Muhammad Aliyan

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Education

National University of Science and Technology (NUST- CEME) Rawalpindi
Bachelor of Engineering in Computer Engineering

Professional Experience

1) Freelance **(Fiverr), June 2023 – Present**
2) **MERN Full stack developer** Full time, **3Dim** (**China**), **Aug 2025-Present**
3) **MERN Full Stack Developer** Intern, **Zapply** (**USA**) , **June 2025 - Aug 2025**
4) AI/ML Intern, **CARE, Mar 2025-May 2025**
5) Director **Web** & IT wing, Comppec **, Jan 2025 – May 2025**
6) Deputy Director Admin & HR, Comppec**, Jan 2024-May 2024**

Projects

Full-Stack Freelancing Platform | React.js, TypeScript, Redux, Node.js, Express, MongoDB, Azure Blob Storage, JWT

- Engineered a Fiverr-inspired freelancing marketplace where users can register as buyers or sellers, create/manage gigs, **browse services**, and place/**track** orders.
- Implemented secure **authentication & authorization with JWT** and **Redux Toolkit** for persistent sessions and protected routes.
- Integrated **Azure Blob Storage** with **SAS token** generation for secure, scalable handling of gig images, profile pictures, and order attachments.
- Built consistent buyer & seller order **APIs** with **Mongoose** population, **JSON** normalization (toObject), and automatic image URL generation to ensure clean, reliable data for frontend consumption.
- Developed dynamic **frontend UI** in **React.js, TypeScript,** and **Tailwind CSS** including gig listings, order workflows, seller dashboards, and profile management.
- Designed **MongoDB** schemas & queries for efficient relationships between users, gigs, and orders, supporting analytics (impressions, clicks, conversions, cancellations).
- Developed **RESTful APIs** with **Express.js** for **CRUD** operations on users, gigs, and orders, integrated with Multer for uploads and Azure services.
- Enhanced seller dashboards with real-time gig performance metrics and order **tracking**.
- **Deployed backend** on **Azure App Service** and **frontend** on **Azure Static Web Apps**, delivering a **fully cloud-hosted**, **production-ready solution**.

Full-Stack Social Media Application using MERN Stack | React.js, Node.js, Express, MongoDB, Multer, bcrypt

- Designed and **developed** a Facebook-inspired social media platform enabling users to create accounts, share posts (text, images, videos), view feeds, and interact with content through likes and comments.
- Implemented **secure user authentication** with **bcrypt** password **hashing** and **JWT**-based **session management**, ensuring data privacy and protection against unauthorized access.
- **Developed** a robust **media handling system** using **Multer** and **MongoDB GridFS** for efficient storage and retrieval of user-generated content (profile pictures, cover photos, posts, and stories).
- Created dynamic **frontend** components with **React.js** including News Feed, Reels, User Profiles, and Story features with responsive design for optimal cross-device experience.
- Implemented **RESTful API endpoints** with **Express.js** and **Node.js** for **CRUD operations**, supporting real-time updates to user content and interactions.
- Designed **MongoDB** schemas for optimal data relationships between users, posts, comments, and media, enabling efficient querying and population of nested data.
- **Optimized** performance through client-side **state management**, server-side pagination, and efficient media streaming techniques for large files.

- Added advanced features including profile customization, timeline organization, and comprehensive **error handling** for both client and **server-side operations**.

Full-Stack Real-Time Chat Application using MERN Stack | React.js, Node.js, Express, MongoDB, Socket.io, Multer

- Built with **React.js, Node.js, Express, MongoDB**, and **Socket.io** for instant messaging.
- Features: User auth (**bcrypt**), real-time messaging (text/media), chat history, online/offline **status**.
- **Socket.io** for live updates, message **sync**, and status **tracking**.
- **React.js frontend** with dynamic UI: Chat Interface, User List, Message Threads, and Profile Management.
- **RESTful APIs** (**Express/Node.js**) for user **management**, messaging, and chat **operations**.
- **MongoDB** for optimized **data storage** (users, messages, media) with **efficient querying**.
- **Performance optimizations**: **State management**, **GridFS** for media, and **error handling**.

AI-Powered Document Assistant "MERNBot" | Full-Stack Application using MERN Stack + OpenAI API

- Developed a **MERN** stack application **integrating OpenAI GPT**-3.5 for document summarization and **AI-powered** Q&A through a **real-time chatbot** interface.
- Enabled users to upload or paste documents and receive concise AI-generated summaries, with secure **JWT-based authentication** and **role-based access control**.
- Built **RESTful API routes** for text preprocessing, prompt engineering, and chatbot response handling, ensuring efficient and accurate interactions with **OpenAI**.
- Created a **responsive React.js frontend** with chat UI, loading **states**, and typing indicators for enhanced user experience and **dynamic** document interaction.
- Implemented **MongoDB data models** to store users, document history, and chat logs, supporting persistent and context-aware AI conversations.

