

Wofford College
Department of Mathematics

Technical Report

Maximizing Accessibility in Spartanburg's Bus System



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Executive Summary

This paper is an analysis of the accessibility to services and amenities of Spartanburg's bus routes. The city of Spartanburg, SC is growing and is home to many companies headquarters including Denny's and Milliken. Since Spartanburg is a growing city, it is important to look at the public transportation and see how accessible it is for the average community member. We examined a few bus stops on multiple bus routes in Spartanburg, SC and determined whether or not the bus stops were "good" based on their relative distance to different amenities. Looking at existing maps of Spartanburg bus stops, we created a 0.6 mile radius around different stops and looked at what amenities were within the radius. The 0.6 mile radius was used in assumption that the average person is willing to walk that far to reach any service or amenity.

Another important assumption we had to make was the importance of our selected services and amenities. We assumed importance based off of how many times someone would go to that particular amenity and then gave them a point value between 1 and 10. For example, a grocery store is visited on average once a week, so it has the highest score of 10. Once we had our point system organized, we created our model which is an equation that takes into consideration the assigned point values of different amenities, as well as the number of amenities that are in the 0.6 mile radius. By solving the model, it gives a point value that can be used to determine if a bus stop is "good".

One important limitation that we have in regard to this model is the lack of community input. Based off of time constraints, there was not opportunity to interview community members to see how often people are using the bus system, where they are going, or where they need to go. This model is based off of our assumptions of how amenities rank in importance, which is variable among people. We also did not take into consideration how bus stops are located among different residential areas.

Using our full model analysis, we came to the conclusion that the Dorman Center Inbound Stop 2 is considered to be a good stop with an accessibility score of 74. However, the South Liberty Inbound stop is considered to be a bad stop with an accessibility score of 36. We observed multiple stops with varying different accessibility scores indicating that the bus routes in Spartanburg have different levels of accessibility.

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1 Introduction

1.1 Problem Overview

Spartanburg is a growing city in the Upstate region of South Carolina that is home to the headquarters of multiple reputable companies, such as Denny's and Milliken. As a city grows in population, its infrastructure needs to grow simultaneously in order to maintain a stable environment for both residents and industries. Public transportation is an aspect of city infrastructure that has become increasingly important in urban centers everywhere. While Spartanburg has strong foundations in this area, improvements can be made. We were tasked with making improvements by determining a method to maximize accessibility to public services and amenities in Spartanburg through the means of the bus system.

1.2 Aims and Objectives

As previously stated, the main objective of our model was to develop a method to maximize accessibility to services and amenities through the public bus system in Spartanburg, South Carolina. In order to do this, we sought to create something that can serve as a means of assessing accessibility for both existing stops and locations for potential new stops. Considering this, we came up with the following problem statement:

Our model will predict the optimal places to put bus stops in Spartanburg by finding areas that would maximize the amount of reachable and important services and amenities.

1.3 Overview Statistics

This is a problem with minimal existing research and data that are specific to the city of Spartanburg. However, we do have some insightful statistics on the infrastructure and residents of Spartanburg. After manually collecting data on all of the services and amenities within Spartanburg that fall into various categories (Appendix A), we can see that there are 16 pharmacies, 39 grocery stores, 15 laundromats, and 21 medical facilities available within the city. To put those numbers in context, the 2022 United States Census reports that there are 38,584 residents in the city of Spartanburg. This shows that there are plenty of valuable services and amenities available to the residents in Spartanburg that can accessed through the bus routes.

In addition to this data, we were also able to find data collected by the U.S. Census Bureau in 2022 that showed various statistics about employed workers in Spartanburg County (Appendix B). In this dataset, it shows the amount of vehicles that workers reported as being available to them, as well as showing the means of transportation that workers reported using in order to get to their jobs. After performing a simple

data summary (Appendix C), we found that an estimated 20.8 percent of workers in the Spartanburg area have 1 or less cars available to them, which shows that a large portion of residents could realistically benefit from improved public transportation. Additionally, we found that the vast majority of workers that claimed to walk to work also reported having no vehicle available to them. This could indicate that the current bus system does not reach the employers of many residents in the area who are in critical need of efficient public transport due to a lack of personal vehicles. We feel that these statistics are good motivators for the problem we are seeking to solve, as they show the legitimate need from the community for an improved bus system.

2 Model and Solution

2.1 Assumptions

We have made a prioritized list of the different categories of services/amenities in the city to more accurately assess how a stop would be “good” in terms of maximizing access to those services. This in itself is a big assumption that we have mostly created based on intuition, but plan to revise and back up based on articles and data that we find. This is what the priority list looks like so far:

Groceries (1 day a week), Pharmacies (1 day a month), Medical Facility (irregular but important visits), Religious Buildings (1 day a week), Laundromats (1 day a week), Retail Stores (1 day a week), Community centers (1-3 days a week, recreational), and Restaurants (1-2 days a week) (Table 1).

Our estimates of how often a service is visited (and potentially how important those visits are) are a big part of how we made this list. Overall, we feel that the top three: grocery stores, pharmacies, and medical facilities are the most important because of how essential they are to anyone’s life. The next three are potentially essential to someone’s life based on their circumstances and/or lifestyle. Then, the last three are places that are still important and regularly visited, but not necessarily essential by any means.

The model has been constructed under the assumption that bus riders will be willing to walk for a time of at most 15 minutes to get to a bus stop, and/or get to services within 15 minutes walk from a bus stop. The average adult human over 60 years walks at a speed of 1.21 meters/sec (Alves et al., 2020) hence if we calculate the maximum distance to and from a bus stop we get:

$$(1.21 \text{ meters/s})(15 \text{ min}) = (1.21 \text{ meters/s})(15 \text{ min}) \left(\frac{60 \text{ sec}}{1 \text{ min}} \right) \approx 965 \text{ meters} \approx 0.6 \text{ miles}$$

Bus fares will be affordable for the average bus rider. Though an affordable bus system is undeniably important, this simply is not something that we will take into consideration as part of our model, which is why we’re making this assumption. We plan

on using a model that concisely assesses maximizing accessibility based on geographical data and metrics that we define as unrelated to money.

Service/Amenities	Points
Presence of Grocery Store	10
Presence of Pharmacy	9
Medical Facilities	5
Religious Buildings	4
Laundromats	3
Retail Stores	2
Community Centers	2
Restaurants	1

Table 1: *Point System For Clusters*

2.2 Model

We created a model that accounts for the amount of services and amenities in an area, as well as their importance. Each service/amenity is represented by a different variable and has a corresponding point value (Table 1) as the coefficient. To use the model, we counted up how many of each service/amenity was located in the 0.6 mile radius, and then multiplied it to its coefficient. During our research, we saw that there were a lot of grocery stores and pharmacies along the bus routes. Therefore, we made those two services a binary variable. This accounts for any skewing that could occur due to having multiple grocery stores or pharmacies in the 0.6 mile radius.

$$P = 10g + 9p + 5m + 4t + 3l + 2c + 2s + r \quad (1)$$

3 Results

3.1 Results Overview

Despite only having the resources to apply our model to existing stops within the Spartanburg bus system, we obtained results that we believe are indicative of our model being a sound way to generally assess accessibility to services and amenities. We were able to apply the model in its full capacity to two existing bus routes: one in a very dense shopping district, and another in a more residential area. We were also able to apply a simplified version of the model - only considering the three services/amenities with the highest point value - to four additional stops. As a means of performing sensitivity analysis, we also applied this simplified version of the model to the two stops that received the full model application as well

