

Which Neighborhood in Atlanta is Best for a Metal Music Venue Business?

Considering Transportation, Demographic, and Urban Planning Factors

CP6542: Transport and GIS Final Report

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GitHub: <https://github.com/drunken-boat/livehouse-atl>

1 Introduction

Atlanta's city planning vision aims to build an economically viable and community-based metropolitan area. This includes making Atlanta an attractive, accessible, and world-class destination for entertainment and cultural exchange for all racial, ethnic, and national groups.(Atlanta Department of City Planning, 2021)

According to the City of Atlanta Department of City Planning (DCP), arts serve as an economic driver. The DCP plans to invest in neighborhood commercial districts with vibrant public spaces and expand resources to support local neighborhood scale economies that can tap into regional and global networks. (DCP, 2021)

Live music venues, which are important for art and make great small businesses, rely on complex systems of cultural and social capital to bring revenue into each venue space. This revenue can be further capitalized to improve business growth.(Whiting, 2021)

Economic geography suggests that the need to access large and sophisticated markets and the nature of music and creative industries to cluster in scenes leads to geographic concentration.(Florida et al., 2010)

Metal music is growing in Atlanta and has regional, even national, impact. The Southeast is one of the most promising areas in the country right now when it comes to the music business, with an extremely deep pool of both fans and bands. The "Mass Destruction Music Fest" has put the Southeast on the national metal map (Castro, 2017).

Given the growth of metal music and the cultural significance of music venues, it's a good time and to invest in a metal music venue in Atlanta. However, according to music venue owners and investors, venues are important sites where cultural values and market imperatives are negotiated. Most booking agents and small venue owners often express the pursuit of profit as a secondary objective, seeing themselves as curators of cultural space and facilitators of the types of sociality required for such spaces to thrive.(Carah et al., 2017)

The for a music venue business is important and is an interdisciplinary topic. Therefore, it's important to integrate transport, geography, urban planning, and sociology to investigate which neighborhood in Atlanta is best for a metal music venue business. This project provide a spatial and mathematical model to find the best neighborhood for a metal music venue business.

1.1 Problem Statement

In the vibrant city of Atlanta, known for its diverse musical heritage, there is a growing interest in metal music. As a result, there is a potential market for new metal music venues. However, the success of such a venture depends on various factors including location, accessibility, and the demographic characteristics of the neighborhood. This project aims to analyze these factors to identify the most suitable neighborhood for establishing a new metal music venue.

This project aims to identify the best neighborhood in Atlanta for establishing a metal music venue business, considering transportation and demographic factors.

1.2 Project Location

Atlanta's strategic geographical position and robust transportation system make it a key gateway for the national and international music industry in the southeastern region. According to a 2011

report, the music industry was projected to contribute over 313 million dollars annually to state and local government revenues, with an estimated total employment of 19,955.(Tai, 2014)

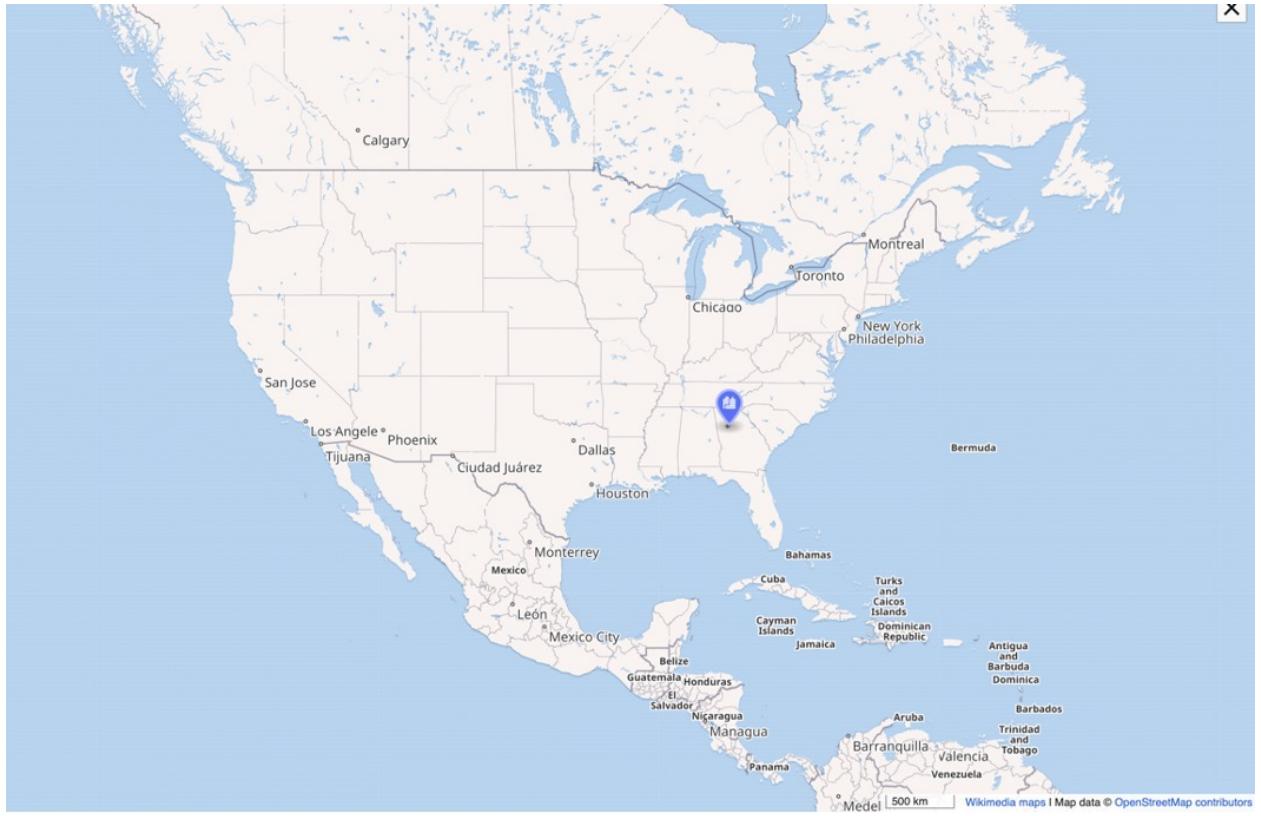


Figure 1: Project Location on Planet Earth

1.3 Terms and Context

Metal Music: A music genre, originated in the UK and US in the late 60s and early 70s. It evolved from blues rock, psychedelic rock, and acid rock, and is known for its powerful sound featuring distorted guitars, long guitar solos, strong beats, and high volume. Metal music lovers are called "metalheads"(Walser, 1993), which is the major consumer of metal music venue business.

