

ATHARVA PANDE

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EDUCATION

M.Tech in Computer Science Engineering, IIIT Hyderabad
CGPA: 6.59

August 2023-Present

B.Tech in Information Technology, Government College of Engineering, Aurangabad
CGPA: 6.795

Graduated 2022

SKILLS

Technical Skills	Python, C++, gRPC, MPI, POSIX systems, Distributed Systems, Machine Learning, Image Processing, Data Structures, Algorithms
Frameworks	PyTorch, OpenMPI, Linux Shell Scripting
Soft Skills	Critical Thinker, Active Learner, Strong Communication, Collaboration

COURSEWORK

Data Structures and Algorithms, Operating Systems, Database Management, Object-Oriented Programming, Computer Networks, Machine Learning, Parallel Programming, Digital Logic, Computer Organization and Architecture

PROJECTS

POSIX Shell Implementation (C/C++)

- Developed a custom shell supporting process management, I/O redirection, piping, and background/foreground execution. Implemented built-in commands (`cd`, `echo`, `pwd`, `ls`) with support for flags and path handling (`~`, `...`, `-`). Managed background processes with PID reporting and handled job control (`CTRL-Z`, `CTRL-C`). Created a `pinfo` command for process info and implemented recursive file search. Supported file redirection (`<`, `>`, `>>`) and pipeline chaining, with tab autocompletion for files and directories.

Distributed File Sharing System (C/C++)

- Developed a peer-to-peer file-sharing system with synchronized trackers for real-time file distribution and communication between clients. Implemented client features for account creation, group management, and file sharing with SHA1 integrity checks. Designed a piece selection algorithm for concurrent file downloads from multiple peers. Enabled clients to upload, download, and share files across groups, with automatic file sharing on login. Ensured tracker synchronization and file availability across multiple peers and groups.

Seam Carving Image Resizing Project

- Implemented the seam carving algorithm for content-aware image resizing, where an image is resized by iteratively removing vertical or horizontal seams based on energy calculations. Calculated pixel energy using a chosen energy function, considering RGB values, to assess pixel importance for seam identification. Identified and removed the lowest energy seam, reducing image dimensions while preserving important content. Allowed users to specify the desired output dimensions, ensuring flexible resizing while maintaining visual quality.

Background Subtraction using Gaussian Mixture Models

- Implemented background subtraction using Gaussian Mixture Models (GMM) for video frame analysis. Developed a custom GMM algorithm to model pixel intensities over time and distinguish foreground from background in dynamic video streams. Applied frame averaging and GMM-based methods to identify and segment moving objects in videos while maintaining background stability. Used OpenCV for image processing tasks and Scikit-learn for implementing the GMM algorithm, achieving real-time performance on video data.