3.2 Full Model Application on Two Existing Bus Stops

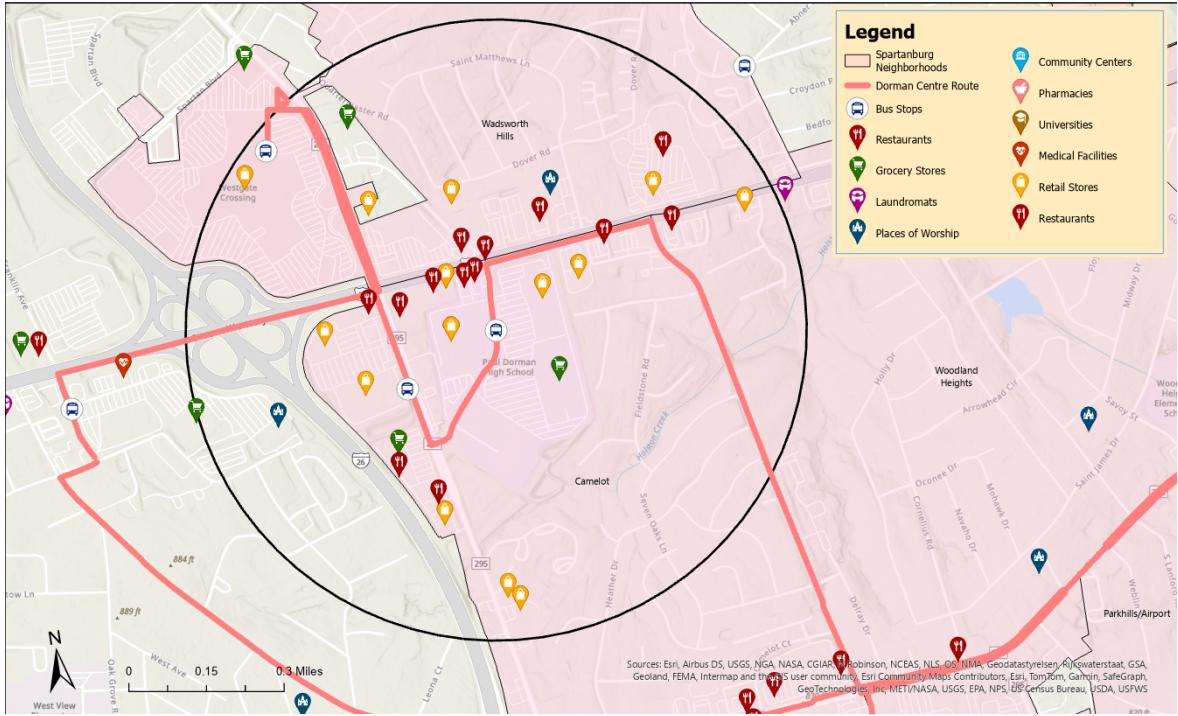


Figure 1: Dorman Center Inbound Stop

As previously stated, we were able to fully apply our model to two existing stops in the Spartanburg bus system: Dorman Center Stop 2 Inbound and South Liberty Stop 2 Inbound. The Dorman Center Inbound stop (see Figure 1) is in the center of one of the most dense shopping districts in all of Spartanburg. The 0.6 mile radius around this stop reaches a Walmart Supercenter, several major retail stores such as Ross and Best Buy, as well as part of the local shopping mall.

Within the 0.6 mile radius surrounding this stop, there exists at least one grocery store, three medical facilities, two places of worship, fourteen retail stores, and thirteen restaurants. Plugging this information into our model, we get that this bus stop has an accessibility score $P = 10 + 5(3) + 4(2) + 2(14) + 13 = 74$.

The South Liberty Inbound stop (see Figure 2) is in the heart of a large residential district in southern Spartanburg, but still has a considerable amount of important services surrounding it. Within the 0.6 mile radius surrounding this stop, there exists seven places of worship, one laundromat, one retail store, one community center, and one restaurant. Plugging this information into our model, we get that this bus stop has an accessibility score $P = 4(7) + 3(1) + 2(1) + 2(1) + 1 = 36$.

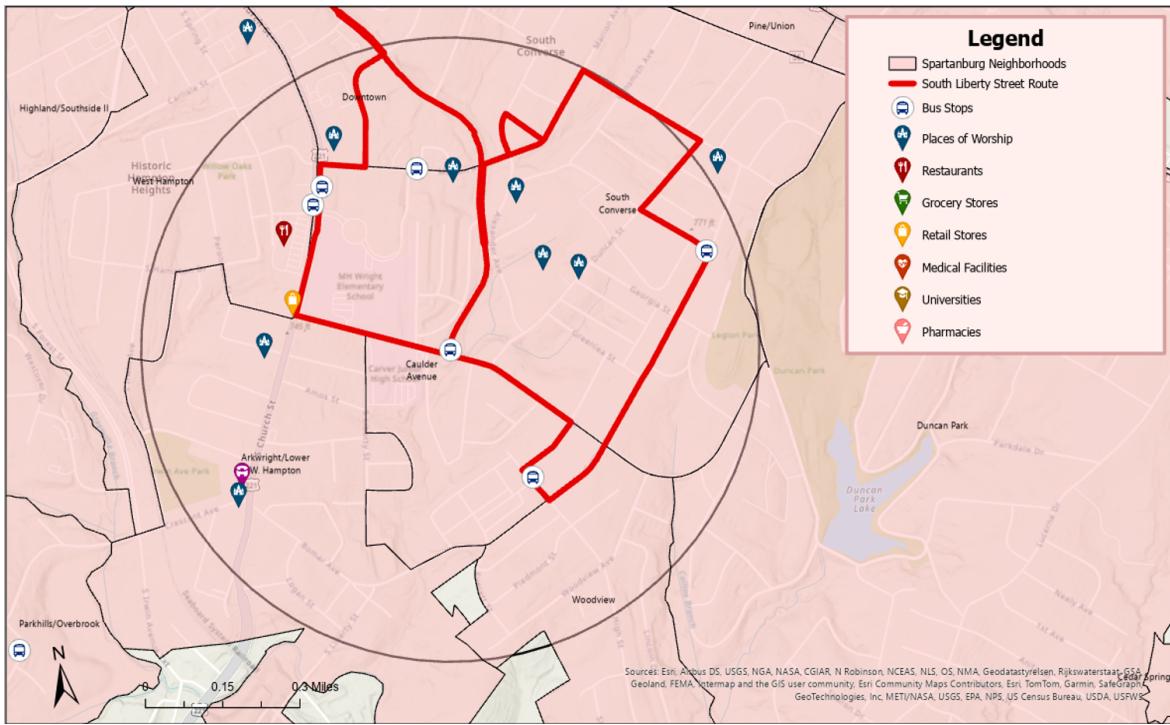


Figure 2: *South Liberty Inbound Stop*

3.3 Partial Model Application on Four Additional Bus Stops

We were given additional map data that each have every current bus stop marked, with a corresponding 0.6 mile radius circle drawn around it. Figure 3 has every grocery store in Spartanburg plotted, while Figures 4 and 5 have every pharmacy and medical facility plotted, respectively. Using this data, we were able to apply the limited version of our model to four additional bus stops in the existing system: Crestview Stop 2 Inbound, Hillcrest Stop 2 Outbound, North Church Stop 3 Outbound, and Hillcrest Stop 2 Inbound.

The first two stops that we applied to our simplified model are ones that could be considered average to below average in the context of services and amenities. The Crestview stop lies in a heavily residential district near downtown Spartanburg, and does not have any grocery stores, medical facilities, or pharmacies in the 0.6 mile radius surrounding it. So, though it may provide a solid option for residents to get to the bus, it receives a simplified accessibility score $P = 0$. The Hillcrest Outbound stop, while lying along a major road that feeds into and out of downtown Spartanburg, is still largely surrounded by residential areas. The 0.6 mile radius around this stop has one grocery store and one medical facility within it, giving a simplified accessibility score $P = 10 + 5(1) = 15$.

The latter stops are ones that lie in much denser shopping areas, similarly to the Dorman Center stop. The North Church Outbound stop lies next to a major medical

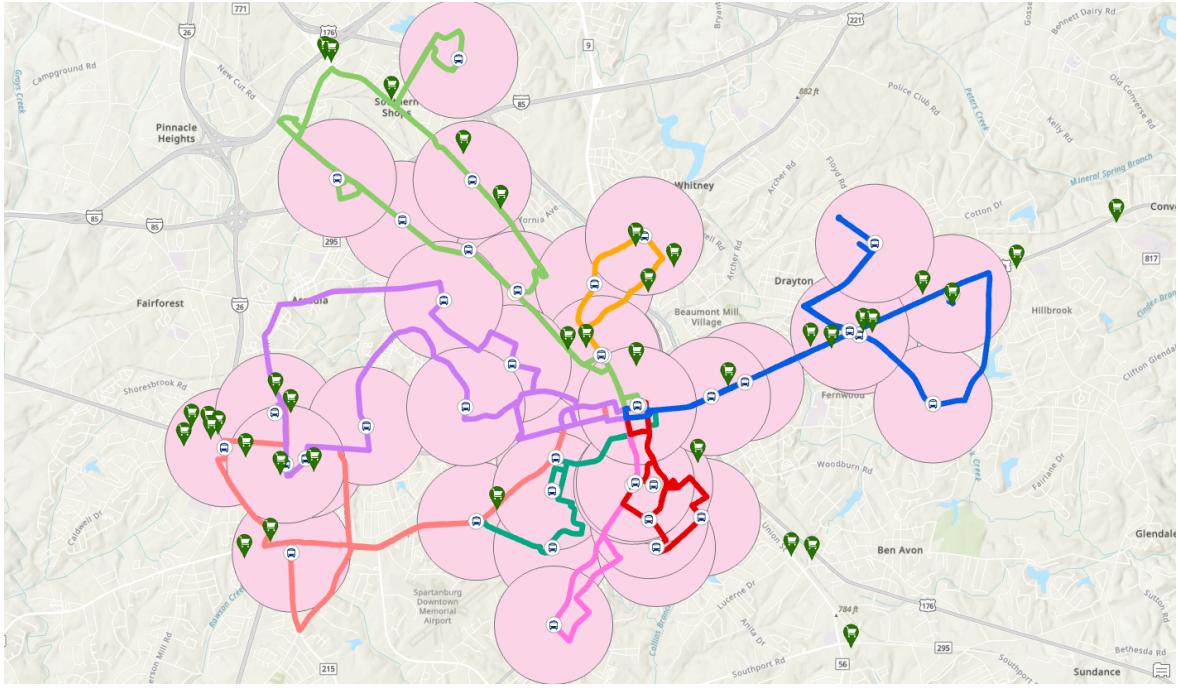


Figure 3: *Grocery Stores Along Bus Routes*

complex as well as several businesses just north of Spartanburg. The 0.6 mile radius around this stop has one grocery store, six medical facilities, and five pharmacies within it. Thus, this stop receives a simplified accessibility score $P = 10 + 9 + 5(6) = 49$. Lastly, the Hillcrest Inbound stop lies right in the middle of the densest shopping district in eastern Spartanburg. The 0.6 mile radius around this stop has four grocery stores, four pharmacies, and one medical facility within it, giving it a simplified accessibility score $P = 10 + 9 + 5(1) = 24$.

