# Alan Lin

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## Education

**Boston University** Expected (May 2026)

*Bachelor of Arts in Computer Science* *Boston, MA*

- **Relevant Coursework:** Data Science Tools & Applications, Database Systems, Distributed Systems, Software Engineering, Web App Development, Analysis of Algorithms, Functional Programming, Statistics, Linear Algebra, Computing Systems, Discrete Math, Data Structures & OOP in Java

## Experience

**City of Boston** Sep. 2024 - Dec. 2024

*Data Analyst* *Boston, MA*

- Engineered Flask web application analyzing $4.7B+ municipal budget data, implementing RESTful APIs and pandas data pipelines for real-time financial analytics visualization
- Implemented linear regression analysis using scikit-learn to correlate per capita income with municipal spending across Boston neighborhoods, processing 4 years (FY22-FY25) of financial data
- Built interactive choropleth maps using Folium and GeoPandas to visualize $4.7B+ budget allocation across Boston neighborhoods, highlighting geographic spending patterns and socioeconomic disparities

**Boston University** Jan. 2024 - May 2024

*Software Engineer : Full-Stack Developer* *Boston, MA*

- Developed full-stack recipe management application using Express.js and Firebase, implementing 7+ RESTful API endpoints for user authentication and CRUD operations on recipe data
- Integrated 2 third-party APIs (Spoonacular and Sam's Club) to enable ingredient-based recipe search and real-time price comparison functionality, processing data for 100+ ingredients
- Engineered scalable NoSQL database architecture using Firebase Firestore, managing user profiles and recipe storage for 100+ unique recipes per user with 5+ data fields each

## Projects

**Latent Semantic Analysis Search Engine** | *Python, Flask* Oct. 2024

- Developed a Flask-based search engine application using scikit-learn, implementing TF-IDF vectorization and Truncated SVD for efficient processing of 20,000+ documents from the 20 Newsgroup dataset
- Engineered a consine similarity algorithm to retrieve and rank the top 5 most relevant documents for user queries, achieving real-time search functionality
- Designed an interactive web interface using Chart.js, visualizing search results and similarity scores for up to 5 documents per query

**KMeans Clustering Visualization** | *Python, Flask, Javascript* Sep. 2024

- Developed an interactive K-Means clustering tool, enabling real-time visualization of 300+ data points and color-coded cluster assignments across 4 centroid initialization methods
- Implemented step-by-step and full-convergence modes, allowing users to dynamically update and converge cluster assignments, observing shifts in centroids in under 100ms
- Created responsive web interface with interactive controls for dataset generation, algorithm stepping, and convergence visualization, enabling hands-on exploration of clustering behavior

**SProfile** | *ReactJS, NodeJS, ExpressJS, Firebase* Apr. 2024

- Engineered full-stack Spotify profile application using Express.js and OAuth 2.0, implementing secure user authentication and authorization across 8+ API endpoints
- Integrated multiple third-party APIs (Spotify, TicketMaster) to create personalized music discovery platform, managing real-time data flow for user profiles and event recommendations
- Built scalable backend architecture handling OAuth token refresh system and cookie-based state verification, ensuring secure access to 6+ Spotify user data scopes including playlist management and listening history

## Technical Skills

**Programming Languages**: Javascript, Java, Python, C, Bash/Shell, x86 Assembly Language, OCaml, SQL
**Frameworks/Libraries**: ReactJS, ExpressJS, NextJS, ViteJS, Flask, NumPy, Pandas, Folium, SciKit, Flask
**Developer Tools**: Git/GitHub, Postman, VSCode, Webstorm, Firebase, Jupyter Notebook, LaTeX