AI Reflection

Project Title: Economic Disparities and Resilience in Manhattan: A ZIP Code-Level Analysis

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Date: May 2025

Introduction

In executing our project on economic disparities and resilience across Manhattan ZIP codes, we strategically leveraged AI tools, specifically ChatGPT by OpenAI, to enhance our analytical processes, streamline data interpretation, and refine storytelling narratives within our Tableau visualizations. Below is a detailed reflection on how AI integration specifically impacted each stage of the project.

Question 1: Employment Trends

Data Preparation and Support:
Based on the rich source of downloadable data from https://data.census.gov, ChatGPT assisted in analyzing the structure of the unemployment data to efficiently identify the mandatory columns to be retained (e.g., ZIP Code, Labor Force, Employed Population).

Analysis Strategy:
Artificial Intelligence suggested the most effective way to visualize unemployment trends, for instance, using line graphs to showcase changes over time and bar charts to highlight the most significant shifts in employment rates.

Impact of Artificial Intelligence on the Project:
The use of AI significantly improved the efficiency and quality of unemployment trend analysis. Processing large datasets was expedited, while AI-assisted error detection reduced the time spent troubleshooting data inconsistencies.

Reflection:
Despite the advantages of AI in increasing productivity, human oversight remained essential for iteratively adjusting the visualizations to ensure accuracy and relevance.

Question 2: Education and Employment

Use of AI in Data Exploration and Analysis:

- ChatGPT assisted the team in formulating targeted exploratory questions, specifically focusing on how education levels correlate with employment outcomes.
- Provided guidance on identifying relevant data fields (% bachelor's degree, unemployment rate) crucial for visualizing correlations clearly and effectively.

Visualization and Dashboard Development:
- AI recommendations significantly informed the design choices for the bubble chart and geographic map visualizations, ensuring clarity in representing complex educational attainment data across ZIP codes.
- ChatGPT also suggested integrating interactive parameter controls to allow dynamic exploration of various education levels, enhancing user engagement and interpretability.

Narrative and Storytelling:
- ChatGPT generated preliminary textual summaries of insights, helping craft clear, compelling narratives that highlighted key disparities in education attainment and their direct impact on employment trends.

Question 3: Income Trends and Employment

Data Interpretation and Analytical Guidance:
- ChatGPT helped clarify the analytical pathway to assess income trends relative to employment levels, emphasizing the importance of median household income as a measure of economic stability.
- Provided insights on structuring data to effectively visualize income brackets and employment levels, facilitating an intuitive understanding of socioeconomic conditions across ZIP codes.

Visualization Refinements:
- AI-guided suggestions led to the use of heat maps and treemaps to visualize income and employment data effectively, clearly distinguishing ZIP codes experiencing economic growth versus stagnation.
- Recommendations from ChatGPT refined the color-coding strategy, helping viewers intuitively understand correlations between income levels and employment stability.

Enhanced Storytelling:
- Generated concise, impactful narrative segments that clearly articulated the disparities in income growth and employment levels, contributing significantly to the overall coherence and persuasiveness of our data story.

Question 4: Rent Burden Analysis

AI's Role in Data Processing:
AI was particularly helpful in calculating rent burden ratios by accurately converting monthly

rent data to annual values. ChatGPT suggested effective methods to handle irregular data formats (e.g., "3500+"), which improved data accuracy and consistency.

Visualization and Interpretation:
ChatGPT recommended using choropleth maps to visualize rent burden across ZIP codes, effectively highlighting areas with high housing cost stress. Additionally, AI suggested using diverging color gradients to differentiate between low and high burden areas.

Human Judgment in Final Output:
Although AI facilitated data processing and provided visualization suggestions, manual adjustments were essential to ensure that visual representations aligned with practical interpretations. Human input refined the color scales to more accurately depict rent burden severity.

Question 5: Socioeconomic Vulnerability Assessment

Composite Scoring Methodology:
 ChatGPT assisted in brainstorming how to combine multiple socioeconomic factors (rent burden, unemployment, education, income, and business activity) into a single vulnerability score. It guided the application of appropriate weighting techniques to balance the influence of each factor.

Visualization Techniques:
 AI recommended using choropleth maps to display the composite vulnerability scores across ZIP codes, allowing for clear geographic comparisons. Additionally, AI helped generate ranking insights to pinpoint the most and least vulnerable areas.

Human Refinement and Insight:
 AI-driven calculations were carefully reviewed to ensure that weights assigned to different factors reflected real-world socioeconomic impacts. Human analysis was essential to interpret why certain ZIP codes consistently appeared as high-risk despite different economic conditions.

General AI Reflection
The integration of AI tools significantly enhanced data analysis, visualization accuracy, and storytelling clarity. While AI played a supportive role, the project required ongoing human involvement to interpret the results and ensure contextual relevance. The AI-driven data processing steps, particularly those involving error detection and data transformation, saved considerable time and improved accuracy. However, nuanced decisions—such as choosing final visualizations and assigning weights in vulnerability scoring—demanded human expertise.

Conclusion

By leveraging AI for brainstorming, data cleaning, and visualization enhancement, we efficiently managed the large and varied datasets involved in this project. While AI tools like ChatGPT contributed to streamlining data processing and error correction, human input was essential to ensure methodological rigor and contextual relevance. This balanced approach led to insightful and reliable visualizations that accurately reflect the socioeconomic landscape of Manhattan.