Music Venue: A music venue is any location used for a concert or musical performance. Music venues range in size and location, from a small coffeehouse for folk music shows, an outdoor bandstand or a concert hall to an indoor sports stadium. In this project, the music venue is in the same scope yelp's music venue category.

1.4 Conceptual Vision and Model

The conceptual model, comprising both spatial and mathematical components, transforms transport and demographic factors into quantifiable metrics. These metrics are spatially joined by location, with the area serving as a weight to aggregate metric scores for neighborhoods. Neighborhoods with the highest scores are selected, and restriction layers are overlaid to identify the most suitable neighborhoods. The final step involves pinpointing the neighborhood that is optimal for a metal music venue business.

1.5 Objectives

The objectives of this project are to:

1. Evaluate the accessibility to current music venues.
2. Identify neighborhoods with high potential for establishing metal music venues, considering transport, demographic, and urban planning factors.
3. Contribute to the promotion of a vibrant music scene in Atlanta.

2 Data Processing and Inclusion

2.1 Data Source

Atlanta Statistical Neighborhood

City of Atlanta Neighborhood Area polygon data were derived from the course materials provided in Lab 2.

Music Venue Point of Interest Points of interest for music venues were obtained through query from the Yelp Business Search API(Yelp, 2023).

Demographic Data: Census Tract City of Atlanta is within Fulton and DeKalb county. Polygon data with census tract in Fulton and DeKalb county, which includes monthly housing price, median household income, median age, and race, were sourced from the American Community Survey(ACS) 5-year estimates for 2019(U.S. Census Bureau, 2019). Monthly housing price reflects real estate cost, which represent rent price for music venue, median household income and median age represent neighborhood consuming characteristics.

Demographic Data: Metalheads' demography The age, gender, race distribution is from a sociology paper researching metalheads (Shukla,2022).

Transport Data: Road network, parking lots

Road network polylines and parking lots (points and polygons) in city of Atlanta are downloaded with Python query with OSMnx(Boeing, 2017).

Urban Planning Data: Zoning and Livable Center Initiative Zoning and Livable Center Initiative(LCI) are directly downloaded from fulton county GIS data portal(Fulton County, 2023).

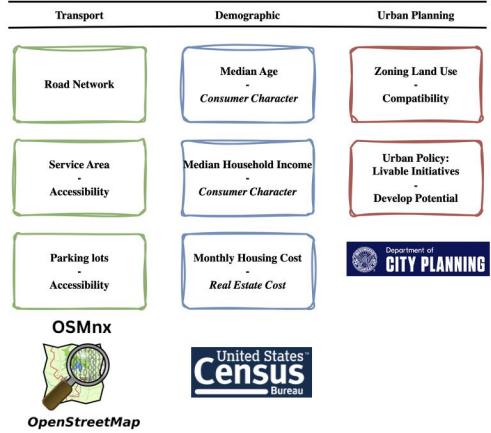


Figure 1: Data source and Usage

2.2 Data Accuracy

There are several potential sources of inaccuracies in the data. OSMnx data, which is obtained from GPS, might have meter-level inaccuracies due to daily variations in accuracy and systematic errors. There might also be inaccuracies in naming (OpenStreetMap Wiki, 2020). The Yelp Business Search API, which returns up to 1000 businesses and excludes businesses without reviews, might overlook some music venues that either lack reviews or exceed the limit (Yelp, 2023). Demographic data of metalheads is researched in England, so there could be unknown difference in Atlanta, due to different cultural and historical context

The first two inaccuracy are ignored because this project is in neighborhood level. The potential demographic inaccuracy is solved by only considering age distribution, and not considering race and gender.

To enhance accuracy, this project employs 5-year estimates from the ACS instead of 1-year estimate. Demographic data collected in a 5-year time span offer increased statistical reliability(U.S. Census Bureau, 2019).

2.3 Data Processing

prior to incorporating data into the spatial model, two key steps are undertaken. The first step involves transforming the coordinate reference system to WGS 84 UTM Zone 16. The second step is service area in network analysis. In ArcGIS Pro, use music venue points of interest as facilities, time thresholds set at 5, 10, 15, and 20 minutes, and using driving as network type.

