UMAR BALAK

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EDUCATION

Saraswati College Of Engineering   **Navi Mumbai, India**
*Bachelor of Engineering in Computer Science And Engineering (AIML) with **8.66 CGPA***   *2021 – 2025*
Relevant Coursework: Artificial Intelligence, Machine Learning, Data Structures, Analysis of Algorithms, Operating Systems, Database Management, Computer Networks

SKILLS

Programming Languages: Python, SQL

Frameworks / Tools: FastAPI, Streamlit, TensorFlow, Keras, Scikit-Learn, NumPy, Microsoft Azure

PROJECTS

AdaptFL: Federated Learning Framework – *Try Now*   **GitHub**
A federated learning framework enabling decentralized model training across 100+ clients while preserving data privacy.
- Trained a multi-input federated learning model with diverse data types (images, point clouds, time-series, sensor data), achieving an initial loss of 0.4 while ensuring data privacy and efficient global model updates.
- Built a FastAPI-based server managing client registrations, model weight aggregation, and global weight distribution with an average **latency of <200ms** per request.
- Integrated WebSockets for real-time synchronization, handling **500+ concurrent clients**, and Microsoft Blob Storage for AES-256 encrypted model weight storage.
- Developed an admin panel displaying real-time metrics, model aggregation updates, and client contributions with 99% uptime.
- Technologies: Python, FastAPI, PostgreSQL, NextJs

AI-driven Proctored Exam System – *Try Now*   **GitHub**
Developed a system utilizing advanced AI technologies for real-time proctored exam monitoring.
- Implemented YOLOv8 for **background monitoring** to detect unauthorized individuals, enhancing exam integrity.
- Deployed a real-time **eye gaze tracking** and head movement detection system, ensuring active monitoring in exams.
- Technologies: OpenCV, MediaPipe, Django, SQL

TinyVGG: Image Classification Model – *Try Now*   **GitHub**
An optimized image classification model based on the VGG16 architecture, designed for high efficiency and performance.
- Achieved **92% classification accuracy** on the CIFAR-10 dataset by utilizing a robust VGG16-based model.
- Reduced model size to 4MB, optimizing it for deployment on resource-constrained devices while retaining performance.
- Integrated a image preprocessing pipeline, ensuring consistent input quality for the model.
- Technologies: TensorFlow, Convolutional Neural Network

CineMate: Movie Recommendation System – *Try Now*   **GitHub**
A movie recommendation system leveraging advanced algorithms and techniques for accuracy and user satisfaction.
- Utilized K-Nearest Neighbors and TF-IDF algorithms to provide users with the top 10 tailored movie recommendations.
- Features two sections for movie: one with 8,000 top Netflix movies and another with 75,000 top TMDB movies.
- Technologies: KNN, Python, Scikit-Learn, Pandas, Streamlit

EXPERIENCE

Quasar 2.0 Hackathon - *1st Prize Winner*   **March 2024**
Developed an innovative AI-powered proctoring system, integrating YOLOv8 for detecting unauthorized individuals and employing OpenCV and MediaPipe for accurate eye gaze and head movement tracking to enhance exam integrity.

NASA Space App Challenge - *Winner*   **October 2023**
Engineered an intelligent project collaboration platform featuring a machine learning-based recommendation engine, facilitating seamless student-recruiter matchmaking via a user-friendly web interface.

OPEN SOURCE CONTRIBUTIONS

PerceptionPro: Computer Vision-Based Attention Tracking – *Pypi*   **January 2025**
A Python library for real-time computer vision tasks (head pose estimation, eye tracking, object detection).

CERTIFICATIONS

Microsoft Azure AI-900 - Microsoft   **March 2023**