3.4 General Analysis

After analyzing our results, we feel that we were able to create a model that accurately assesses accessibility to services and amenities within the Spartanburg community. For the two stops we selected to fully apply our model to, we intentionally picked a heavily commercial stop and a heavily residential stop to see if our model outputted a drastic difference like we would expect. The Dorman Center stop received an accessibility score that is just over double that of the South Liberty stop, which reflects what we were expecting. In addition to this, the residential stops that we evaluated with the simplified model, Crestview and Hillcrest Outbound, received very low scores (0 and 15 respectively). This was expected, as we feel it is much more likely for a heavily residential area to have the smaller, less important services such as laundromats, churches, and restaurants than having the major services and amenities. Conversely, the more dense stops we evaluated, North Church and Hillcrest Inbound, received very respectable

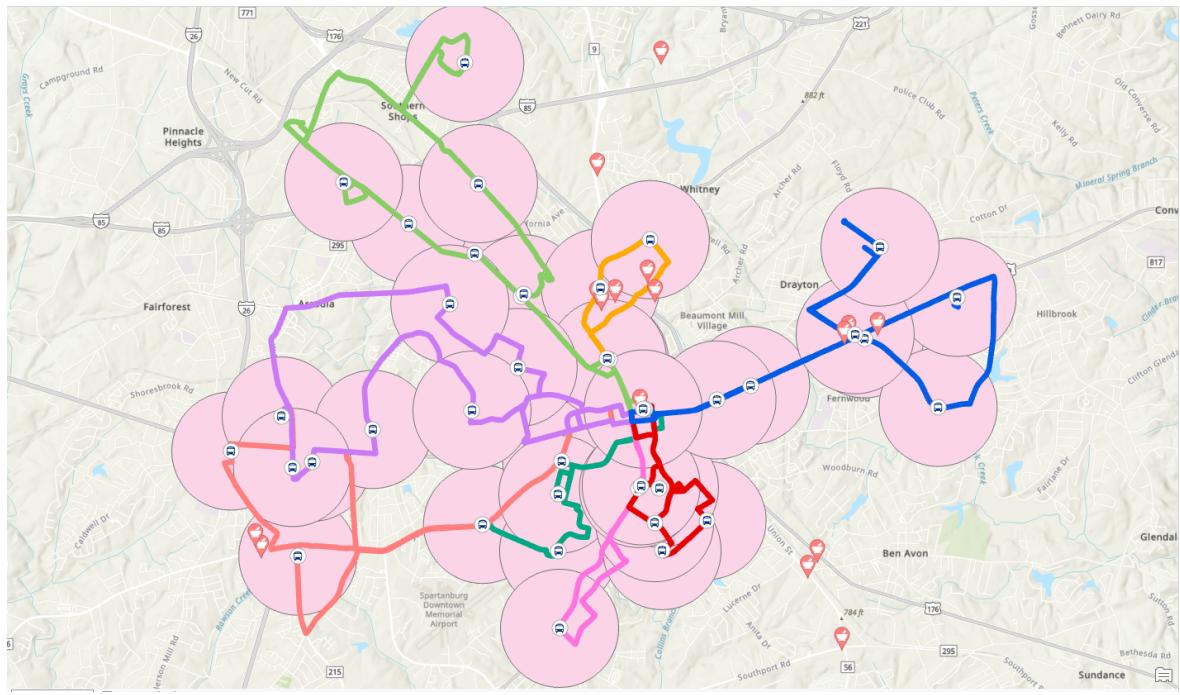


Figure 4: Pharmacies Along Bus Routes

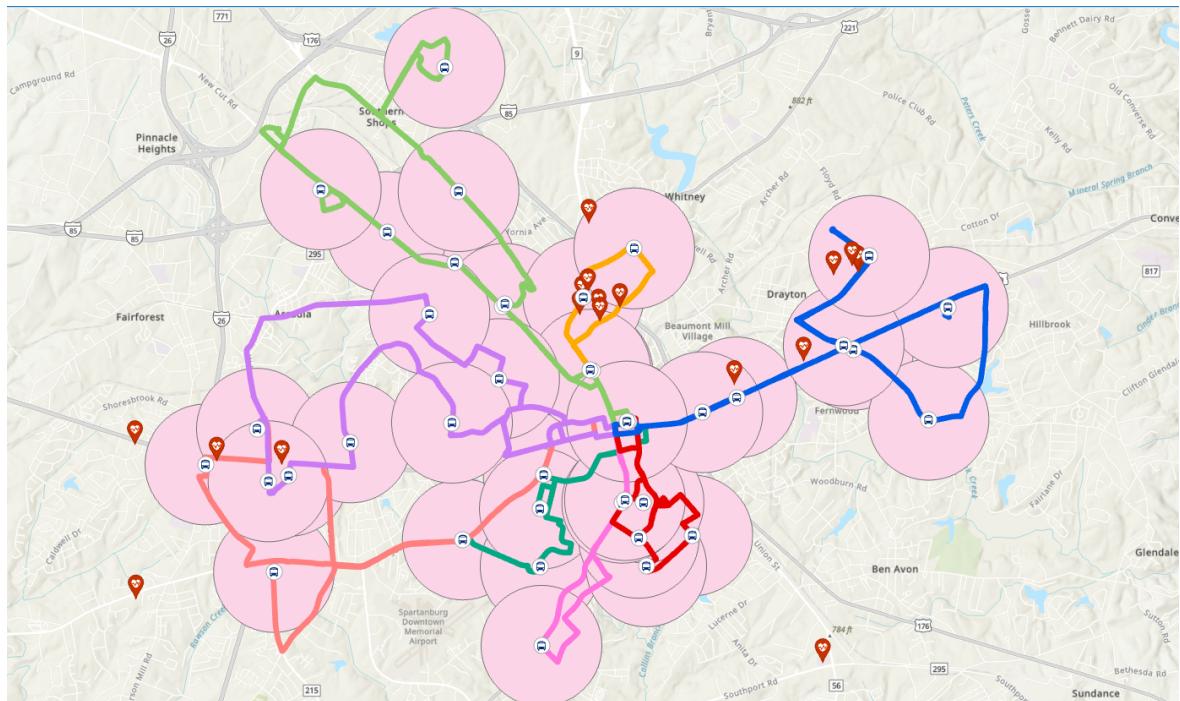


Figure 5: Medical Facilities Along Bus Routes

stores despite the limited amount of services assessed (49 and 24 respectively). In fact, the North Church stop received a higher score than the South Liberty stop, despite only evaluating the top three services for North Church and applying the entire model for South Liberty. We feel that this result further shows that our model appropriately assesses accessibility, by giving high scores to stops with a plentiful amount of services and giving low scores to stops in largely residential areas.

3.5 Sensitivity Analysis

We evaluated the accessibility of the bus stops by looking at our three highest-ranking amenities: grocery stores, pharmacies, and medical facilities. The same accessibility score weights and radius size surrounding the bus stops were used, with 10 points being given for the presence of at least one grocery store, 9 points for near a pharmacy, and 5 points for each medical facility. When comparing the Dorman Center stop with the South Liberty stop, the Dorman Center stop's score is significantly higher than the South Liberty stop. The Dorman Center, having four grocery stores and three medical facilities earns 25 points from our accessibility score while the South Liberty stop does not contain any of the three services and amenities listed above and has a total of 0 from our accessibility score. Therefore, examining only these three amenities in comparing Dorman Center stop and the South Liberty stop does not change the ranking of accessibility scores between the two stops. Because focusing on these three categories does not change the ranking of these two stops based on accessibility scores, it is reasonable to view only these three categories in determining the accessibility scores.