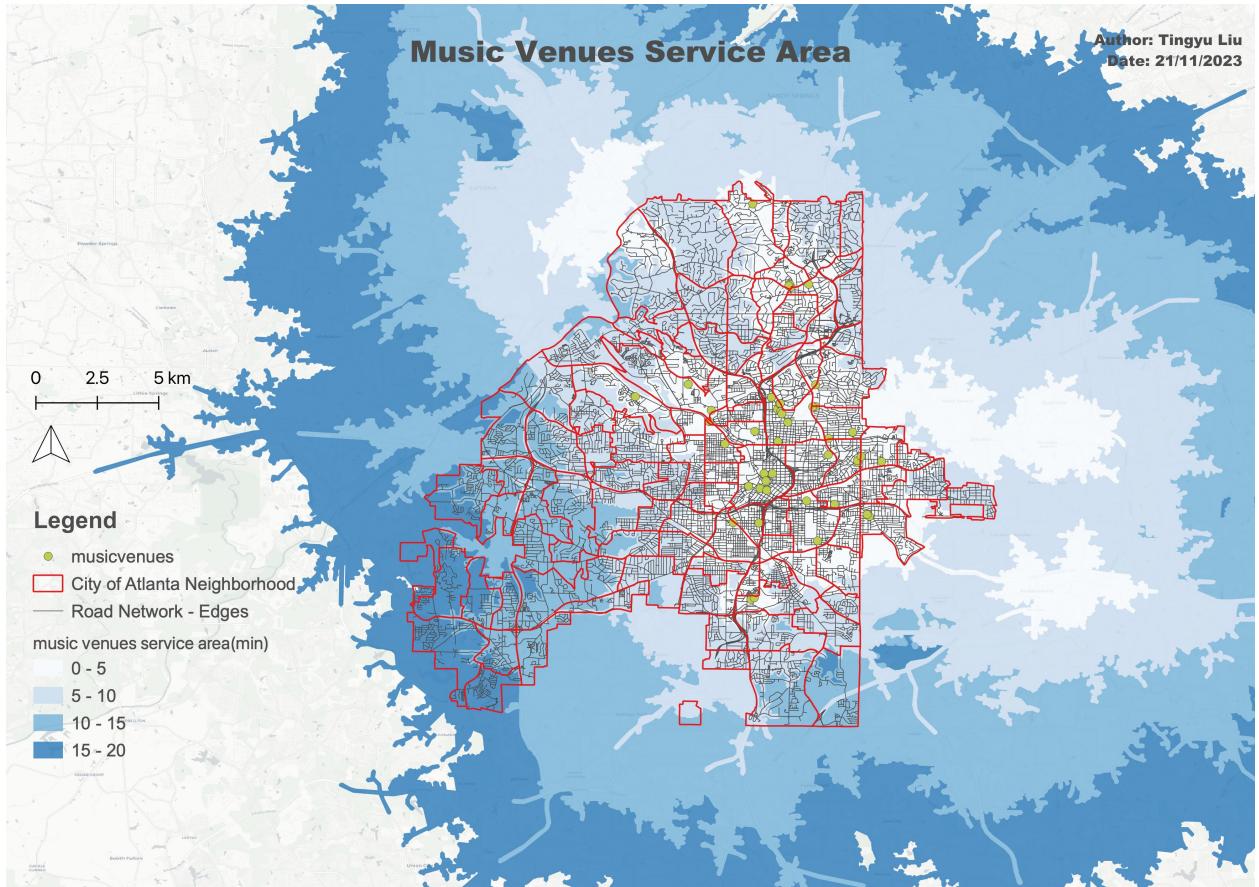


Figure 3: Music Venue Service Area

3 Solution and Methods

3.1 Spatial and Mathematical Model

The spatial and mathematical model involved building a spatial model to convert transport and demographic factors to quantifiable metrics, then ranking neighborhoods based on these metrics to find the top 5 neighborhood candidates. Then, urban planning and transport factors were used as restrictions to select the best suitable one.

