Estella Xu

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EDUCATION

Northwestern University | Evanston, IL   Expected June 2025
Bachelor of Arts in Mathematics and Computer Science
GPA: 3.67/4.0 | **Dean's List** | **SAT:** 1560/1600 (780 Math)
Relevant Courses: Math Models in Finance, AI & Machine Learning, Probability and Stochastics, Scalable Software

SKILLS

Technical: Proficient in Python, C/C++, SQL, LaTeX, Amazon Web Services (RDS, S3, Lambda, API Gateway)
Familiar with JavaScript, Node.js, Vue.js, Nuxt.js, PrimeVue, scikit-learn, XGBoost, Pandas, NumPy, Git
Experience with Linux, R, TensorFlow, Regular Expressions, WebGL, Yahoo Finance API, Excel
Languages: Fluent in Mandarin

RESEARCH EXPERIENCE

Coadjoint Orbits of Extensions of Lie Groups, *Independent Researcher*   June - August 2023
- Wrote a grant proposal and was awarded the Summer Undergraduate Research Grant.
- Conducted an 8-week independent research project to rigorously prove new properties of coadjoint orbits of extensions of Lie groups under the guidance of Professor Santiago Cañez.
- Authored a final paper on the subject.
- Reviewed existing research from 4+ publications and examined patterns in the behavior of certain Lie groups.
- Set goals to measure progress and self-taught challenging material.

LEADERSHIP & WORK EXPERIENCE

Northwestern's 80th and 81st Dolphin Show, *Director of Sales and Promotions*   September 2022 - June 2024
- Analyzed sales patterns using Excel to increase ticket sales for the nation's largest student produced musical.
- Sold 3,525 tickets with a gross of \$61,195, selling out the venue and generating more revenue than any previous year of the Dolphin Show.
- Arranged group sales and discounts with 6 schools and 20 restaurants, accounting for 160 tickets.
- Piloted inclusive ticketing by using a grant from Student Activities Assistance Fund to implement a new pay-what-you-can system, providing 70+ students with reduced price tickets.
- Led a team of 6 members; directed weekly meetings and created video tutorials on Excel features.
- Coordinated with the box office to set up the ticketing platform and resolve patrons' inquiries.

PrizeSole, *Software Engineer Intern*   June - August 2024
- Developed a front-end application for an online store using Nuxt.js, incorporating features such as Nuxt Icons for an enhanced user interface.
- Built a checkout form using PrimeVue components. Integrated the Stripe API to ensure secure transactions.
- Used AWS Lambda functions with the API Gateway to create serverless back-end services, including functions to add users to the database upon sign-up for efficient and scalable user management.

TECHNICAL PROJECTS

Derivative Pricing and Financial Modeling   July 2024 - Present
- Developed an options pricing model using Black-Scholes to calculate the prices of European options.
- Calculated the Greeks to assess the sensitivity of option prices to market factors.
- Implemented a Monte Carlo simulation to predict portolio values over time. Analyzed historical data and applied Cholesky decomposition to simulate correlated returns.
- Interpreted simulation results by computing measures such as value at risk, variance, and confidence intervals.

Predictive Modeling of Stock Market Movement   July 2024 - Present
- Used Random Forest classifiers to predict daily movements of a given stock or index using the opening and closing price, the volume traded, and the highest and lowest price.
- Used the mean reversion theory by adding additional predictors including the ratio between today's closing price and the rolling average over varying periods of time.
- Backtested the model using growing amounts of data to predict subsequent periods.

Advertisement Conversion Modeling   May 2024
- Implemented functions to clean conversion and non-conversion datasets using Pandas dataframes. Performed data analysis by writing functions to compare continuous and categorical variables (e.g., conversion by zip code).
- Built one classification model using XGBoost and another using GridSearchCV to predict the conversions and non-conversions of advertisements given features such as zip code, browser, etc.
- Trained and tested the classifier by splitting conversion/non-conversion datasets. Achieved ROC AUC score of 0.88.