4 Conclusions

The objective of our model was to analyze the existing bus route system in Spartanburg, SC. Using an equation to quantify each service and amenity, we devised a value for each bus stop that would allow us to compare with alternative bus stops.

Our model did not take into account any residential areas, which is a significant aspect of the model. The residential areas are where the general population lives and will commute to and from the services and amenities. The model did not consider "walk-ability" to and from the bus stops. Things that may decrease the "walk-ability" would be highways and poor sidewalks. The walking speed we devised by an average walking speed of a 65+ year old, which is not entirely inclusive of every passenger of the public transportation. Finally, we did not communicate with the general public of Spartanburg, SC. This would have brought us greater insight into the major necessities of the citizens of the city.

The further work to be done to this model would be to collaborate with the community. Also, we would recommend compiling a value for each stop and analyzing a median value to create a threshold that would label each stop as "good" or "bad." This

would finalize a solution that could be presented to Spartanburg County for further analysis and implementation.

References

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Appendices

A Data Used for Services and Amenities Maps

This appendix consists of all of the Excel Spreadsheets that we created in order to map data on the services and amenities in Spartanburg. All data was hand-collected through Google Maps and data sets found through websites run by the City of Spartanburg.

NAME	TYPE	ADDRESS	CITY
Gibbs Cancer Center and Re	Clinic	380 Serpentine Drive	Spartanburg
Heart Wellness Center	Clinic	299 East Pearl Street	Spartanburg
Imaging Services - SMC Mai	Clinic	1700 Skylyn Drive	Spartanburg
Immediate Care Center - Ea	Urgent Care	1200 East Main Street	Spartanburg
Immediate Care Center - W	Urgent Care	151 Peachwood Center Dri	Spartanburg
MEDcare Urgent Care	Urgent Care	301 East Wood Street	Spartanburg
Medical Group of the Caroli	Clinic	1083 Boiling Springs Road	Spartanburg
Medical Group of the Caroli	Primary Care	1690 Skylyn Drive	Spartanburg
Medical Group of the Caroli	Clinic	853 North Church Street	Spartanburg
Medical Group of the Caroli	Clinic	2995 Reidville Road	Spartanburg
Medical Group of the Caroli	Clinic	1686 Skylyn Drive	Spartanburg
Medical Group of the Caroli	Primary Care	2995 Reidville Road	Spartanburg
Medical Group of the Caroli	Primary Care	2191 Southport Road	Spartanburg
Medical Group of the Caroli	Primary Care	120 Heywood Avenue	Spartanburg
Medical Group of the Caroli	Primary Care	1650 Skylyn Drive	Spartanburg
Medical Group of the Caroli	Primary Care	100 East Wood Street	Spartanburg
North Grove Medical Park	Clinic	8311 Warren H. Abernathy	Spartanburg
Prisma Health Urgent Care	Urgent Care	1330 Boiling Springs Road	Spartanburg
Spartanburg Medical Cente	Hospital	1501 W O. Ezell Blvd	Spartanburg
Spartanburg Medical Cente	Hospital	101 East Wood Street	Spartanburg
		1700 Skylyn Drive	Spartanburg

STATE	ZIP CODE	TYPES
SC	29303	HOSPITAL
SC	29303	NURSING HOME
SC	29307	CLINICS
SC	29307	URGENT CARE
SC	29301	PRIMARY CARE
SC	29303	MENTAL HEALTH CENTER
SC	29303	REHABILITATION CENTER
SC	29307	
SC	29303	
SC	29301	
SC	29307	
SC	29301	
SC	29306	
SC	29302	
SC	29307	
SC	29303	
SC	29301	
SC	29303	
SC	29301	
SC	29303	
SC	29307	

NAME	ADDRESS	CITY	STATE	ZIP CODE
7 Moon Asian Supermarket	1301 Asheville Highway	Spartanburg	SC	29303
Abbott's Farm Outlet	1980 Reidville Road	Spartanburg	SC	29301
ALDI	1605 East Main Street	Spartanburg	SC	29307
ALDI	150 Blackstock Road	Spartanburg	SC	29301
Asc Foodstore & Fresh Seafood	486 Magnolia Street	Spartanburg	SC	29303
Asian Groceries	7750 Warren H Abernathy Highway	Spartanburg	SC	29301
Bellews Country Store	240 Garner Road	Spartanburg	SC	29303
Blue Moon Bodega	220 E Daniel Morgan Ave	Spartanburg	SC	29302
El Diamante	8087 Asheville Highway	Spartanburg	SC	29303
Food Lion	95 Garner Road	Spartanburg	SC	29303
Food Lion	2401 Reidville Road	Spartanburg	SC	29301
Garner's Natural Foods	1855 East Main Street	Spartanburg	SC	29307
Hobo Hollar Farms	124 Old Converse Road	Spartanburg	SC	29307
Ingles	2120 Boiling Springs Road	Spartanburg	SC	29316
Ingles	2000 South Pine Street	Spartanburg	SC	29302
Ingles	8004 Warren H Abernathy Highway	Spartanburg	SC	29301
Ingles	2795 East Main Street	Spartanburg	SC	29307
Ingles	2375 Chesnee Highway	Spartanburg	SC	29303
La Unica Supercenter	100 North Town Drive	Spartanburg	SC	29303
La Unica Supercenter	7610 Asheville Highway	Spartanburg	SC	29303
Lidl	2200 East Main Street	Spartanburg	SC	29307
Lidl	8180 Warren H Abernathy Highway	Spartanburg	SC	29301
Los Volvanes Tienda Latina	8011 Warren H Abernathy Highway	Spartanburg	SC	29301
Masters & Milk Neighborhood Market	401 Old Canaan Road	Spartanburg	SC	29306
Pat's Food Store	478 Union Street	Spartanburg	SC	29306
Prostor European Food and Deli	225 West Blackstock Road	Spartanburg	SC	29301
Publix Super Market	1905 East Main Street	Spartanburg	SC	29307
R K Food Store	548 Howard Street	Spartanburg	SC	29303
S&A Discount Grocery	1214 Union Street	Spartanburg	SC	29302
Sunny's Market	108 Westview Boulevard	Spartanburg	SC	29306
Super Mercado El Rey	8056 Asheville Highway	Spartanburg	SC	29303
Target Grocery	8199 Warren H Abernathy Highway	Spartanburg	SC	29301
Tate Meatworks	670 East Main Street	Spartanburg	SC	29302
The Fresh Market	1200 E Main St	Spartanburg	SC	29307
US Foods Chefs Store	300 West Blackstock Road	Spartanburg	SC	29301
Walmart Neighborhood Market	203 Cedar Springs Road	Spartanburg	SC	29302
Walmart Supercenter	141 Dorman Centre Drive	Spartanburg	SC	29301
Walmart Supercenter	2151 East Main Street	Spartanburg	SC	29307
Wise Buys Discount Groceries	369 B Whitney Road B	Spartanburg	SC	29303
ALDI	150 E Blackstock Rd Ste.B	Spartanburg	SC	29301
Sam's Club	200 Peachwood Center Dr	Spartanburg	SC	29301

NAME	ADDRESS
BELL LAUNDRY AND CLEANERS INC	1752 E MAIN ST
ROCKET LAUNDRY	806 S CHURCH ST
CLEAN 1 COIN LAUNDRY	902 PINE ST
WESTGATE LAUNDRY WASH DEPOT	1395 W O. Ezell Blvd
WASH DEPOT	2177 S Pine St
BELL LAUNDRY AND CLEANERS INC	448 MARION AVE
NEW METHOD LAUNDRY AND CLEANERS	520 E Cleveland St
CROWN HEALTH CARE LAUNDRY SERVICES	355 Old Greenville Rd
CAROLINA CLEAN LAUNDRY	197 Hidden Hill Rd
FOWLER BROTHERS CLEANERS	3281 Reidville Rd
TAN COIN LAUNDRY LLC	1061 Fernwood Glendale Rd
MASTER'S MARK CLEANERS	1065 Fernwood Glendale Rd
FOWLER BROTHERS CLEANERS	896 Springfield Rd
WESTVIEW PLAZA COIN LAUNDRY	106 S Blackstock Rd # A
UPSTATE LINEN SERVICES	355 Old Greenville Rd

CITY	STATE	ZIP
SPARTANBURG	SC	29307
SPARTANBURG	SC	29306
SPARTANBURG	SC	29302
SPARTANBURG	SC	29301
SPARTANBURG	SC	29302
SPARTANBURG	SC	29306
SPARTANBURG	SC	29303
SPARTANBURG	SC	29301
SPARTANBURG	SC	29301
SPARTANBURG	SC	29301
SPARTANBURG	SC	29307
SPARTANBURG	SC	29307
SPARTANBURG	SC	29303
SPARTANBURG	SC	29301
SPARTANBURG	SC	29301