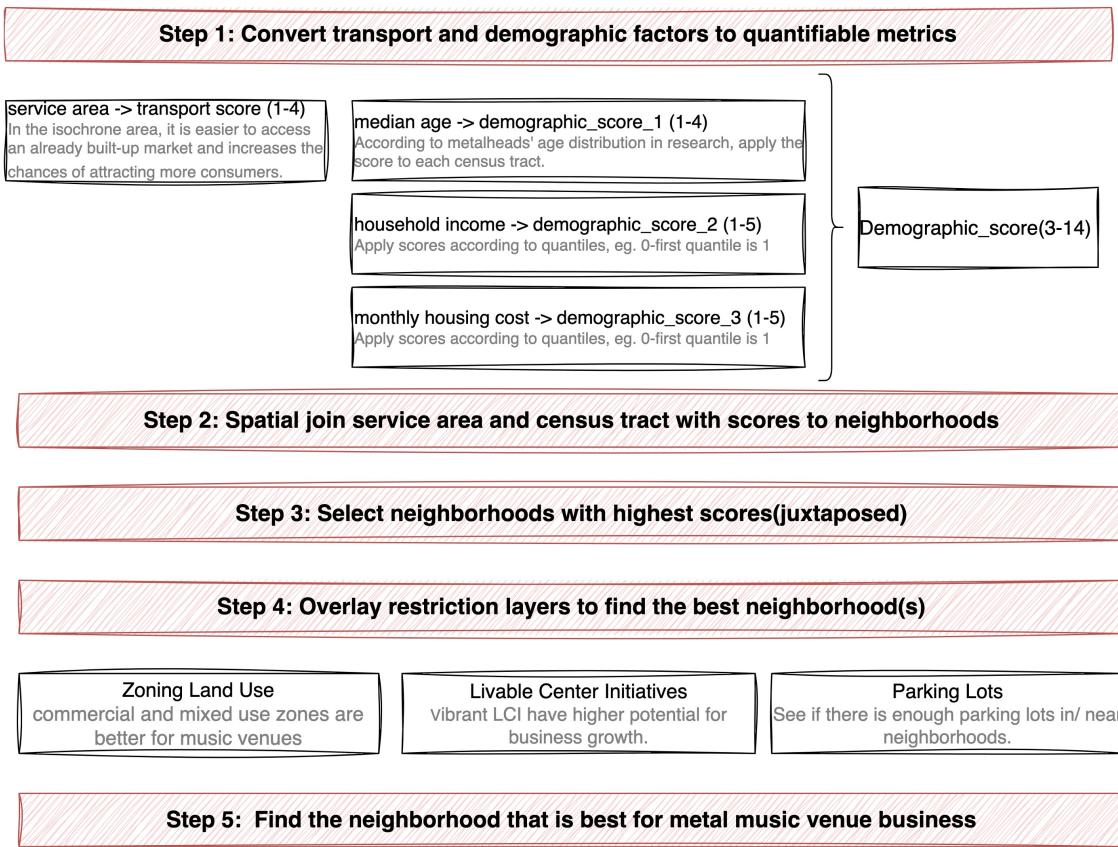


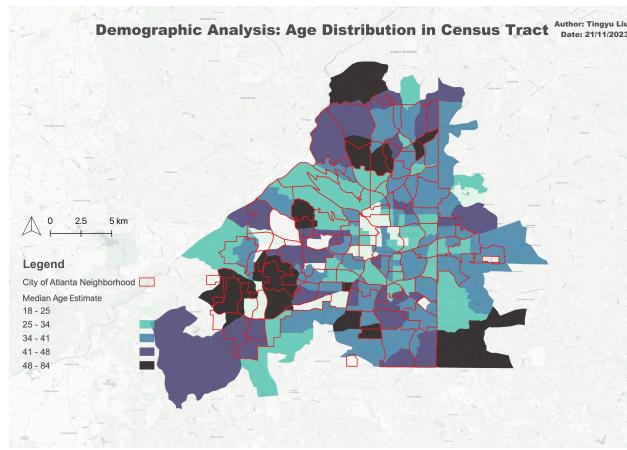
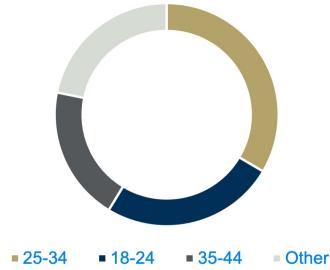
Figure 2: Model Steps

3.2 Model Steps

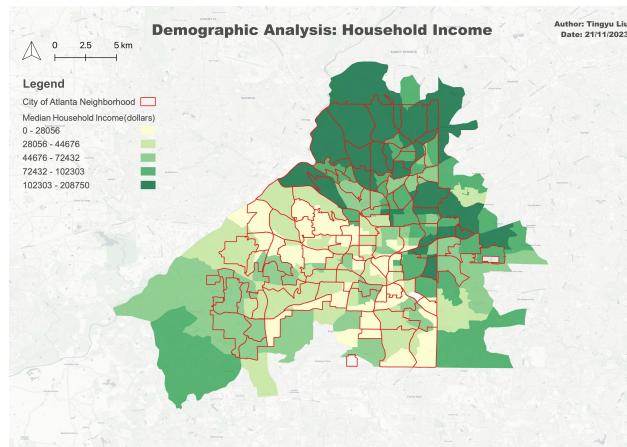
- Convert transport and demographic factors to quantifiable metrics.
In transport factor(network analysis), apply scores according to accessibility to existing music venues. Higher score means nearer to existing music venues. According to economic geography, the concentration is good for music venue business. And more accessible place means more familiar to current metalheads, and easier to build cultural recognition. For example, service area within 0-5 minutes driving get score 4 out of 4.

In age distribution, according to metalheads' age distribution in research, apply the score to each census tract. Higher score means more similar range to metalheads' age range. For example, age 25-35 will get score 4 out of 4.

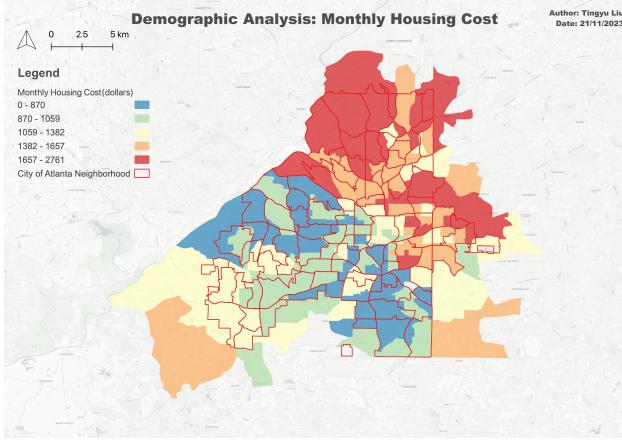
Metalhead Age Range



In median household income, separate income to 5 ranges according to equal quantile, apply scores according to quantiles. Higher score means higher consuming capacity. For example, 102303 - 208750 dollars will get score 5 out of 5.



In monthly housing cost, separate income to 5 ranges according to equal quantile, apply scores according to quantiles. Higher score means higher consuming capacity. For example, 1657 - 2761 dollars will get score 5 out of 5.



2. Spatial join service area and census tract with scores to neighborhoods

In the first steps, the scores are in the service area polygons or census tract polygon, and considering the objective is to find out the best neighborhood, so the author join score attribute by location, and sum the score in each neighborhoods based on area.

In the initial stages of the process, each service area polygon or census tract polygon is assigned a score, denoted as S_i , where i represents the index of the polygon. The objective is to identify the optimal neighborhood, which necessitates the aggregation of scores by location. This is achieved by associating the score attribute with each neighborhood. The total score, T_j , for a given neighborhood j , is computed by summing the scores of all polygons within the neighborhood, each weighted by their respective area, A_i . Mathematically, this can be represented as:

$$T_j = \sum_{i \in N_j} \frac{A_i}{A_{neighborhood}} \cdot S_i \quad (1)$$

Here, N_j signifies the set of polygons within neighborhood j , and A_{total} is the total area of all polygons. This equation effectively calculates the weighted scores in each neighborhood based on area, aligning with the described procedure.

3. Select neighborhoods with highest scores(juxtaposed)

After summarizing up the score to neighborhood, sort final score in descending order, and select the neighborhood that has top score.

4. Overlay restriction layers to find the best neighborhood(s)

The author consider two restrictions: urban planning(zoning and LCI) and transport(parking lot).

Zoning and LCI Land use designated for commercial and mixed-use purposes aligns more effectively with the operational requirements of a music venue business. Furthermore, the LCI(Livable Centers Initiative), which advocates for the creation of vibrant, walkable spaces, provides additional support for these neighborhoods as potential locations for the proposed music venue. The more ratio of commercial and mixed-use area, and the more overlay with LCI, the more suitable for music venue business for a neighborhood.

