

The Impact of the 'School Commute Times' on pedestrian-vehicle crashes in Fulton County, GA



Lan Liu, Bo Zhang
 lz10035@auburn.edu
 Auburn University | CIVL 6410 GIS In Civil Engineering

ABSTRACT

More and more people start to concern the pedestrian safety on the road. Many factors can induce pedestrian injuries. This project applied ArcGIS analysis technique to identify the influence of 'School Commute Times' (SC) on the pedestrian-vehicle crashes. The crash rate was not uniform but increased during the SC (8-9 am and 3-4 pm). The results showed that nearly no clusters of pedestrian crashes happened around schools, which suggests that the policies related pedestrian crashes during SC need to be focused on overall traffic levels and signs around complex intersections instead of focusing geographically on areas around school.

MOTIVATIONS

- Most people consider traffic volume as a major factor that caused pedestrian crashes in any kind of situation, this project was designed to analyze the relationship between traffic volume and pedestrian crashes in a specific time.
- To avoid pedestrian crashes during school commute times, people made policies that focused on areas around schools. This project made analysis to verify these policies by locating the clusters of pedestrian crashes.

DATA SOURCES

- Latitude and Longitude of pedestrian crashes and school locations in Fulton County, GA
- School districts, census tracts, and roads datasets collected via Tigre Census
- Traffic counts data collected via GDOT website
- Pedestrian crash data in USA included pedestrian statistics and causes of injury
- Fulton County traffic safety data included crash and fatal & injury rates

METHODS

- Pedestrian crash locations
- Use Clip command to display pedestrian crashes within Fulton County, GA
- School locations
- Buffer 1 km around schools to display the school areas
- Traffic volume
- Edit attribute table of road shapefile to add information of traffic counts
- Pedestrian fatalities
- Provide the 3-D Pie graph of fatalities to show the background of pedestrian crashes in USA
- Summarize pedestrian crashes in Fulton County