Autonomous Vehicle System using Raspberry Pi and Classical Image Processing | Python, OpenCV, Raspberry Pi Camera, GPIO

- Designed and **developed** a **self-driving** car prototype using **Raspberry Pi** equipped with a **camera module** to simulate **autonomous** navigation in real-world scenarios.
- **Implemented classical image processing algorithms** (**edge detection**, **contour analysis, color segmentation**) using **OpenCV** to recognize obstacles, road boundaries, and directional cues in **real-time**.
- Developed **decision-making logic** enabling the vehicle to adjust its path dynamically based on **detected objects** and environmental observations.
- **Utilized Raspberry Pi GPIO pins** to control vehicle motion (e.g., motor speed and direction) based on visual input and obstacle **detection**.
- Created a **lightweight and efficient pipeline** to process camera input frames, extract meaningful features, and trigger navigation responses with minimal latency.
- Ensured robustness of the system by testing in various lighting and surface conditions and optimizing the **image processing pipeline for performance and reliability**.
- Achieved **obstacle avoidance** and basic **lane-following** capabilities without the use of **deep learning**, demonstrating the power of **classical CV** techniques on **low-power hardware**.

Mission Logging and Tracking System for Pakistan Army Pilots | Flutter, Dart, Django, Python, SQL, HTTP

- Developed a cross-platform **mobile application** using **Flutter** and **Dart** to streamline mission logging and tracking **for Pakistan Army pilots and their units**.
- Implemented **secure user authentication** for pilots and unit personnel, allowing pilots to log new missions and view their mission history.
- Designed a **Django** backend with **RESTful APIs** (using **Django REST Framework**) to handle **mission data**, **user authentication**, and **real-time updates**.
- Integrated **SQL database** for **efficient storage** and retrieval of mission details, including pilot information, mission locations, timestamps, and status.
- Enabled **real-time mission tracking** for units, allowing them to view recently added missions, apply filters (by pilot, location, or date), and assign follow-ups.
- **Utilized HTTP** requests for seamless communication between the **Flutter frontend** and **Django backend**, ensuring data consistency and reliability.
- Enhanced user experience with **responsive UI/UX design**, including mission summaries, search functionality, and notification alerts for new missions.
- Ensured data security with **encrypted transmissions** and **role-based access control** (**RBAC**) to **restrict unauthorized access**.

Anti-Sleep Detection System for Vehicle Drivers | Python, C++, Arduino, ESP32

- Designed and implemented an **anti-sleep detection system** for **vehicle drivers** using **Arduino**, **ESP32**, and various **sensors**.
- Developed a system to **continuously monitor** the **driver's eyes** using **cameras** and **sensors**, with an algorithm to detect drowsiness based on eye closure duration (3-5 seconds).
- Integrated an alarm mechanism to alert the driver if drowsiness was detected and programmed the system to automatically stop the vehicle if the driver failed to respond.
- Implemented **signaling features** to notify other drivers of potential **hazards** when the vehicle is stopped due to drowsiness.
- Created a **mobile app** for **real-time monitoring** of driver and vehicle status, and for remote control of vehicle functions.
- Utilized motors and other hardware components to control vehicle safety features and interface with the vehicle's existing control systems.

Audio classification using CNN | Python, TensorFlow, keras, Librosa, Numpy, Matplotlib

- Developed an **audio classification model** using **deep learning** to categorize sound signals into speech, street_music, and noise using the UrbanSound8K **dataset**.
- Extracted **MFCC features** (**Mel-Frequency Cepstral Coefficients**) from audio signals for feature representation and classification.
- Built and trained a **deep neural network (DNN)** using **TensorFlow**/**Keras**, achieving high classification accuracy.
- Visualized **spectrograms** and waveforms to analyze different sound categories using **Librosa** and **Matplotlib**.
- Processed and augmented audio data to improve model robustness and generalization.
- Evaluated model performance using accuracy metrics, confusion matrix analysis, and loss plots.
- Implemented **data preprocessing techniques** such as feature **scaling**, **label encoding**, and train-test splitting for optimized model training.
- Designed and trained the **model** using **Adam optimizer** and **categorical cross-entropy** loss function to handle multi-class classification effectively.