NAME	TYPE	ADDRESS	CITY	STATE	ZIP
The Peddler Steak House	FINE DININ	149 West Main Street	Spartanburg	SC	29301
Level 10	FINE DININ	225 West Main Street	Spartanburg	SC	29301
Initial Q	FINE DININ	127 West Main Street	Spartanburg	SC	29301
The Kennedy	FINE DININ	221 East Kennedy Street	Spartanburg	SC	29301
Oak1831 Kitchen and Bar	FINE DININ	9027 Fairforest Road	Spartanburg	SC	29301
Sparks	FINE DININ	299 N Church St	Spartanburg	SC	29301
The Terrace	FINE DININ	299 N Church St	Spartanburg	SC	29301
Sophia's	FINE DININ	155 West Main Street	Spartanburg	SC	29301
Wendy's	FAST FOOD	150 S Pine St	Spartanburg	SC	29301
Sugar-n-Spice	FAST FOOD	212 S Pine St	Spartanburg	SC	29301
A&W Restaurant	FAST FOOD	104 E Blackstock Rd	Spartanburg	SC	29301
Sub Station II	FAST FOOD	875 E Main St	Spartanburg	SC	29301
Hub City Chicken & More	FAST FOOD	451 E Henry St	Spartanburg	SC	29301
Chick-fil-A	FAST FOOD	1790 Asheville Hwy	Spartanburg	SC	29301
Chick-fil-A	FAST FOOD	1503 W O. Ezell Blvd	Spartanburg	SC	29301
Cribb's Kitchen On Main	FAST FOOD	226B W Main St	Spartanburg	SC	29301
Jack in the Box	FAST FOOD	1500 W O. Ezell Blvd	Spartanburg	SC	29301
Five Guys	FAST FOOD	1623 John B White Sr Blvd	Spartanburg	SC	29301
American Deli	FAST FOOD	550 S Church St Ste 1	Spartanburg	SC	29301
Dairy Queen Grill & Chill	FAST FOOD	100 Dorman Centre Dr	Spartanburg	SC	29301
Zaxby's Chicken Fingers & E	FAST FOOD	1715 John B White Sr Blvd	Spartanburg	SC	29301
Hardee's	FAST FOOD	2451 Reidville Rd	Spartanburg	SC	29301
Ricky's Drive In West	FAST FOOD	497 E Blackstock Rd	Spartanburg	SC	29301
Ike's Korner Grille	FAST FOOD	104 Archer Rd	Spartanburg	SC	29301
Burger King	FAST FOOD	2100 Winchester Pl	Spartanburg	SC	29302
Jimmy John's	FAST FOOD	807 N Pine St Ste. C	Spartanburg	SC	29302
Moe's Original BBQ - Spart	CASUAL DII	578 N Church St Suite D	Spartanburg	SC	29302
Boots' & Sonny's Drive-In	FAST FOOD	120 E Henry St, Spartanburg	Spartanburg	SC	29302
Arby's	FAST FOOD	161 S Pine St	Spartanburg	SC	29302
Sully's Steamers	FAST FOOD	578 N Church St Ste. C	Spartanburg	SC	29302
Wendy's	FAST FOOD	109 E Blackstock Rd	Spartanburg	SC	29302
Wayback Burgers	FAST FOOD	1735 John B White Sr Blvd	Spartanburg	SC	29302
Popeyes Louisiana Kitchen	FAST FOOD	1628 John B White Sr Blvd	Spartanburg	SC	29302
Cook Out	FAST FOOD	1620 John B White Sr Blvd #4	Spartanburg	SC	29303
Chipotle Mexican Grill	FAST FOOD	1490 W O. Ezell Blvd Suite A	Spartanburg	SC	29303
The Beacon Drive-In	CASUAL DII	255 John B White Sr Blvd #6	Spartanburg	SC	29303
Andrews Atomic Dogs	CASUAL DII	1011 Union St, Spartanburg	Spartanburg	SC	29303
Wow Wings N Hibachi	CASUAL DII	431 W Main St	Spartanburg	SC	29303
Chick-fil-A	CASUAL DII	429 N Church St	Spartanburg	SC	29303
Sun King Chinese Restaurar	CASUAL DII	100 McMillan Dr	Spartanburg	SC	29303
Arby's	FAST FOOD	1731 Reidville Rd	Spartanburg	SC	29303
Wade's Restaurant	CASUAL DII	1000 N Pine St	Spartanburg	SC	29303
McDonald's	CASUAL DII	106 Garner Rd	Spartanburg	SC	29303
McDonald's	CASUAL DII	1598 John B White Sr Blvd	Spartanburg	SC	29303
Taco Bell	CASUAL DII	800 N Pine St	Spartanburg	SC	29303
Cook Out	CASUAL DII	1966 E Main St	Spartanburg	SC	29303

Bronco Mexican Main Street	CASUAL DII	435 E Main St	Spartanburg	SC	29303
Delaney's Irish Pub	CASUAL DII	117 W Main St	Spartanburg	SC	29303
Arby's	FAST FOOD	1808 Asheville Hwy	Spartanburg	SC	29303
KFC	FAST FOOD	1797 Asheville Hwy	Spartanburg	SC	29303
Burger King	FAST FOOD	1796 Asheville Hwy	Spartanburg	SC	29303
McClellan's at Monarch Caf	CASUAL DII	498 Howard St	Spartanburg	SC	29306
Real Deal	CASUAL DII	1311 Asheville Hwy	Spartanburg	SC	29306
Ali Baba	CASUAL DII	201 Wall St	Spartanburg	SC	29306
Subway	FAST FOOD	1000 N Pine St	Spartanburg	SC	29306
Bojangles	FAST FOOD	102 Dorman Centre Dr	Spartanburg	SC	29306
Konnichiwa of Spartanburg	CASUAL DII	198 W Main St	Spartanburg	SC	29306
Smoking Butt Heads BBQ	CASUAL DII	111 W Main St	Spartanburg	SC	29306
Jason's Deli	CASUAL DII	1450 W O. Ezell Blvd	Spartanburg	SC	29306
Cocobowlz Spartanburg	CASUAL DII	100 E Main St	Spartanburg	SC	29306
McDonald's	FAST FOOD	500 Hearnon Cir	Spartanburg	SC	29306
Subway	FAST FOOD	156 Magnolia St	Spartanburg	SC	29306
KFC	FAST FOOD	1459 W O. Ezell Blvd	Spartanburg	SC	29306
Taco Bell	FAST FOOD	7680 Warren H Abernathy H	Spartanburg	SC	29306
Willy Taco	FAST FOOD	930 E Main St	Spartanburg	SC	29306
Papa's & Beer	FAST FOOD	180 E Blackstock Rd	Spartanburg	SC	29306
Taco Bell	FAST FOOD	1783 Asheville Hwy	Spartanburg	SC	29306
Kenny's Home Cooking	CASUAL DII	1000 N Pine St #31	Spartanburg	SC	29306
Tropical Smoothie Cafe	FAST FOOD	1490 W O. Ezell Blvd	Spartanburg	SC	29306
Moe's Southwest Grill	FAST FOOD	449 E Main St	Spartanburg	SC	29307
Zaxby's Chicken Fingers & Buffalo Wings	CASUAL DII	1601 E Main St	Spartanburg	SC	29307

TYPES ARE
FINE DINING
FAST FOOD
CASUAL DINING

Name	Address	City
Hibachi and Sushi Buffet	151 Dorman Centre Dr #2625	Spartanburg
Panera Bread	108 E Blackstock Rd	Spartanburg
Red Lobster	170 E Blackstock Rd	Spartanburg
Jason's Deli	1450 W O. Ezell Blvd	Spartanburg
Monterrey	1450 W O. Ezell Blvd	Spartanburg
Poke Bros	1450 W O. Ezell Blvd Suite 1120	Spartanburg
Dunkin'	1452 W O. Ezell Blvd	Spartanburg
Buffalo Wild Wings	1494 W O. Ezell Blvd	Spartanburg
Olive Garden	1498 W O. Ezell Blvd	Spartanburg
Golden Corral	1492 W O. Ezell Blvd	Spartanburg
Kanpai of Tokyo	2300 Winchester Pl	Spartanburg

NAME	ADDRESS	CITY	STATE	ZIP
Wofford College	429 N Church St	Spartanburg	SC	29303
Spartanburg Methodist College	1750 Powell Mill Rd	Spartanburg	SC	29301
Converse University	580 E Main St	Spartanburg	SC	29302
University of South Carolina Upstate	800 University Way	Spartanburg	SC	29303
Spartanburg Community College	107 Community College Drive	Spartanburg	SC	29303
VCOM-Carolinas	350 Howard St, Spartanburg			29303

