

# Charles Vargas

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## EDUCATION

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### Northeastern University

Bachelor of Arts in Business Administration

- **Relevant Coursework:** Accounting, Business + Society, Microeconomics, Statistics

New York, NY

Aug. 2024 – May 2028

## EXPERIENCE

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### Business Intelligence + Data Analytics Intern

Oct. 2023 – May 2026

Apple Montessori Schools

Westfield, NJ

- Automated KPI dashboards in Power BI integrating HR, finance, and enrollment data across 20+ schools, reducing manual reporting time by 50% and saving leadership 15+ hours monthly.
- Built predictive enrollment models tracking 20+ schools, improving forecast accuracy by 50% and generating data-driven recommendations that reduced student attrition by 10%. Methodology demonstrated end-to-end on public data in the NYC D2 Enrollment Forecasting project below.
- Integrated and cleaned 3+ years of data from multiple CRMs and billing platforms, mapping full customer journey and identifying conversion bottlenecks that increased enrollment rates.
- Delivered real-time performance analytics that directly informed pricing strategy, staffing decisions, and market expansion planning.

### Product Designer

Mar. 2026 – Present

Medara

New York, NY

- Manage and continuously optimize website content, structure, and user experience to improve clarity, engagement, and alignment with company objectives.
- Design and refine marketing collateral and support UI/UX enhancements, translating company messaging into clear, visually compelling materials.

## PROJECTS

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### NYC D2 Elementary Enrollment Forecasting | *Python, Power BI, Prophet* | [Github](#)

May 2026

- Treated 12 years of NYC DOE + NYSED enrollment data as a forecasting question: how do you make defensible 3-year projections from 9 historical years and 2 post-COVID data points? Built three analyst-bounded scenarios in Python; deployed as a 4-page Power BI dashboard with scenario/model slicers and per-school drill-through.
- Back-tested 2022–25 forecasts against post-publication NYSED actuals: piecewise-linear Base scenario landed within 9% MAPE versus Prophet’s roughly 19%, more than 2x the error.
- Stitched NYC DOE, NYSED, and Census ACS catchment income data via the Census Geocoder API; quantitatively refuted the “wealthy catchments left first” hypothesis with a +0.14 income/decline correlation across 30 schools.

### NYC Subway Events from Ridership Data | *Python, scikit-learn, Socrata API* | [Github](#)

May 2026

- Treated NYC event detection as a signal-processing question: can you identify when a major event occurs (Knicks games, marathons, parades) from MTA hourly ridership alone, with no event calendar as input? Built day-of-week and season-aware ridership baselines per station-hour in Python so a sold-out Sunday game is scored against the right Sundays, not a generic weekday median.
- Quantified each event with a five-dimensional signature (peak intensity, lead time, lag time, decay half-life, pre/post asymmetry) rather than a single excess-ridership figure; clustered the signatures with scikit-learn and found that venue, not sport, drives the pattern: Knicks, Rangers, and MSG concerts cluster together, while Yankees day and night games sit roughly 3x apart in intensity.
- Validated against a held-out 2024 calendar of 513 events, recovering 495 (96.5% recall) without ever exposing the calendar to the model; integrated Socrata API ridership and NOAA weather data end-to-end.

### NYC Distance-Based Fare | *Python, TypeScript, Tailwind* | [Github](#)

Nov. 2025 – Dec. 2025

- Modeled NYC fare policy on real MTA data: would a distance-based fare actually change who pays and who saves? Analyzed 5+ years of ridership data across OD pairings, fare structures, and station metadata; built an interactive site so non-technical readers could test the tradeoff for their own commute.
- Uncovered \$913M in MTA revenue gaps using Python-based modeling; proposed a pricing optimization strategy where about 15% of riders pay less under the redesigned structure while recovering lost revenue without raising consumer fares.

## TECHNICAL SKILLS

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**Languages:** Python (pandas, NumPy, statsmodels, scikit-learn, Prophet), SQL, TypeScript, HTML/CSS

**Frameworks:** React, Next.js, Figma

**BI & Visualization:** Excel, Power BI (DAX, Power Query), Tableau, Matplotlib

**Developer Tools:** Git, GitHub, Vercel, VS Code

**Data Engineering:** NYC OpenData (Socrata API) / NYSED / Census ACS / NOAA APIs, Census Geocoder