Parking Metal music events predominantly occur during the evening hours, leading to a majority of the audience opting to drive to the venue. To cater to this demographic, music

venues typically undertake one of two strategies. They either allocate substantial financial resources towards the acquisition of a parking lot, or they strategically select a location in close proximity to public parking facilities.

- Find the neighborhood that is best for metal music venue business

3.3 Method Integration

The method integration involved using ArcGIS Pro for Network Analyst (Service Area), QGIS for Layout, Join attribute by location, Field Calculator, attribute table, and Python for OSMNX, Folium, Geopandas.

4 Research Results, Discussion, and Conclusion

4.1 Analysis Result

Competitor Analysis

The competitor analysis is analyzing existing music venues in city of Atlanta, which are potential business competitors of a new metal music venues. involved analyzing the spatial distribution of existing music venues, their attributes, and their density. The majority of music venues are located in mid east part of Atlanta, which reflect the clustering effect in economic geography((Florida et al., 2010)).

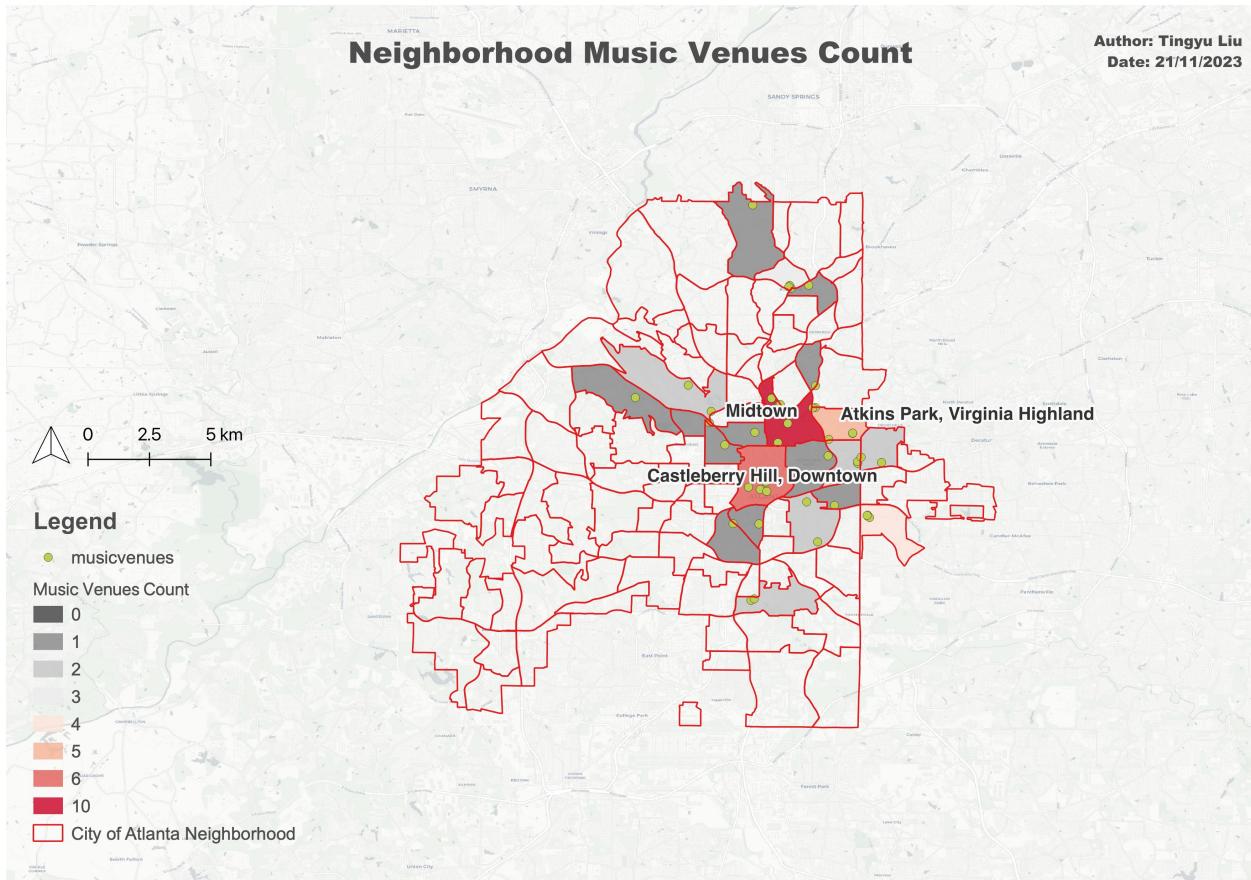


Figure 3: Neighborhood Music Venue Count

Transport Analysis

The transport analysis is service area in network analysis, which evaluate the accessibility of existing music venues.

Midtown, distinguished by the highest number of music venues, exhibits a spatial distribution primarily on the eastern side of Atlanta. Neighborhoods with a significant concentration of music venues, such as Midtown, Castleberry Hill, and Akins Park, are centrally located, forming a cluster in the central part of the city.

The areas with the greatest accessibility, defined as those within a 0-5 minute driving time, display a spatial skew when compared to the distribution of music venues. While the music venues are predominantly distributed along an east-west axis, the service area extends more significantly in the north-south direction. This pattern can be largely attributed to the presence of the I-75 and I-85 highways. The influence of transport factors on accessibility and location analysis is evident. Music venues within a shorter driving time achieve higher transport scores, indicating that the proximity to major highways and ease of access are beneficial for the music venue business.

