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Mapping Detroit, Michigan
Using GIS to Determine A Livability Score

INTRODUCTION

- My project investigates the ability to get to important places in Detroit without a personal vehicle.
- I am interested understanding how to reduce the number of vehicles on the road for environmental, economical, health, and safety reasons.
- By investigating how easy it is to access critical resources via mass transit, I will have a better understanding on what motivates people to drive/not drive and how to shift these motivations.
- To do this I am assessing the availability of public transportation and location of amenities with respect to where people are living, and thus assign a "livability score."

OBJECTIVES

- Map population distribution in Detroit, MI
- Map locations of amenities relating to Public Services, Transportation, Education, and Food
- Analyze the geospatial relationship between the population and the amenities
- Determine weights of influence for factors of importance
- Evaluate "livability" of region based on sum of factored weights

METHODS

- Geographic Information Systems (GIS) data analysis software used to compile layers of data and to produce visual representations of the analyses
- Detroit area sectioned by 616 Census tracts, which became the polygons of comparison
- Data layers listed above were applied and analyzed
- Proximity of amenities to polygons was calculated
- Weights assigned to the amenity and its proximity (see graphic below for breakdown)
- Data model run to factor weights to determine "livability score"

DATA

At the right is a table that includes information about the data layers that were key to determining the livability score

Amenity	Data Layers
Transportation-public transit	Bus stops Bus routes
Transportation-roadways	Freeways, Highways (major & minor) including Local Roads
Open space	Parks
Public Services-critical	Fire Stations, Police Stations, Hospitals
Public Services-leisurely	Libraries, Community Access Centers, Recreation Centers
Base Features	Rivers, Cities, Lakes, Counties
Population	Census
Education	Colleges & Universities, Public Schools
Food	Grocery stores

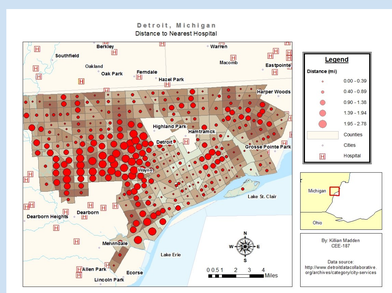


Figure 1. Shows the relationship between population density and the proximity to medical facilities

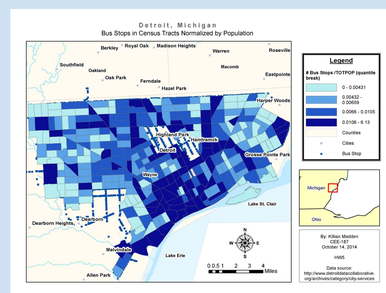
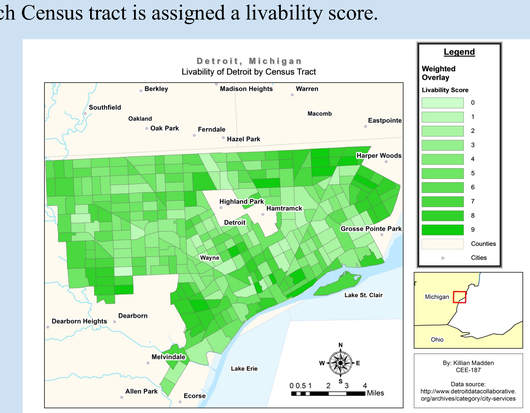


Figure 2. The relationship between population density and bus stop location

FINDINGS

The various data layers were overlain with weights to produce a map of Detroit, MI where each Census tract is assigned a livability score.



CONCLUSIONS & DISCUSSION

Each Census tract now has a "livability" score by which you can determine the ease at which a resident could access necessary amenities. This ease is in terms of transportation without the use of a personal vehicle. The availability of public transit and distance from a region to an amenity were critical to determining this ease.

This score can be used in deciding where to live in Detroit if you wish to get around without a car. The model can be adapted to take into consideration additional factors and alter priorities.

The results of this investigation could be utilized when determining where access is limited and perhaps where additional amenities or transit options are needed.

FUTURE STUDY & LESSONS LEARNED

Future Study

- The livability score would be enriched by additional data. Examples include data on:
  - Public walkways, additional open space
  - Other food sources e.g. farmers' markets, dining establishments
  - Tree cover, topography, and climate
  - Actual use of current transit systems
- The region of study could be expanded to include neighboring towns such as Hamtramck and Highland Park, both of which are enclosed by Detroit, and Windsor, Ontario, which is very nearby.
- A network analysis of the transit system could be used to determine other livability considerations such as the duration of trips, reliability of the routes, and connectivity of one route to another.

Lessons Learned

The analysis provided through GIS has numerous capabilities and applications. The most difficult portions of completing the project involve the foundations of building a data set and properly coding all of the data. After a working data set is established, there is are numerable exciting interactions possible between layers that can help you determine important geospatial realtionships

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