Luis Castellanos

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Education

Purdue University Aug. 2021 — Dec. 2025
B.S. in Mathematics & B.S. in Data Science *West Lafayette, IN*

Relevant Coursework

Mathematics: Discrete Math, Modern Algebra, Complex Analysis, Real Analysis, Fourier Analysis, Ordinary Differential Equations, Stochastic Processes

Data Science / Computer Science: Data Mining and Machine Learning, Linear Programming, Data Structures and Algorithms, Foundations of Computer Science, Intro to AI, Large-Scale Data Analytics, Data Science Capstone

Statistics: Probability Theory, Statistical Theory

Advanced Topics: Markov chains, LP duality and simplex method, regression and model evaluation

Projects

Java Marketplace Program (repo) Java, OOP, Swing, Sockets
- Designed modular backend logic (`Product`, `Store`, `User`) enforcing constraints, inventory consistency, and transactional correctness.
- Implemented a client–server architecture with Swing GUIs and socket communication supporting product listing, search, cart management, and checkout.
- Persisted system state via Java Serialization, enabling reliable recovery and simplified state management.

Game Theory: Zero-Sum Games & Linear Programming Linear Programming, Game Theory
- Modeled finite two-player zero-sum games using payoff matrices and formulated optimal mixed strategies as linear programs.
- Applied the Minimax Theorem to compute Nash equilibria via primal–dual LP pairs and simplex-based solution methods.
- Interpreted mixed strategies through LP duality, connecting equilibrium solutions to feasibility and optimality conditions.

Carcassonne Markov Chain Model (report) Python, NumPy, Stochastic Processes
- Constructed a finite-state Markov chain (32 states) encoding board configurations and player turns with tile-based transition probabilities; implemented simulation and analysis in Python.
- Estimated first-mover advantage and expected game length via Monte Carlo simulation and transition analysis; full write-up and results published on personal website.

Homelab Server Deployment Ubuntu Server, CasaOS, Tailscale
- Deployed a self-hosted homelab providing media services, game servers, and local LLM inference; documented architecture and operational workflows on personal website.
- Configured secure remote access and hardened networking setup; maintained runbooks covering deployment, backups, and remote administration.

Personal Website Jekyll, GitHub Pages
- Built and maintain an academic site publishing project write-ups with assumptions, methodology, diagnostics, and results beyond raw repositories.
- Organized content for fast static delivery and recruiter-friendly navigation (projects, notes, reports) at luiscastelds.github.io.

Selected Work (Online)

Detailed project reports, visualizations, and reproducible analyses (assumptions, evaluation, and conclusions) available at luiscastelds.github.io.

Research & Academic Projects

NBA Salary Prediction (Capstone) Python, pandas, scikit-learn
- Built regression and ensemble models for third-year NBA salary prediction with feature engineering and cross-validation.
- Evaluated performance using error diagnostics and feature importance; methodology, assumptions, and results documented on personal website.

Technical Skills

Programming: Python (NumPy, pandas, scikit-learn, Matplotlib), Java, R, MATLAB, LaTeX, C
Data / ML: Supervised & unsupervised learning, regression, PCA, optimization, model evaluation, data visualization
Databases & BI: SQL, MySQL, Power BI, Tableau
Tools: Git, Jupyter, GitHub Pages, PyTorch
Languages: Spanish (native), English (fluent), German (beginner)