AKSHAT SANGHVI

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SYNOPSIS

- Final 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.
- Developing state-of-the-art lip-reading models utilizing deep learning techniques and Audio-Visual multimodal data, with a focus on developing assistive technology applications to improve communication access for ALS patients.
- Building algorithms for realistic physical manipulation and interaction within 3D environments, enhancing visual understanding capabilities of robots.
- Finding critical vehicles for planning the path of self-driving cars, enabling safer and more efficient navigation.
- Enjoy playing chess and serving as a coordinator of our college chess club.

RESEARCH EXPERIENCE

Honours (Advised by Dr. Jawahar C.V and Dr. Vinay P. Namboodari)
CVIT (Center for Visual Information Technology) Lab

📅 07/2023 - Present   📍 IIIT-Hyderabad, Telangana
🔗 https://cvit.iiit.ac.in/

Computer Vision Lab for research in Image Processing, Vision, Graphics and ML

- **Personalized Lip-Reading for Deaf Speakers:** Adapted 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)

Independent Study (Advised by Dr. K. Madhava Krishna)
RRC (Robotics Research Center) Lab

📅 10/2023 - Present   📍 IIIT-Hyderabad, Telangana
🔗 https://robotics.iiit.ac.in/

- **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.

Independent Study (Advised by Dr. Charu Sharma and Dr. Avinash Sharma)
MLL (Machine Learning Lab)

📅 07/2024 - Present   📍 IIIT-Hyderabad, Telangana
🔗 https://web2py.iiit.ac.in/research_centres/default/view_area/220

- **Compact 3D Scene Representation:** Using Gaussian Splatting for 3D scene reconstruction and novel view synthesis, exploiting local repititions and symmetries in the scene to achieve storage compression.

PROJECTS

Image-Space Manipulation of Objects in Video
📅 09/2023 - 11/2023
🔗 https://github.com/akshatsanghvi211103/DIP_Project
Digital Image Processing Course Project

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.

ACHIEVEMENTS

College Merit List (2022)

Qualified KVPY for IISc with Rank 186 (2020)

JEE Mains 156, Advanced 2019 Rank (2020)

NTSE Stage 2 Qualified (2018)

RMO Qualified (2018)

Chess FIDE rating of 1730

EDUCATION

B.Tech. in Computer Science (CSE)
International Institute of Information Technology, Hyderabad

📅 2021 - Present
- CGPA: 9.01 (till 6th Sem)

High School
Green Valley High School

📅 2021
- PCM - 96% in 12th Class CBSE Board

SKILLS

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

ML Frameworks
PyTorch, TensorFlow, Numpy, Pandas

Others
Open3D, Git, Vim, SQL, React JS, Flask, Node JS

COURSES

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

PUBLICATIONS

💎 **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. Submitted work is currently **under review**.

PASSIONS

💎 **Chess**

💎 **Quantum Computing**

PROJECTS

GMM Visualization

📅 09/2023 - 11/2023

Statistical Methods in AI Course Project

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.

VLabs Web App

📅 01/2023 - 04/2023

Design and Analysis of Software Systems Course Project

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 (VLabs is a problem solving lab that provides simulation learning for various disciplines in Science and Engineering).

Greddit

📅 02/2023 - 04/2023

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.

xv6 Operating System Feature Addition

📅 08/2022 - 11/2022

🔗 https://github.com/akshatsanghvi211103/Extending-MIT-s-xv6-OS

Operating Systems and Networking Course Assignment

Added new features to MITs 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.

Building an Interactive Shell

📅 09/2022 - 11/2022

🔗 https://github.com/akshatsanghvi211103/User-Defined-Interactive-C-Shell

Operating Systems and Networking Course Project

Created a shell from scratch with including the basic commands like 'ls', 'cd', and 'cat', and advanced bash functionalities like pipelining, signalling, foreground and background processes and I/O redirection, using only the C language

PID Control for Motor Angle

📅 09/2022 - 11/2022

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.