Real-Time Hand and Face Detection Using OpenCV and MediaPipe | Python, OpenCV, MediaPipe, NumPy

- Developed a real-time hand and face detection system using **OpenCV** and **MediaPipe** to detect and track hands and faces in **live video streams**.
- Implemented hand landmark detection to count the number of fingers raised, enabling gesture-based interaction.
- Utilized **MediaPipe's Face Detection** module to detect faces and draw bounding boxes around them in real-time.
- Processed and visualized hand landmarks and face bounding boxes using **OpenCV** for real-time video analysis.
- Enhanced the system by adding visual **feedback**, such as bounding boxes and finger count displays, for better user interaction.
- Leveraged **NumPy** for efficient array manipulations and calculations during **image processing**.

Skills

Technical Skills

Web & Full-Stack Development

- Proficient in **MERN Stack** (**MongoDB, Express.js, React.js, Node.js**) for end-to-end application development.
- Built and deployed **RESTful APIs** with **Express.js** & **Node**.**js**, integrating **MongoDB** with **GridFS** for scalable media storage/streaming.
- Developed responsive, component-based UIs in **React.js with Redux Toolkit for state management**.
- Strong foundation in **HTML**, **CSS**, **JavaScript** (**ES6**+) for **frontend development**.
- Implemented **secure authentication & authorization** using **JWT**, **bcrypt**, and **role-based access control**.
- Integrated file uploads with **Multer**, **Azure Blob Storage**, and **GridFS** for efficient handling of images, videos, and documents.
- Experience with **Django REST Framework** for **API development** and **Flutter**/**Dart** for cross-platform **mobile apps**.

Databases & Backend

- Hands-on experience with **MongoDB**, **MySQL**, and **PostgreSQL** for **data modeling** and **querying**.
- Designed optimized schemas to manage relationships between users, gigs, and orders for freelancing platforms.
- Proficient in **API** integration using **Fetch**, **Axios**, and **Django REST Framework**.

Machine Learning & Deep Learning

- Skilled in **Scikit-Learn, TensorFlow, and Keras** for building and deploying **ML/DL** models.
- Experienced in **data preprocessing**, **feature engineering**, **model evaluation, and pipeline development**.
- Implemented **supervised & unsupervised algorithms** for **classification**, **regression**, and **clustering**.
- Hands-on with CNNs, transfer learning, and deep learning for image/audio analysis.

Data Analysis & Visualization

- Strong expertise in **NumPy**, **Pandas** for data manipulation and analysis.

- Built insightful visualizations and dashboards using **Matplotlib**, **Seaborn**, and **Plotly**.

MLOps & Deployment

- Familiar with **MLflow** for experiment **tracking**, **model packaging**, and **deployment**.
- **Docker** for **containerization** and **model deployment**.
- **CI/CD Automation** & **Orchestration**: Hands-on experience designing and implementing automated **CI/CD pipelines** for machine learning using **GitHub Actions**. This includes authoring **YAML** configuration files to define workflows for **automated testing**, container building, and deployment upon code changes, enabling rapid and reliable iteration.

Version Control & Collaboration

- Proficient in **Git & GitHub** for collaborative **software development**.
- Knowledge of **DVC** (**Data Version Control**) for managing **datasets** and **ML pipelines**.

Programming & Tools

- Strong programming in **Python** (**ML, automation, data workflows**).
- Experienced in **TypeScript**, **JavaScript**, **Dart** for **full-stack and mobile apps**.
- Familiar with **OS** module and **system-level scripting**.

Continuous Learning

- Actively expanding expertise in **MLOps**, **cloud deployment**, and **scalable architectures**.
- Engaged in advanced courses and certifications to stay current in **AI**, **ML**, and **full-stack development**.

Programming Languages

- **Python**
- **C++**
- **Java**
- **JavaScript**
- **MIPS**
- **Verilog**

CERTIFICATIONS

Director **Web** & IT wing Comppec

Deputy Director Admin & HR Comppec

Deputy Director Marketing team Comppec

Machine Learning With **Python** By Coursera

Supervised Machine Learning: Regression Classification By Coursera

Unsupervised Machine Learning: Recommenders, Reinforcement Learning By Coursera

Advance Learning Algorithms By Coursera

Machine Learning Specialization By Coursera

Deep Learning Specialization By Coursera

Computer Vision and Image Processing By Coursera

Advance Computer Vision With TensorFlow By Coursera

OpenCV course By FreeCodeCamp