Brahmteg Singh Dua

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EDUCATION

Thapar Institute of Engineering and Technology   Patiala, Punjab
*Bachelor of Engineering in Computer Science, CGPA: **8.67***   *August 2021 - May 2025*

TECHNICAL SKILLS

Languages: **C++**, **Python**, C, SQL
Developer Tools: Git, AWS Lambda, Firebase, Docker, **Unix/Linux**, Apache Spark, PostgreSQL
Concepts: Scalable System Design, Distributed Systems, Microservices, Fault Tolerance, Linear Programming
Libraries: **PySpark**, Pandas, NumPy, **Matplotlib**, TensorFlow, PyTorch, SciPy, OpenCV, **Transformers**
Relevant Course Work: **Data Structures And Algorithms**, OS, Computer Networking, Computer Architecture, **Linear Programming, Relational Databases**, ML, Edge AI, **OOPS**, **DBMS**, DAA, Docker

EXPERIENCE

Advance Application Engineering Intern   June 2024 - July 2024
Accenture

- Spearheaded the development and implementation of **adversarial artificial intelligence** systems to follow and track visual inputs.
- Utilized cutting-edge algorithms, data compression, and machine learning techniques to enhance system accuracy and robustness, improving tracking performance by **40%**.
- Integrated Model Card Toolkit and What-If Tool into Accenture's website, driving an **80%** improvement in customer convenience by streamlining access to crucial model insights and fostering decision-making.
- Streamlined model documentation and evaluation using the **Model Card Toolkit**, leading to a **81.2%** improvement in model accuracy and reliability, while leveraging **Scrum** to deliver features in 2-week sprints.
- Leveraged the **What-If Tool** to enable interactive and insightful model analyses, enhancing user experience and increasing customer convenience by **80%**.

PROJECTS

Parkinson's Disease Detection System (Capstone) | *Python, **AWS S3**, Neural Networks, Shap* | *Link*

- Led the development of an AI-driven system for early-stage Parkinson's disease detection, utilizing advanced machine learning algorithms. The process involved pre-processing input data by cleaning, normalizing, and transforming it for model training.
- Integrated **XGBoost**, a gradient boosting algorithm, to enhance structured data handling. The system featured a neural network architecture with Conv2D, MaxPooling layers, and three dense layers. Model insights were visualized using **SHAP** values, improving diagnostic accuracy to **98.6%** and reducing detection time by **89.2%**.

AI Agent: Smart PDF Assistant | *Python, PostgreSQL, SentenceTransformer, Typer, Groq, LLM, dotenv, phi* | *Link*

- Developed an AI Agent: Smart PDF Assistant for seamless knowledge extraction and interaction with PDFs. Incorporated a **768-dimensional** vector space for embedding storage, enhancing accuracy to **94.1%**.
- Enabled integration with a PostgreSQL-based vector database (pgvector) for efficient data management. Indexed **50+ pages** of external PDF data, achieving a **91.4%** query precision rate.
- Integrated **Groq LLM (LLaMA 3.3-70B)** to deliver robust natural language understanding and conversational context management. Achieved scalability. Designed a CLI-based interface for user-friendly interactions, supporting chat history and tool call transparency.

AI-Driven Crop Disease Detection | *Python, TensorFlow, **EC2**, Computer Vision* | *Link*

- **Built a ResNet50**-based CNN using transfer learning and linear programming to optimize hyperparameters (batch size, learning rate) on 9,500+ leaf images, achieving **95.8%** precision in detecting 81 plant diseases (*Invent & Simplify*).
- **Deployed via Google Colab**'s GPU with data augmentation (rotation/flipping) and **L2 regularization**, cutting overfitting by **34%** and reducing crop loss by **91.2%** for farmers (*Customer Obsession*).

AI-Driven Space Object Classification | *Python, TensorFlow, Astrophysics Data Analysis, Computer Vision* | *Link*

- Directed the development of a cutting-edge AI model for classifying celestial objects from telescope imagery, increasing classification accuracy to **95.3%**.
- This innovation advanced the understanding of space phenomena such as stars and galaxies, enabling a 88% improvement in the efficiency of **astronomical data analysis**.

Major Achievements

- **CCS inter-university hackathon Runner Up (2024)** - Spearheaded a cross-disciplinary team to craft scalable solutions under pressure, balancing creativity with executional precision in competitive environments.

- **Smart India Hackathon Top 20 projects (2024)** - Designed a socially impactful tech prototype, merging user-centric problem-solving with ethical innovation for complex challenges.

- **Merit Based Scholarship (2022) Thapar University** - Recognized for consistent excellence and intellectual curiosity, embodying a growth mindset and commitment to lifelong learning.

- **Innovative India Coding Championship (AICTE) 2022 Air 2506** - Systematically deconstructed high-stakes problems, showcasing analytical rigor and structured thinking in a national competitive landscape.

- **Google kickstart 2022 round E Global rank 5340** - Mastered rapid iteration and adaptability in a global arena, thriving in ambiguity to deliver solutions under time-critical constraints.