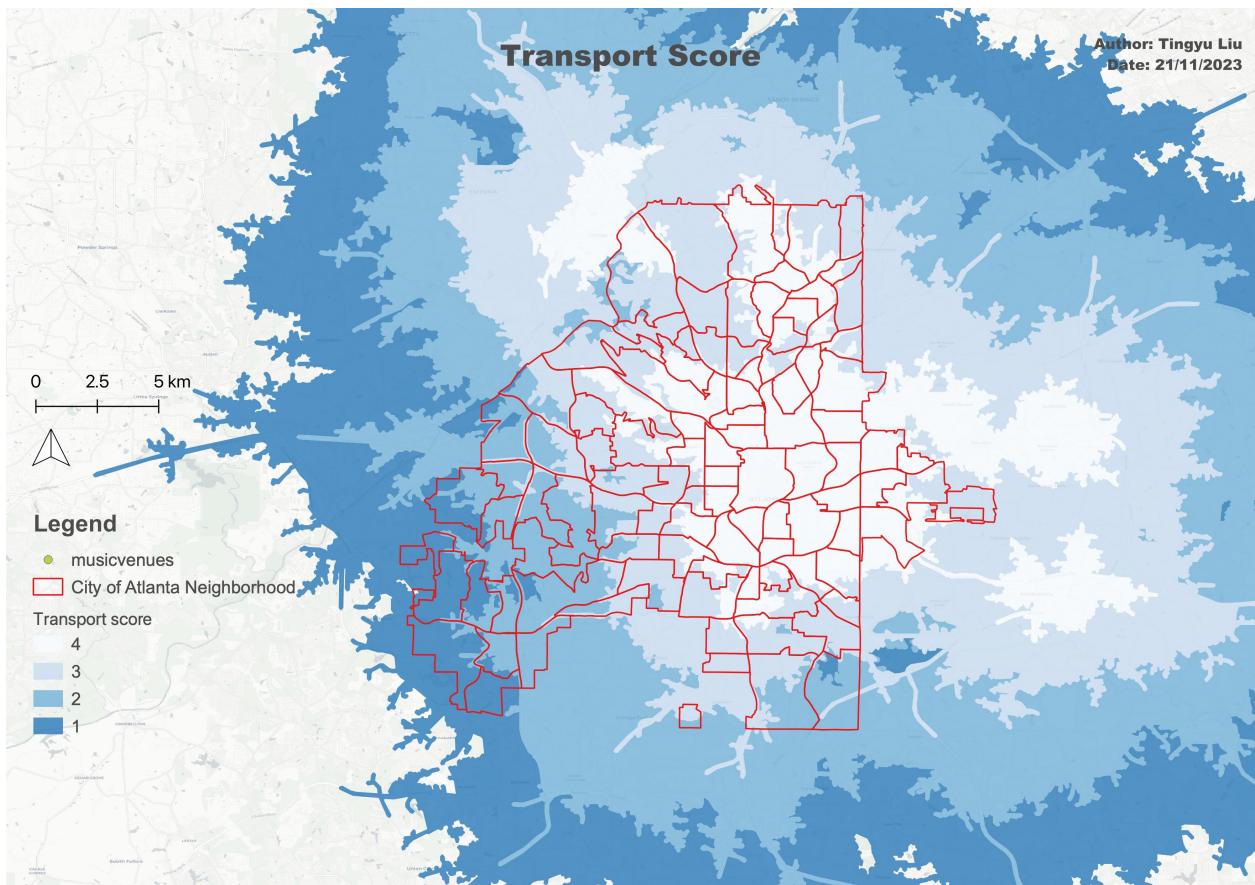


Figure 3: Neighborhood Music Venue Count

