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MADHAV AGARWAL

EDUCATION

MS by Research, Computer Science and Engineering, (2021-2023)
International Institute of Information Technology Hyderabad, India
CGPA: **9.17**

Bachelor of Technology (Hons.), Information Technology, (2014-2018)
Ajay Kumar Garg Engineering College, Ghaziabad, India
Dr. A.P.J. Abdul Kalam Technical University, Lucknow, India
Percentage: **76.00%**

PUBLICATIONS

Understanding the Generalization of Pretrained Diffusion Models on Out-of-Distribution Data
AAAI Conference on Artificial Intelligence (AAAI), 2024. (**Oral**) (Link)
Authors: Sai Niranjan Ramachandran, Rudrabha Mukhopadhyay*, Madhav Agarwal*, C. V. Jawahar & Vinay Namboodiri*

Audio-Visual Face Reenactment
Winter Conference on Applications of Computer Vision (WACV), 2023. (Link)
Authors: Madhav Agarwal, Rudrabha Mukhopadhyay, Vinay Namboodiri & C. V. Jawahar.

Compressing Video Calls using Synthetic Talking Heads
33rd British Machine Vision Conference (BMVC), 2022. (Link)
Authors: Madhav Agarwal, Anchit Gupta, Rudrabha Mukhopadhyay, Vinay Namboodiri & C. V. Jawahar.

Dataset Agnostic Document Object Detection
Pattern Recognition, 2023 (Link)
Authors: Ajoy Mondal, Madhav Agarwal & C. V. Jawahar

CDeC-Net: Composite Deformable Cascade Network for Table Detection in Document Images
25th International Conference on Pattern Recognition (ICPR), 2020. (**Oral**) (Link)
Authors: Madhav Agarwal, Ajoy Mondal & C. V. Jawahar

PROFESSIONAL WORK HISTORY

Scientific Researcher at **Technical University of Munich** (Niessner Lab) (Sept 2023 – Dec 2023)
3D Motion Modelling and Generation | Face and Full Body Reenactment

Research Fellow at **International Institute of Information Technology Hyderabad** (Nov 2019 – June 2023)
Computer Vision | Deep Learning | Face Reenactment | Document Understanding

Senior Data Scientist at **CAW Studios** (Dec 2019 – Aug 2020)
Document Information Extraction and digitalize the tabular data using deep learning and OCR.

Data Scientist at **Innefu Labs Pvt. Ltd.** (Jul 2018 - Sept 2019)
Smart Security and Surveillance Solution using deep learning, deployed at multiple large-scale locations.

Data Scientist at **Tidyquant Pvt. Ltd.** (Jan 2018 - April 2018)
Predictive analytics using machine learning

Machine Learning *Intern* at **HR Real Value** (June 2017- July 2017)
Prediction of house prices and valuation of real estate using Machine Learning models.

Data Analyst *Intern* at **GoHelper** (May 2016 – July 2016)
Mapping vendors with potential customers based on geographic and revenue models.

Skills

Programming Languages: Python, C and C++

Deep Learning Technologies: CNN, RNN, LSTM, GAN, Transformers, NeRF, Diffusion Models

Deep Learning Framework: PyTorch, Keras, TensorFlow

ML Libraries : OpenCV, Numpy, Pandas, Scipy, Matplotlib, Numba

Operating System : Linux, Windows, macOS

Research and Industrial 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

Studied the problem of transferring motion and expression information from one video to another. Proposed various novel techniques to use audio and visual modalities along with facial cues. Explore the possibility of using these methods with face super resolution and frame interpolation for efficient transmission.

Page Object Detection and Localization

Worked on the problem of detecting objects like Table, Figures, Charts, etc. in unstructured document images. Proposed a cascade architecture using deformable convolutions, which detects tables and other objects with high accuracy. Extended this work to incorporate NLP and OCR for end-to-end document digitalization.

Smart Security and Surveillance Solutions

Developed various modules such as: 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 object like Weapon, Person, Face, Helmet, Shoes, and Safety Harness etc. The proposed solutions are deployed at multiple large-scale organizations.

Person Attribute Recognition and Classification

Identify the attributes of person like age, gender, clothes etc. and use them for classification. The proposed solution helps in 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 and Extra-curricular Activities

- Received **Graduate Scholarship** from IIIT-Hyderabad to cover full tuition fee of MS degree.
- Member and **Student Head Coordinator** (2017-18) of **Big Data Centre of Excellence**, R&D Lab of AKGEC, for three years (2015-2018).
- Won **1st Prize** in **Big War** event of **BigDataThon'17** (24 Hours project making competition on Big Data technologies) organized by ABESIT, Ghaziabad (April 2017).
- Successfully organized 12 Hrs. Workshops on "**Machine Learning and Neural Networks**" (Feb 2018) and "**Data Science**" (March 2017) as a **Mentor.**
- 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.
- NPTEL certified in Python with an **ELITE** certificate.
- Secure **800/800** in National Programming Aptitude Test 2017 by NPTEL.
- 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.