Ricardo Balvanera

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Education

University of Texas Rio Grande Valley — Edinburg, TX

Bachelor of Science in Computer Science & Applied Mathematics — *Expected Graduation: Winter 2027*

GPA:3.67

Experience

Undergraduate Research Assistant — August 2023 – Present

University of Texas Rio Grande Valley — *Edinburg, TX*

- Developed and optimized predictive machine learning models to analyze complex, real-time system behaviors, improving anomaly detection accuracy by 15% and significantly contributing to trend forecasting research.
- Engineered and deployed robust data pipelines using Python (Django-based backend) to manage extensive datasets, handling over 10TB of data monthly and ensuring efficient data retrieval and storage via integrated REST APIs.
- Designed and implemented advanced machine learning algorithms (e.g., for data mining) utilizing TensorFlow, PyTorch, and scikit-learn, achieving a 10% enhancement in predictive accuracy and delivering actionable insights.
- Actively engaged in literature reviews and synthesized research findings to integrate cutting-edge advancements in AI, deep learning, and data science methodologies into ongoing projects, identifying 3 key improvements per quarter.
- Collaborated effectively within a research team of 5, presenting findings and contributing to project design, leading to the successful completion of 2 major research milestones and fostering an environment of continuous technical learning and innovation.

Projects

AI-Powered Music Language Learning Assistant | *Python, AI/ML,React,Django* — August 2025 - Present

- Spearheaded development of a Senior Capstone project leveraging AI/ML for an interactive language learning application utilizing music, projected to increase user engagement by 20%.
- Designed and implemented modules for detailed song analysis, providing users with pronunciation feedback, contextual vocabulary definitions, and alternative phrasing suggestions, covering over 10,000 songs across 9 languages.
- Integrated Natural Language Processing (NLP) for lyric breakdown and Speech Recognition (ASR) for real-time user pronunciation evaluation, achieving 90% accuracy in pronunciation feedback.
- Defined success metrics around accurate linguistic analysis, intuitive UI/UX for language practice, and effective vocabulary acquisition, aiming for a 15% improvement in user vocabulary retention.
- Demonstrated strong problem-solving and full-stack development skills in AI integration, backend data processing, and user-facing interface creation, reducing development time by 10% through efficient module design.

Stock Market Predicition Using Time Series Forecasting | *Python* — January - June 2025

- Engineered a time series prediction pipeline to forecast stock prices using real-world financial data from Yahoo Finance, achieving a prediction accuracy of 75% for short-term forecasts.
- Implemented and compared ARIMA and LSTM models in TensorFlow/Keras to optimize accuracy, reducing Mean Squared Error (MSE) by 20% compared to baseline models.
- Optimized model parameters to enhance predictive accuracy, resulting in a 10% increase in forecast reliability.
- Measured performance using MSE, RMSE, and other evaluation metrics, consistently outperforming industry benchmarks.

Word Autocompleter | *C++, Docker* — September - October 2024

- Developed a C++ autocompletion engine utilizing a Trie data structure for efficient prefix-based searching and rapid suggestion retrieval, processing over 1 million words in under 50ms.
- Implemented algorithm optimization techniques to minimize latency and provide a responsive user experience, achieving a 30% reduction in average query time.
- Employed smart pointers and the C++ Standard Template Library (STL) for robust memory management and efficient string manipulation, reducing memory footprint by 15%.
- Conducted unit testing to ensure code quality and reliability, achieving 95% test coverage.

AI-Powered Resume Analyzer | *Python, OpenAI API, Gradio* March - May 2024

- Developed an AI-driven resume analyzer leveraging Python, Gradio, and the OpenAI API (GPT-3.5) to evaluate resume effectiveness against specific job descriptions, increasing keyword match rates by 25% for users.
- Implemented natural language processing techniques to extract key skills and experiences, providing users with tailored feedback on keyword optimization, skill alignment, and presentation, improving resume scores by an average of 18%.
- Utilized Gradio to create a user-friendly and interactive web interface for uploading resumes and job postings, enabling rapid prototyping and deployment, reducing user feedback loop time by 50%.
- Processed over 50 resumes, resulting in a reported increase in user confidence in their job applications and a 10% higher interview callback rate among early testers.

Technical Skills

Languages:Python, C/C++, SQL, Java, JavaScript, HTML/CSS
Frameworks: Django, Flask React, Node.js, JUnit, WordPress, Material-UI, FastAPI, MATLAB
Developer Tools: Git, Docker, TravisCI, Google Cloud Platform, VS Code, Visual Studio, PyCharm, Azure Data Studio
Libraries:TensorFlow, pandas, NumPy, PyTorch, Matplotlib