Demographic Analysis

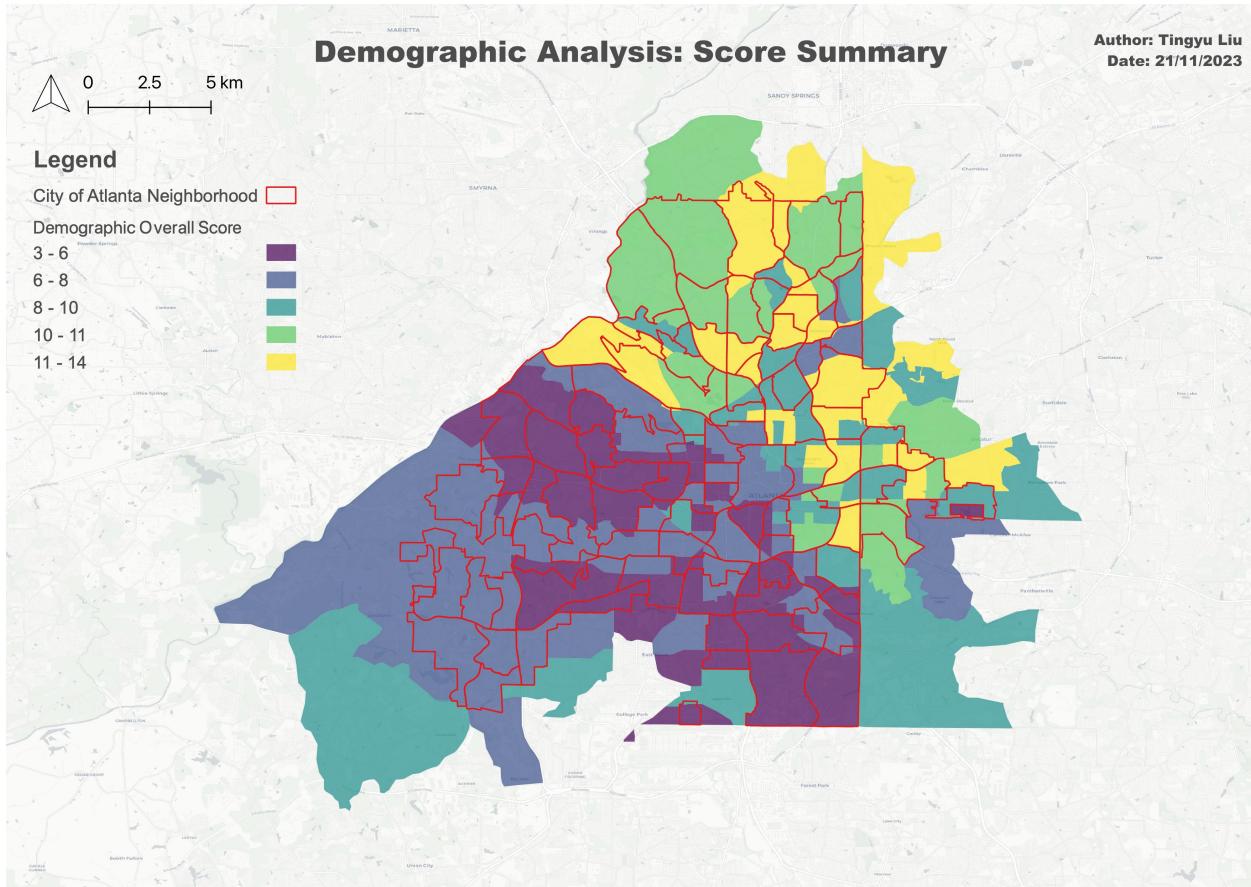
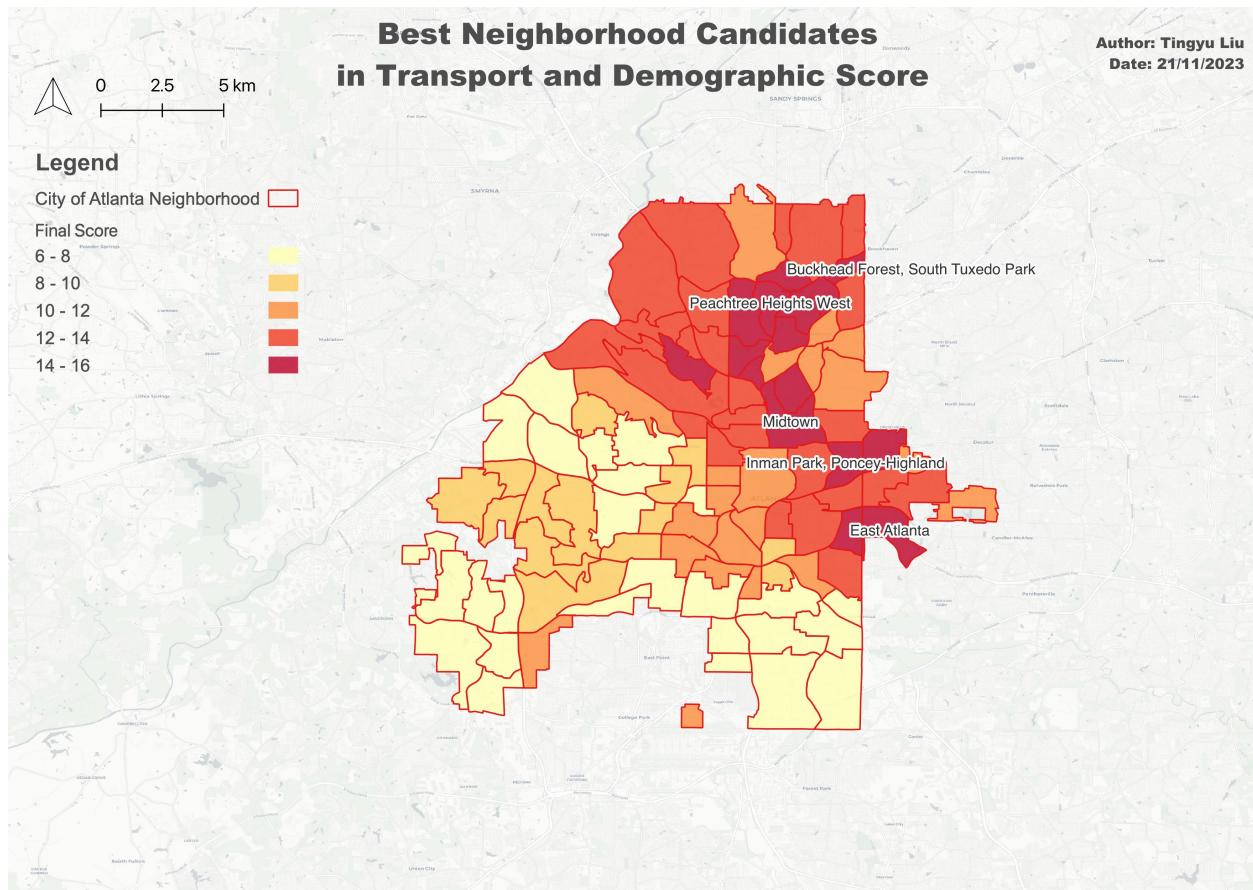


