

Akshat Sanghvi

B.Tech CSE (Honours) at IIIT Hyderabad
CGPA: 9.01 till 7th Sem
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Synopsis

Final (4th) year B.Tech student in Computer Science at the International Institute of Information Technology Hyderabad (IIIT-H), pursuing an honours degree with a focus on research. Currently working in three research labs here at IIIT-H : CVIT (Computer Vision), RRC (Robotics) and MLL (3D vision). Enjoy playing chess a lot, and served as a coordinator of my college chess club and have a FIDE rating of 1730.

Skills

LANGUAGES

Python, C, C++, JavaScript,
HTML/CSS, Bash, x86, cuda

ML FRAMEWORKS

PyTorch, TensorFlow, Numpy

OTHERS

Markdown, Git, Vim, React.js,
Flask, Node.js, MySQL, MongoDB

Achievements

2019 NTSE Stage 2 Qualified
2023 Merit List (Monsoon)
2023 Merit List (Spring)
2021 Deans List 2 (Monsoon)
2020 RMO Qualified
2021 KYPY Rank 186
2021 JEE Mains Rank 156
2021 JEE Advanced Rank 2019

Coursework

Computer Vision,
Mobile Robotics,
Linear Algebra,
Digital Image Processing,
Advanced NLP,
Statistical Methods in AI,
Data Structures and Algorithms,
Operating Systems and Networks,
Information Security,
Quantum Information and
Computation,
Data and Applications

Research Experience

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- 7/23-NOW **Honours CVIT (Center for Visual Information Technology) Lab**
Personalized Lip-Reading for Deaf Speakers: Customized pretrained Visual Speech Recognition (VSR) models to improve lip-reading performance for out-of-distribution Deaf (and accented) English speakers, with a curated dataset having such speakers with unclear or no speech, to enhance lip-reading accessibility for the Deaf community. Submitted work is currently under review.
Visual Question Answering (VQA) Web App: Designed and built web applications to showcase the answering capabilities of different VQA models in diverse domains (Medical, Road and Document VQA)
Advised by Dr. Jawahar C.V and Dr. Vinay P. Namboodari
- 10/23-NOW **Independent Study RRC (Robotics Research Center) Lab**
Critical Object Estimation for Self-Driving Cars: Designing and implementing algorithms for real-time path planning in autonomous vehicles, optimizing for computational efficiency by prioritizing essential vehicle interactions, unlike traditional methods that are limited to analyzing a fixed number of closest vehicles.
Advised by Dr. K. Madhava Krishna and Dr. Arun K. Singh
- 7/24-NOW **Independent Study MLL (Machine Learning Lab)**
Compact 3D Scene Representation: Developing methods for 3D scene reconstruction and novel view synthesis using Gaussian Splatting, addressing the challenge of large model sizes (up to a gigabyte) for extensive scenes. Leveraging local repetitions and symmetries to achieve significant storage compression without compromising quality.
Advised by Dr. Avinash Sharma and Dr. Charu Sharma

Publications

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- SEPT. 2024 **DeafVSR: Personalizing Lip Reading for Deaf Speakers**
This work presents a personalized approach to automatic lip reading, considered to be one of the most important assistive technologies for the deaf community. Also employing layer-specific fine-tuning to identify the most effective parameters in the pre-trained model for speaker-specific learning. The work is submitted to the prestigious ICASSP conference and is currently under review.

Projects

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- 2023 **Image-Space Manipulation of Objects in Video CV, ML**
Created 2D simulations of objects moving in response to virtual forces on an object in an image. Done by analysing a short video of tiny motions using of the object to infer its material properties (using modal analysis) by assuming a spring based physics model. Using this information to predict each pixel's reaction to the new user-defined forces.
- 2024 **Exemplar Guided Paraphrase Generation NLP, ML**
Developed ML models for paraphrase generation that uses example sentences (exemplars) to guide rephrasing while preserving the original meaning, utilising the concept of contrastive loss on the style feature and content features of the text

Education

B.TECH. IN CSE (2021-NOW)
IIIT - Hyderabad
CGPA : 9.01 (as of 7th sem)

HIGH SCHOOL (2019-21)
Green Valley High School
Percentage: 96% (Class 12)

Projects

2023	GMM Visualization	Manim Web, Statistical Methods in AI
	Created a comprehensive tutorial on Gaussian Mixture Models, featuring visually engaging representations to enhance understanding of GMM with depth and clarity. Includes example visualizations in 1D, 2D, and 3D.	
2022	xv6 Operating System Feature Addition	C++, C
	Added new features to MIT's open-source implementation of xv6 operating system, like: System calls - 'trace', 'sigalarm'. Added scheduling algorithms like FCFS, LBS, PBS and MLFQ. Also implemented copy-on-write fork.	
2023	VLabs Web App	JS, HTML/CSS, PWA, DynamoDB
	Created a Web App for Virtual Labs IIIT-H as a PWA (Progressive Web Application), to cache the web page of each lab. Used AWS DynamoDB as the database and deployed it to the Android Store with the help of the Trusted Web Activities framework. Also designed the main homepage of the app.	
2023	Greddit	React JS, HTML/CSS
	A Reddit clone Web App using the MERN stack. Chatting website like reddit, where users can add posts and comments, and get blocked or reported. Users have different roles of admin, viewer or editor.	
2022	Building an Interactive Shell	C, Bash
	Created a shell from scratch including basic commands like 'ls', 'cd', and 'cat', and advanced bash functionalities like pipelining, signaling, foreground and background processes, and I/O redirection, using only the C language.	
2022	PID Control for Motor Angle	C++, Arduino UNO
	Project to control a motor adjusting both the motor power and direction to gradually reach a specific angle over time by utilizing PID constants and configuring the hardware components to showcase the application of PID control.	