NAME	TYPE
Carolina Baptist Church	Church
Cornerstone Baptist Church	Church
Cudd Memorial Baptist Church	Church
Eastside Baptist Church	Church
Fairforest Baptist Church	Church
Fairview Baptist Church	Church
First Baptist North	Church
Fountain of Life Baptist Church	Church
SonRise Baptist Church	Church
Southside Baptist Church	Church
Westgate Baptist Church	Church
 Westside Baptist Church	 Church
 Whitney Free Will Baptist Church	 Church
Jesus, Our Risen Savior Catholic Church	Church
St Paul the Apostle Parish	Church
Central Church of Christ	Church
Episcopal Church of the Advent	Church
St Christopher's Episcopal Church	Church
St Matthew's Episcopal Church	Church
Holy Communion Lutheran Church	Church
Joy Lutheran Church	Church
St John's Lutheran Church	Church
Bethel United Methodist Church	Church
Central United Methodist Church	Church
St James United Methodist Church	Church
Covenant Presbyterian Church	Church
First Presbyterian Church	Church
Grace Presbyterian Church	Church
Providence Presbyterian Church	Church
Westminster Presbyterian Church	Church
Temple B'nai Israel	Church
Unitarian Universalist Church of Spartanburg	Church
Davis Chapel Wesleyan Church	Church
Doxa Church	Church
Evangel Cathedral	Church
First Church of the Nazarene	Church
Hope Church	Church
Living Waters Christian Ministries	Church
Rockin' The Nations Ministries	Church
St Francis Anglican Parish	Church

TOTAL Ministries of Spartanburg County - helping
families in crisis with food, clothing, financial
assistance
Truth Chapel

NewSpring	Church
Majority Baptist Church	Church
Believers' Fellowship Academy	Church
Shiloh Seventh Day Adventist	Church
Maxwell Chappell Baptist Church	Church
United House of Prayer for All People	Church
EI Bethel United Methodist Church	Church
Messiah Baptist Church	Church

ADDRESS

CITY

Spartanburg

STATE

SC

ZIP

399 Peachwood Center Dr	Spartanburg	SC	29301
Hudson L Barksdale Blvd	Spartanburg	SC	29306
150 Marion Ave	Spartanburg	SC	29306
209 Alexander Ave	Spartanburg	SC	29306
448 Duncan St	Spartanburg	SC	29306
660 S Church St	Spartanburg	SC	29306
820 S Church St	Spartanburg	SC	29306
450 Duncan St	Spartanburg	SC	29306

NAME

The Vitamin Shoppe

T.J. Maxx

Ross Dress for Less

Five Below

Michaels

Home Depot

Barnes & Noble

WestGate Mall

Burlington

Ollie's

Lens Crafters

Upstate Footworkx

Harbor Freight Tools

The Castle Prom and Bridal

Party City

PetSmart

GB Shoes

Goodwill

Lowe's

Best Buy

Once Upon A Child

Clothes Mentor

Mattress Firm

Skatell's Jewelers

Beauty Mart

Citi Trends

ADDRESS	CITY	STATE	ZIP
1501 W O. Ezell Blvd	Spartanburg	SC	29301
120A Dorman Centre Dr	Spartanburg	SC	29301
120 Dorman Centre Dr	Spartanburg	SC	29301
120 Dorman Centre Dr	Spartanburg	SC	29301
Dorman Centre, 120 Dorman Centre Dr Ste I	Spartanburg	SC	29301
121 Dorman Centre Dr	Spartanburg	SC	29301
1489 W O. Ezell Blvd	Spartanburg	SC	29301
205 W Blackstock Rd	Spartanburg	SC	29301
1450 W O. Ezell Blvd Suite 200	Spartanburg	SC	29301
1450 W O. Ezell Blvd	Spartanburg	SC	29301
1450 W O. Ezell Blvd	Spartanburg	SC	29301
220 Westgate Mall Dr #4	Spartanburg	SC	29301
1450 W O. Ezell Blvd	Spartanburg	SC	29301
1411 W O. Ezell Blvd	Spartanburg	SC	29301
150 E Blackstock Rd	Spartanburg	SC	29301
150 E Blackstock Rd A	Spartanburg	SC	29301
190 E Blackstock Rd	Spartanburg	SC	29301
219 E Blackstock Rd	Spartanburg	SC	29301
120 E Blackstock Rd	Spartanburg	SC	29301
110 E Blackstock Rd	Spartanburg	SC	29301
1450 W O. Ezell Blvd Suite 900	Spartanburg	SC	29301
1450 W O. Ezell Blvd #410	Spartanburg	SC	29301
200 W Blackstock Rd	Spartanburg	SC	29301
217 E Blackstock Rd	Spartanburg	SC	29301
610 S Church St, Spartanburg	Spartanburg	SC	29306
550 S Church St Unit #7	Spartanburg	SC	29306

NAME	ADDRESS	CITY	STATE	ZIP
Beauty Mart	610 S Church St, Spartanburg	Spartanburg	SC	29306
Citi Trends	550 S Church St Unit #7	Spartanburg	SC	

Name	Address	City
Doctors Care	218 E Blackstock Rd	Spartanburg
Spartanburg Vision-West	227 E Blackstock Rd SUITE 200	Spartanburg
Stanton Optical	2500 Winchester Pl #100	Spartanburg

State	Zip
SC	29301
SC	29301
SC	29301

NAME	ADDRESS	CITY
ALDI	150 E Blackstock Rd Ste.B	Spartanburg
Sam's Club	200 Peachwood Center Dr	Spartanburg
Walmart	141 Dorman Centre Drive	Spartanburg

STATE	ZIP
SC	29301
SC	29301
SC	29301

NAME	ADDRESS
C.C. WOODSON COMMUNITY CENTER	210 BOMAR AVENUE
DR. T.K. GREGG COMMUNITY CENTER	650 HOWARD STREET
REV. JAMES D. THORNTON ACTIVITY CENTER	500 NORRIS STREET

CITY	STATE
SPARTANBURG	SC
SPARTANBURG	SC
SPARTANBURG	SC

ZIP

29306

29303

29306

Name	Address
Walgreens Pharmacy	2410 Reidville Rd
CVS Pharmacy	2397 Reidville Rd
Spartanburg Regional Outpatient Pharmacy	101 E Wood St
Walgreens Pharmacy	1790 E Main St, Spartanburg
CVS Pharmacy	1751 E Main St, Spartanburg
CVS Pharmacy	1400 Union St
Walgreens Pharmacy	2198 Southport Rd
Ingles Pharmacy	2000 S Pine St
Palmetto Long Term Care Pharm	250 Dewey Ave
Pharmacy Consultants Inc	111 Corporate Dr
Publix Pharmacy at Hillcrest Shopping Center	1905 E Main St
Spartanburg Regional Pharmacy - Gibbs Center	380 Serpentine Dr
White Oak Pharmacy	1233 Boiling Springs Rd
CVS Pharmacy	87 Garner Rd
Walgreens Pharmacy	1000 N Pine St
Smith Drug Store	142 E Main St

City	State	Zip
Spartanburg	SC	29301
Spartanburg	SC	29301
Spartanburg	SC	29303
Spartanburg	SC	29307
Spartanburg	SC	29307
Spartanburg	SC	29302
Spartanburg	SC	29306
Spartanburg	SC	29302
Spartanburg	SC	29303
Spartanburg	SC	29303
Spartanburg	SC	29307
Spartanburg	SC	29303
Spartanburg	SC	29303
Spartanburg	SC	29303
Spartanburg	SC	29306

NAME TYPE ADDRESS CITY STATE ZIP CODE

Highlight shopping cer

iters, area with lots of employees (virtually impossible to label every workspace

B Data Collected by U.S. Census Bureau on Working Residents of Spartanburg County

This appendix consists of the spreadsheet we obtained from the U.S. Census Bureau, which provides several summary statistics on the employed residents of Spartanburg County. In this dataset, it shows the amount of vehicles that workers reported as being available to them, as well as showing the means of transportation that workers reported using in order to get to their jobs.

Label (Gro) Spartanburg Spartanburg County, South Carolina!!Margin of Error

Total: 159,556 ±4,516

No vehicle 2,655 ±1,277

1 vehicle 30,583 ±3,533

2 vehicles 67,515 ±5,250

3 or more 58,803 ±4,433

Car, truck 128,123 ±5,016

No vehicle 1,046 ±717

1 vehicle 22,755 ±2,833

2 vehicle 55,945 ±4,913

3 or more 48,377 ±4,297

Car, truck 14,660 ±2,580

No vehicle 517 ±420

1 vehicle 4,104 ±1,495

2 vehicle 4,527 ±1,055

3 or more 5,512 ±1,884

Public tra 232 ±222

No vehicle 0 ±222

1 vehicle 75 ±142

2 vehicle 157 ±239

3 or more 0 ±222

Walked: 394 ±365

No vehicle 278 ±329

1 vehicle 28 ±48

2 vehicle 43 ±73

3 or more 45 ±77

Taxicab, r 1,324 ±719

No vehicle 57 ±95

1 vehicle 392 ±326

2 vehicle 819 ±646

3 or more 56 ±72

Worked fr 14,823 ±2,220

No vehicle 757 ±997

1 vehicle 3,229 ±1,228

2 vehicle 6,024 ±1,465

3 or more 4,813 ±1,176

C Data Summary Created for Data in Appendix B

This appendix consists of a simple data summary that we did using Python programming tools, in order to extract and more deeply analyze the data found in Appendix B.

