18) of Big Data Centre of Excellence, R&D Lab of AKGEC, for three years (2015-2018).
- Winner of 'BigWar' event of BigDataThon'17 (24-hour hackathon on Big Data technologies) at ABESIT, Ghaziabad (April 2017).
- Organized Workshops on "Machine Learning and Neural Networks" (Feb 2018) and "Data Science" (March 2017) as a Mentor.
- Part of College Band and Media Team during undergrad.
- Active participation in organizing Tech Fest, Cultural Fest and Blood Donation Camp.
- School Topper in Computer Science, batch of 2013.