AYUSH TIWARI

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EDUCATION

ALIGARH MUSLIM UNIVERSITY (Bachelor of Technology) Aligarh, India

- Major in Computer Engineering, CPI 8.77/10 Aug 2017 - Aug 2021
- Coursework: Object-oriented programming, Data Structures and Algorithms, Operating Systems, Computer Networks, Database Management Systems, Parallel Programming, Machine Learning, Cloud Computing, Software Engineering, Information Security, Discrete Mathematics, Probability, Linear Algebra, Calculus

WORK EXPERIENCE

UNITED HEALTH GROUP (OPTUM) Gurgaon, India

Senior Software Engineer March 2023 – Present

- Worked on migrating the Claim Matrix application (it takes approximately 10 hours to process 70,000 daily claims) from the .NET backend to **Java Springboot**, which resulted in a remarkable 40% time reduction.
- Optimized the claim processing application by processing claims in parallel batches using **Java Concurrency (Parallel Programming)**, resulting in an 80% time reduction.
- Led the transition of Claim Report Generation from a subscription-based SAP Crystal Report system to a cost-effective Java-based solution using HTML and PDF management libraries such as **Thymeleaf**, iText, and FlyingSaucer. Integrated **JUnit** and **Mockito** for robust testing, **Log4j** for detailed logging, and Spring **Actuator** to enhance system monitoring capabilities.
- Designed and implemented large-scale data processing systems using **Kafka** and SQL Server in Java, supported by detailed system designs. Additionally, mentored two interns in developing an automated resume screening application using **Keras**, **TensorFlow**, **NLP**, and **BERT**, complete with **JWT** authentication. Deployed internally, this project enhanced HR efficiency by 90%.
- Spearheaded an application development to replace the old Optum Logo Icons with a new version from all the Physical Health PDF manuals using **CNN** model and **PyPDF2** to handle PDFs with Angular and **Python Flask,** enhancing efficiency by up to 90% by conducting audits and analyzing feedback, collaborating with three cross-functional teams(16 members)

Software Engineer Sep 2021 – March 2023

- Worked on crucial US healthcare enhancement projects like Orthonet, M&R, Project Promise, and Claim Modifier, integrating new clients into the network and modifying the existing processes, resulting in almost $200 million in revenue.
- Spearheaded the development of a Pending Claim Resolution project in **Java Springboot**, resulting in 30% fewer pending claims.
- Developed an Admin Dashboard to overview teams' performances vs. costs incurred using metrics like Story Points, Application downtime, etc. Adopted **Microservices** architecture with **Springboot**, **MySQL** database, and frontend with **Angular**. Integrated Jenkins CI/CD pipeline with **Docker** containers hosted on **Kubernetes**.
- Managed a team of 5 in migrating the manual deployment process to **GitHub** and **Jenkins CI/CD** pipeline.

AUTONISE (EdTech) Bangalore, India

Deep Learning Intern Jan 2021 – Jun 2021

- Collaborated with a team of six to develop a comprehensive ensemble-based deep learning model for classifying raw speech signals into four fundamental emotions: sad, happy, Angry, and Neutral **(SER)**.
- Incorporated Self-Attention mechanisms and manually crafted features such as Chromagram and RMSE to enhance the model's ability to generalize broadly, Attaining 73%, 97.8%, 84%, and 98% accuracy on the CREMA, EMO-DB, SAVEE, and TESS Speech Emotion Recognition (SER) datasets.

PATENT

METHODS, APPARATUSES, AND COMPUTER PROGRAM PRODUCTS FOR CONTEXTUALLY AWARE DEBIASING US Patent Office

Submitted to United States Patent and Trademark Office, US Patent Appl. 18/523, 312 (US18523312)

- Led the implementation of a groundbreaking debiasing algorithm to write Gender and Racial-agnostic and contextually aware text. NLP algorithms were used with the **BERT** model to achieve a remarkable 90% reduction in the biased terms in the text.
- Collaborated with UHG's HR department to build a browser application in **Angular** and **Flask** for writing job descriptions.

UNIVERSITY PROJECTS

DISTRIBUTED BANKING SYSTEM

- Build a secure and scalable online banking system that supports high **concurrency** and secure transactions. Implement microservices architecture to handle banking operations such as account management, loan processing, and payment gateways. **Technologies**: Java, Spring Boot, Spring Cloud, Netflix OSS, RabbitMQ for message brokering, OAuth2 for secure authentication, and Elasticsearch for logging and monitoring.

SERVERS AND LOW-LEVEL DESIGNS

- Developed and architected various system designs for applications similar to Ola/Uber, Zerodha, and Zomato, complete with detailed UML diagrams, class structures, object-oriented approaches, and design patterns. Additionally, I engineered the Web Server, Mail Server, and DNS Server from the ground up using **Java**.

DROWSY DRIVER DETECTION SYSTEM FOR ROAD SAFETY

- Implemented an architecture with 87.5% accuracy to alert the drowsy drivers with an alarm using Python, **OpenCV**, and Keras. Multilayer convolutional neural networks and PCA (Principal Components Analysis), eigenvalues, and LDA (Linear Discriminant Analysis) were used for drowsiness recognition.

END-TO-END ENCRYPTED CHAT APPLICATION

- Devised a real-time chat application for multiple users with a front end in Angular and a back end in the Springboot Websocket library. The chat is encrypted and decrypted using the AES(Advanced Encryption Standard) algorithm. Integrated **Oauth2.0** authorization.

DECENTRALIZED LOTTERY SYSTEM

- Developed a **web3** decentralized online lottery system with Smart Contracts with **Solidity** on the **Ethereum** blockchain.

ADDITIONAL

Languages & Tools: Java, Python, C++, C#, JavaScript, SQL, Solidity, MySQL, Postgresql, MongoDB
Framework & Technology: Angular, Spring boot, Flask, .NET, Git, Maven, Docker, Kubernetes, Jenkins, CI/CD, Azure, Microservices, Kafka, Redis, Elasticsearch, JUnit, Mockito, Log4j, Parallel Programming
AI/ML: Deep Learning, ANN, CNN (ResNet, VGG), RNN (LSTM, GRU), NLP, BERT, Reinforcement Learning, Tensorflow, Keras, PyTorch
Silver Award: Won 2nd prize in Optum(UHG) **Hackathon** for developing an **Augmented Reality(AR)** application to help patients with ASD (Autism Spectrum Disorder) communicate with people by superimposing easily identifiable Emojis on their faces to ease the communication.
Top 1 Percentile Global Ranking: Solved **1000+ DSA problems** on platforms like Leetcode, GeeksforGeeks, Codeforces, HackerEarth, etc.
Certification: Neural Networks & Deep Learning (deeplearning.ai), Blockchain Technology (Princeton University)