We chose to examine a data set from the U.S. Census Bureau website, titled *Means of Transportation to Work by Vehicles Available*. We felt that this data set was relevant to the part of our model that will attempt to maximize accessibility to the residents of Spartanburg. This is because we feel that individuals without vehicle access (or access to few vehicles) are the residents in Spartanburg that are most likely to need public transportation, so we hope that this data set will give us insight into the targeted audience of our model. As we can see, this data set splits the population of Spartanburg County into categories based on how individuals travel to work, and shows how many personal vehicles the people in each category have access to:

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd

meansOfTransport = pd.read_csv('TRANSPORT/meansoftransportation.csv')
meansOfTransport.columns = ['Category', 'Estimate', 'Margin of Error']

meansOfTransport.head(15)
```

	Category	Estimate	Margin of Error	
0	Total:	159,556	±4,516	
1	No vehicle available	2,655	±1,277	
2	1 vehicle available	30,583	±3,533	
3	2 vehicles available	67,515	±5,250	
4	3 or more vehicles available	58,803	±4,433	
5	Car, truck, or van - drove alone:	128,123	±5,016	
6	No vehicle available	1,046	±717	
7	1 vehicle available	22,755	±2,833	
8	2 vehicles available	55,945	±4,913	
9	3 or more vehicles available	48,377	±4,297	
10	Car, truck, or van - carpooled:	14,660	±2,580	
11	No vehicle available	517	±420	
12	1 vehicle available	4,104	±1,495	
13	2 vehicles available	4,527	±1,055	
14	3 or more vehicles available	5,512	±1,884	

Next steps: [Generate code with meansOfTransport](#)

[View recommended plots](#)

As you can see in the above portion of our dataset, the overarching categories focus on the means of transportation to work - whether that be through a personal car, public transportation, or walking. Then, in each category, the data shows how many cars that each individual had available to them. Now, onto a few summary statistics:

In this first block of code, we want to determine the average amount of cars that each individual travelling to work has available to them. To be able to do this, we will consider each person with three or more cars available to them to have exactly three cars available to them.

```
...
numWithZeroCars = int(meansOfTransport.iloc[1,1].replace(",",""))
numWithOneCar = int(meansOfTransport.iloc[2,1].replace(",",""))
numWithTwoCars = int(meansOfTransport.iloc[3,1].replace(",",""))
numWithThreeCars = int(meansOfTransport.iloc[4,1].replace(",",""))

meanCarsAvailable = (numWithOneCar + (2 * numWithTwoCars) + (3 * numWithThreeCars)) / (numWithZeroCars + numWithOneCar + numWithTwoCars + numWithThreeCars)
print(f'On average, each working individual in Spartanburg County has {str(round(meanCarsAvailable, 3))} cars available to them.')

totalWorkersEstimate = int(meansOfTransport.iloc[0,1].replace(",",""))
targetCategories = ['    Car, truck, or van - carpooled:', '    Public transportation (excluding taxicab):', '    Walked:', '    Taxicab, m
nonDrivingWorkersData = meansOfTransport[meansOfTransport['Category'].isin(targetCategories)]
nonDrivingWorkersSum = 0
for row in nonDrivingWorkersData.iterrows():
    temp = row[1][1].replace(",","")
    nonDrivingWorkersSum += int(temp)
nonDrivingWorkersPercent = round((nonDrivingWorkersSum / totalWorkersEstimate) * 100, 3)

print(f'There are an estimated {nonDrivingWorkersSum} working individuals in Spartanburg county that travel for work but choose not to drive')

oneOrLessCarsPercent = round(((numWithZeroCars + numWithOneCar) / totalWorkersEstimate) * 100, 3)
print(f'There are an estimated {numWithZeroCars + numWithOneCar} working individuals in Spartanburg County with access to one or less perso
print(f'There are an estimated {numWithZeroCars} working individuals in Spartanburg County with access to zero personal vehicles. These cou
```

→ On average, each working individual in Spartanburg County has 2.144 cars available to them.
 There are an estimated 16610 working individuals in Spartanburg county that travel for work but choose not to drive on their own in a p
 There are an estimated 33238 working individuals in Spartanburg County with access to one or less personal vehicles. This is estimated
 There are an estimated 2655 working individuals in Spartanburg County with access to zero personal vehicles. These could be considered

As these summary statistics show, working individuals in Spartanburg have approximately 2 cars available for them to drive; however, this statistic does not consider how many other people in their households that they may be sharing those cars with. Furthermore, the population of Spartanburg County that seems to be at a disadvantage (whether or not due to having no vehicle or not having the means to use one to get to work) is relatively small proportionately, but still consists of several thousands of people. Based on research we've done, have decided to consider working individuals with one or less cars available to them as individuals who are likely to benefit from improved transportation. So, based on these numbers, we can say that approximately 20.8% of workers in Spartanburg could benefit from an improved bus system, and about 2650 workers could be considered as individuals with critical need for improved public transportation, since that's how many are estimated to have 0 cars available to them. Now, onto some data visualization:

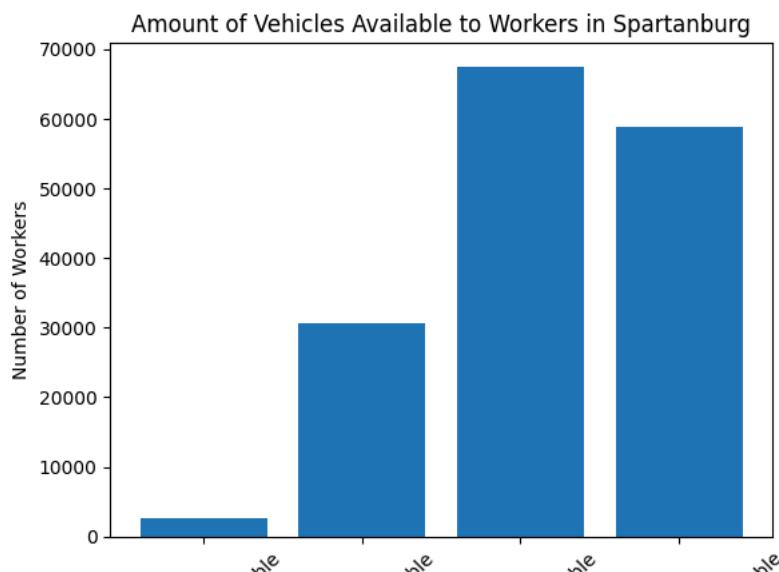
Double-click (or enter) to edit

```
totalVehicleEstimates = meansOfTransport.iloc[1:5]
categories = totalVehicleEstimates['Category']
estimates = [int(row.replace(",","")) for row in totalVehicleEstimates['Estimate']]
plt.bar(categories, estimates)
plt.title("Amount of Vehicles Available to Workers in Spartanburg")
plt.xlabel("Amount of Vehicles Available")
plt.ylabel("Number of Workers")
plt.xticks(rotation=45)
plt.show()

totalDrivingAlone = int(meansOfTransport.iloc[5,1].replace(",",""))
totalWorkingFromHome = int(meansOfTransport.iloc[30,1].replace(",",""))
barX = ['Drives Personal Vehicle Alone', 'Uses Other Transportation Means', 'Works From Home']
barY = [totalDrivingAlone, nonDrivingWorkersSum, totalWorkingFromHome]
plt.bar(barX, barY)
plt.xticks(rotation=45)
plt.title("Comparison of Transportation Means to Work in Spartanburg County")
plt.show()

walkingEstimates = meansOfTransport.iloc[21:24]
categories = walkingEstimates['Category']
estimates = [int(row.replace(",","")) for row in walkingEstimates['Estimate']]
plt.bar(categories, estimates)
```