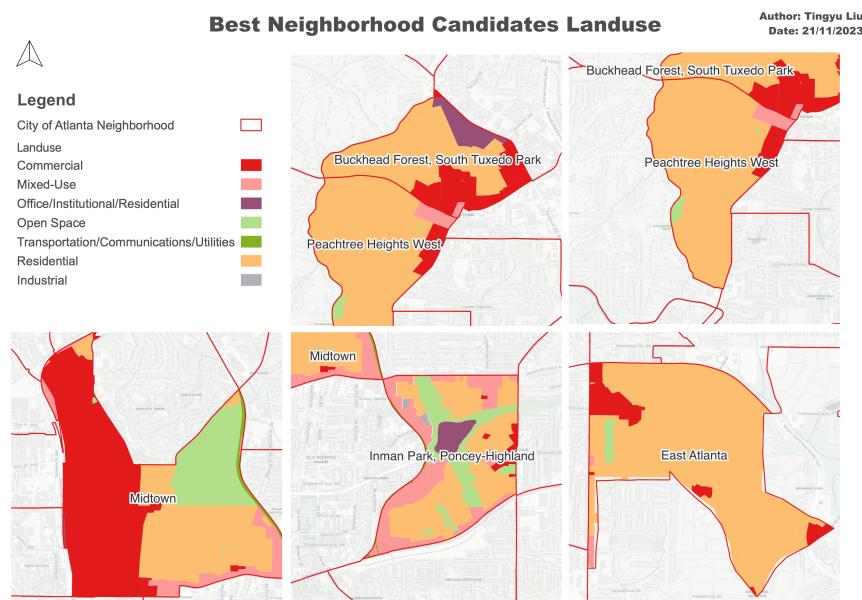
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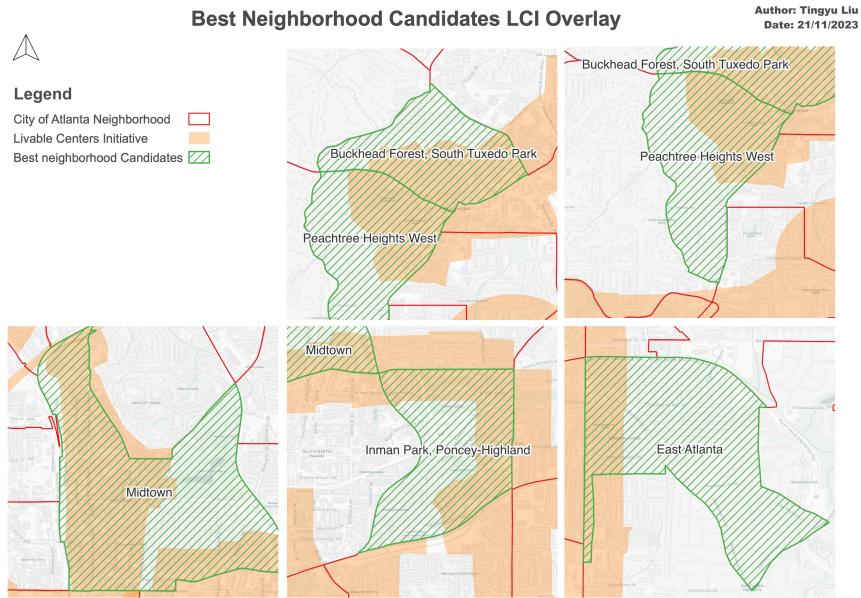
Factor Integration

Upon the integration of transport and demographic scores, the neighborhoods that emerge with the highest scores (14 out of a possible 15) are Midtown, Inman Park, East Atlanta, Peachtree Heights West, and Buckhead Forest. These neighborhoods exhibit advantageous conditions for the establishment of a metal music venue business, as evidenced by their accessibility, demographic composition, and urban planning factors. Through the quantification and amalgamation of these factors, the study identifies these neighborhoods as the most propitious locations for music venue business.



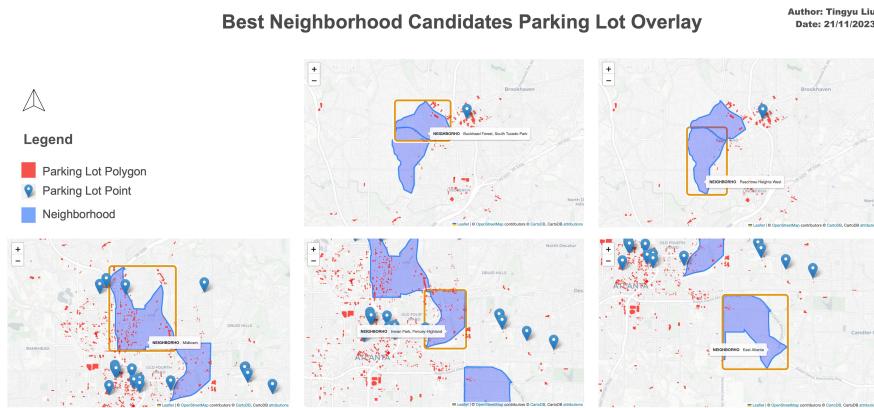
Restriction Analysis





The figure illustrate the distribution of parking lot amenities within and in the vicinity of each potential neighborhood.

Taking into account the availability of parking lots, Midtown and Inman Park emerge as the most viable options. This conclusion is drawn based on the current distribution and accessibility of parking facilities in these neighborhoods.



4.2 Conclusion

Upon quantifying both transport and demographic factors, and imposing transport and urban planning factors as constraints, the study concludes that Midtown and Inman Park emerge as the most favorable locations for establishing a metal music venue business.

Midtown, with its well-established music venue business, presents a competitive landscape. It is likely to resonate with the metal music enthusiasts due to its familiarity. However, it is pertinent to note that this venture in Midtown could be characterized as high-risk, high-reward.

On the other hand, Inman Park, with fewer existing music venues, exhibits a higher potential for

this business, given the suitable conditions it offers. The proposed location for the music venue is Edgewood Avenue, renowned for its restaurant street. However, it is important to consider that the real estate prices in this area are comparatively higher. This factor could influence the overall feasibility of the venture.

4.3 Discussion

Merits and Long-term Effects

This study stands out due to its innovative and interdisciplinary approach. It successfully integrates concepts from different fields, creating a comprehensive framework for analysis. Furthermore, the research is vertical in nature, delving deep into the subject matter to provide nuanced insights. A key strength of this study lies in its ability to combine city-level location analysis with business-level user profiling. This combination allows for a more holistic understanding of the factors influencing the success of a music venue business.

The long-term effects of this project include promoting a vibrant music scene in Atlanta and providing valuable insights for businesses looking to establish a metal music venue in the city.

Uncertainty and Error

The uncertainty and error in this project could arise from the accuracy of the data sources and the assumptions made in the spatial and mathematical model.

Data source Uncertainty and Error

Assumptions made in the spatial and mathematical model

Further Work

While the current study provides valuable insights, there are areas where further work could enhance the findings. One such area is the integration of machine learning techniques. Incorporating machine learning could allow for more sophisticated analyses and predictions, potentially uncovering patterns and relationships not evident in the current study.

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