```
plt.title("Amount of Vehicles Available to Workers that Walk in Spartanburg")
plt.xlabel("Amount of Vehicles Available")
plt.ylabel("Number of Workers")
plt.xticks(rotation=45)
plt.show()
```



The first bar graph, Amount of Vehicles Available to workers in Spartanburg, shows that most people have at least one car to available to them. The second bar graph, Comparison of Transportation Means to Work in Spartanburg County, shows that most people (about 80.3%), drive a personal vehicle alone to work while about 10.4% use other transportation means. Lastly, in the third bar graph, Amount of Vehicles Available to Workers that Walk in Spartanburg, we can see that the vast majority of workers that walk to work are individuals that don't have a personal vehicle available to them. This isn't surprising and we believe that this is indicative of an increased need for efficient buses in the city, especially in areas where these workers live. From these data visualizations, we can determine that a relatively small section of the population relies on transportation that is not a car. However, this data is from Spartanburg County as a whole, so it would be beneficial to find data specific to the city of Spartanburg. Additionally, understanding that there are only 10.4% of the population that rely on other forms of transportation can help us narrow our search in finding communities in the city of Spartanburg who rely on the bus system.

Overall, we feel that this data is important because it cues us in on approximately how many people in the Spartanburg area could benefit from and improved public transportation infrastructure. Not only does it show us how many people already choose not to use a personal vehicle and could therefore benefit from cheap public transport, but it also shows us how many people outright don't have access to a personal vehicle, or may have to share one with a whole family. We feel this kind of data could be used in our problem to understand how much to modify/expand the bus system within reason, and also justify why this kind of problem is important.

60000 | [REDACTED]

D Information on Bus Stops

This appendix consists of a pdf file with the names of all the different bus stops, what routes they are on, and their latitude and longitude location.

stop_id,stop_name,stop_desc,stop_lat,stop_lon,zone_id,stop_url
 OUTBOUND_DOWNTOWN,Dorman Centre Stop 1 Outbound,,34.950933,-81.929859,,
 OUTBOUND_AMMONS_JBWHITEBLVD,Dorman Centre Stop 2 Outbound,,34.930187,-81.954702,,
 OUTBOUND_JBWHITEBLVD_BLACKSTOCK,Dorman Centre Stop 3 Outbound,,34.920972,-81.986320,,
 OUTBOUND_ACADEMYSPORTS,Dorman Centre Stop 4 Outbound,,34.934560,-82.001320,,
 INBOUND_ACADEMYSPORTS,Dorman Centre Stop 1 Inbound,,34.934560,-82.001320,,
 INBOUND_DORMANCTR,Dorman Centre Stop 2 Inbound,,34.934959,-81.986655,,
 INBOUND_WESTGATEMALL,Dorman Centre Stop 3 Inbound,,34.940893,-81.993493,,
 INBOUND_DOWNTOWN,Dorman Centre Stop 4 Inbound,,34.950933,-81.929589,,
 OUTBOUND_DOWNTOWN,Crestview Stop 1,,34.950933,-81.929859,,
 OUTBOUND_DANIELMORGAN_REIDVILLE,Crestview Stop 2,,34.941314,-81.942653,,
 OUTBOUND_CRESCENTHILLAPTS,Crestview Stop 3,,34.928261,-81.940490,,
 INBOUND_CRESCENTHILLAPTS,Crestview Stop 1,,34.928261,-81.940490,,
 INBOUND_BEACONST_NORRISST,Crestview Stop 2,,34.936414,-81.942312,,
 INBOUND_DOWNTOWN,Crestview Stop 3,,34.950933,-81.929859,,
 OUTBOUND_DOWNTOWN,South Liberty Stop 1 Outbound,,34.950933,-81.929859,,
 OUTBOUND_HANOVERPLACE_COLLINSAVE,South Liberty Stop 2 Outbound,,34.936340,-81.915216,,
 OUTBOUND_COLLINSPARK,South Liberty Stop 3 Outbound,,34.930844,-81.922249,,
 INBOUND_COLLINSPARK,South Liberty Stop 1 Inbound,,34.930844,-81.922249,,
 INBOUND_CAUDERAVE_BARKSDALEBLVD,South Liberty 2 Inbound,,34.934716,-81.924390,,
 INBOUND_JCBULLAPTS,South Liberty Stop 3 Inbound,,34.939850,-81.924601,,
 INBOUND_DOWNTOWN,South Liberty Stop 4 Inbound,,34.950933,-81.929589,,
 OUTBOUND_DOWNTOWN,Spartanburg Community College Stop 1 Outbound,,34.950933,-81.929859,,
 OUTBOUND_HOWARDST_SWANEEST,Spartanburg Community College Stop 2 Outbound,,34.964269,-81.954730,,
 OUTBOUND_HOWARDST_NEWCUTRD,Spartanburg Community College Stop 3 Outbound,,34.969324,-81.964292,,
 OUTBOUND_NEWCUTRD_NEWMARND,Spartanburg Community College Stop 4 Outbound,,34.971978,-81.976832,,
 OUTBOUND_SPTBGCOMMCOLLEGE,Spartanburg Community College Stop 5 Outbound,,34.976414,-81.989558,,
 INBOUND_SPTBGCOMMCOLLEGE,Spartanburg Community College Stop 1 Inbound,,34.976414,-81.989558,,
 INBOUND_USCUPSTATE,Spartanburg Community College Stop 2 Inbound,,34.996724,-81.971794,,
 INBOUND_ASHEVILLEHWY_WHITEAVE,Spartanburg Community College Stop 3 Inbound,,34.979525,-81.965731,,
 INBOUND_SWANEEST_HOWARDST,Spartanburg Community College Stop 4 Inbound,,34.964662,-81.954414,,
 INBOUND_DOWNTOWN,Spartanburg Community College Stop 5 Inbound,,34.950933,-81.929589,,
 OUTBOUND_DOWNTOWN,South Church Stop 1,,34.950933,-81.929859,,
 OUTBOUND_SOUTHCURCH_MILSTERST,South Church Stop 2,,34.939284,-81.928283,,
 OUTBOUND_SOUTHCURCH_SOUTHAVE,South Church Stop 3,,34.917014,-81.937982,,
 INBOUND_SOUTHCURCH_SOUTHAVE,South Church Stop 1,,34.917014,-81.937982,,
 INBOUND_SOUTHCURCH_MILSTERST,South Church Stop 2,,34.939737,-81.927888,,
 INBOUND_DOWNTOWN,South Church Stop 3,,34.950933,-81.929859,,
 OUTBOUND_DOWNTOWN,North Church Stop 1,,34.950933,-81.929859,,
 OUTBOUND_NORTHCURCH_WOFFORDCOLLEGE,North Church Stop 2,,34.957253,-81.937336,,
 OUTBOUND_CHURCHST_WOODST,North Church Stop 3,,34.967465,-81.941058,,
 OUTBOUND_WHITNEYRD_BEAUMONTAVE,North Church Stop 4,,34.975685,-81.933714,,
 INBOUND_WHITNEYRD_BEAMONTAVE,North Church Stop 1,,34.975685,-81.933714,,
 INBOUND_NORTHCURCH_WOFFORDCOLLEGE,North Church Stop 2,,34.957393,-81.937719,,
 INBOUND_DOWNTOWN,North Church Stop 3,,34.933708,-81.989944,,
 OUTBOUND_DOWNTOWN,Hillcrest Stop 1 Outbound,,34.950933,-81.929859,,
 OUTBOUND_EMAINHEYWOODAVE,Hillcrest Stop 2 Outbound,,34.957009,-81.911618,,
 OUTBOUND_FERNWOODGLENDALERD,Hillcrest Stop 3 Outbound,,34.966625,-81.892939,,
 OUTBOUND_JESSEBOYDELEMENTARY,Hillcrest Stop 4 Outbound,,34.958507,-81.877863,,
 OUTBOUND_WALMART,Hillcrest Stop 5 Outbound,,34.974943,-81.877822,,
 INBOUND_WALMART,Hillcrest Stop 1 Inbound,,34.974943,-81.877822,,
 INBOUND_EMAIN_DRAYTONRD,Hillcrest Stop 2 Inbound,,34.966990,-81.894693,,
 INBOUND_DILLONDR,Hillcrest Stop 3 Inbound,,34.980324,-81.892939,,
 INBOUND_CONVERSE_EMAIN,Hillcrest Stop 4 Inbound,,34.954083,-81.917103,,
 INBOUND_DOWNTOWN,Hillcrest Stop 5 Inbound,,34.933708,-81.989944,,
 OUTBOUND_DOWNTOWN,Westgate Stop 1 Outbound,,34.950933,-81.929859,,
 OUTBOUND_FARLEY_HUGHST,Westgate Stop 2 Outbound,,34.953844,-81.953172,,
 OUTBOUND_FRONT_SIBLEYST,Westgate Stop 3 Outbound,,34.961364,-81.967117,,
 OUTBOUND_CORONAREST,Westgate Stop 4 Outbound,,34.933708,-81.989944,,
 INBOUND_CORONAREST,Westgate Stop 1 Inbound,,34.950933,-81.929859,,
 INBOUND_POWELL MILL_DOVERRD,Westgate Stop 2 Inbound,,34.941229,-81.976941,,
 INBOUND_TEXTILEDR_GOWANST,Westgate Stop 3 Inbound,,34.946501,-81.960017,,
 INBOUND_DOWNTOWN,Westgate Stop 4 Inbound,,34.933708,-81.989944,,