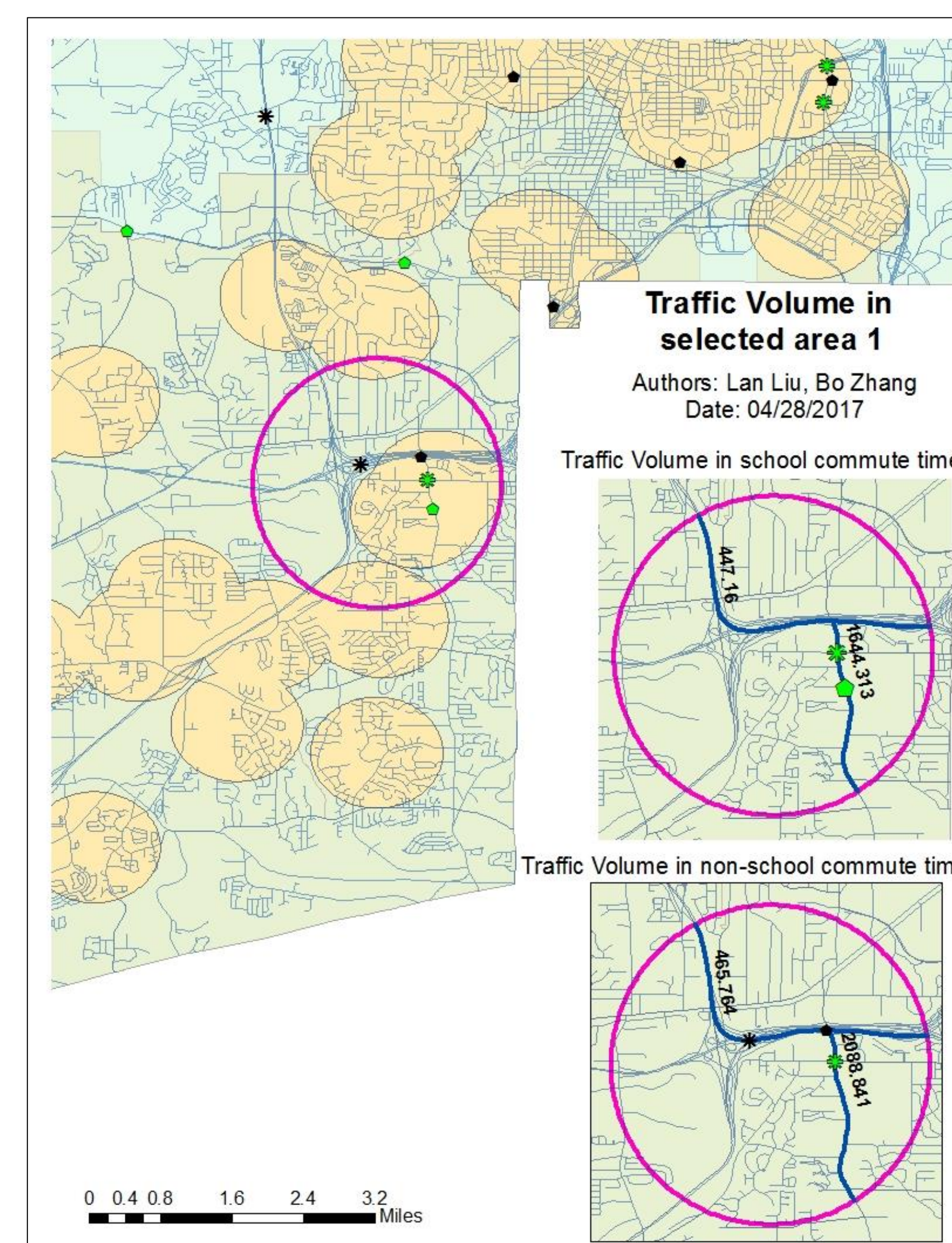
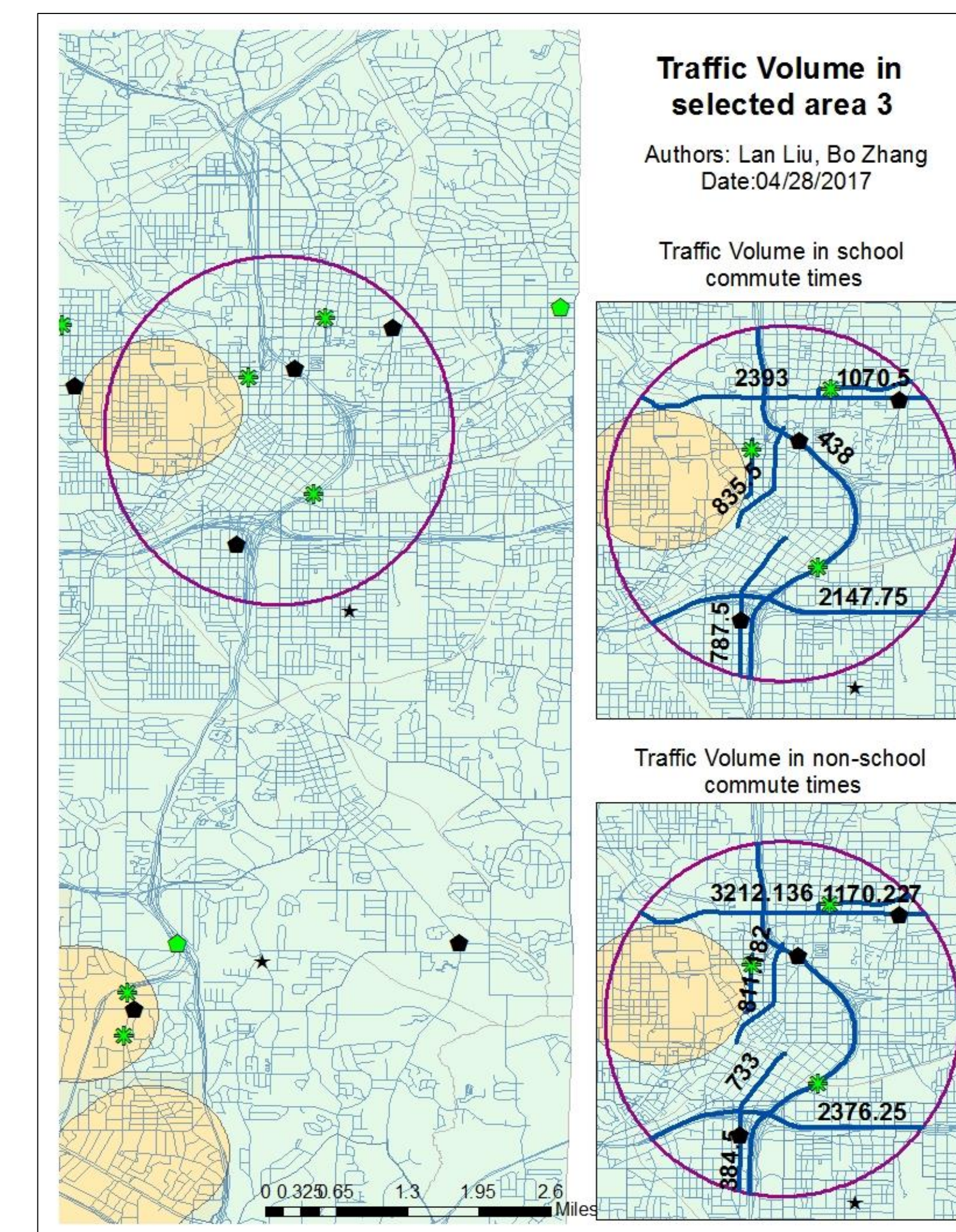
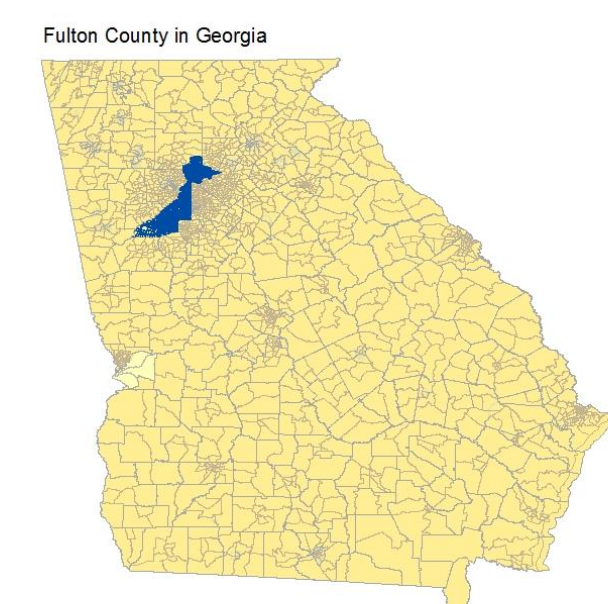
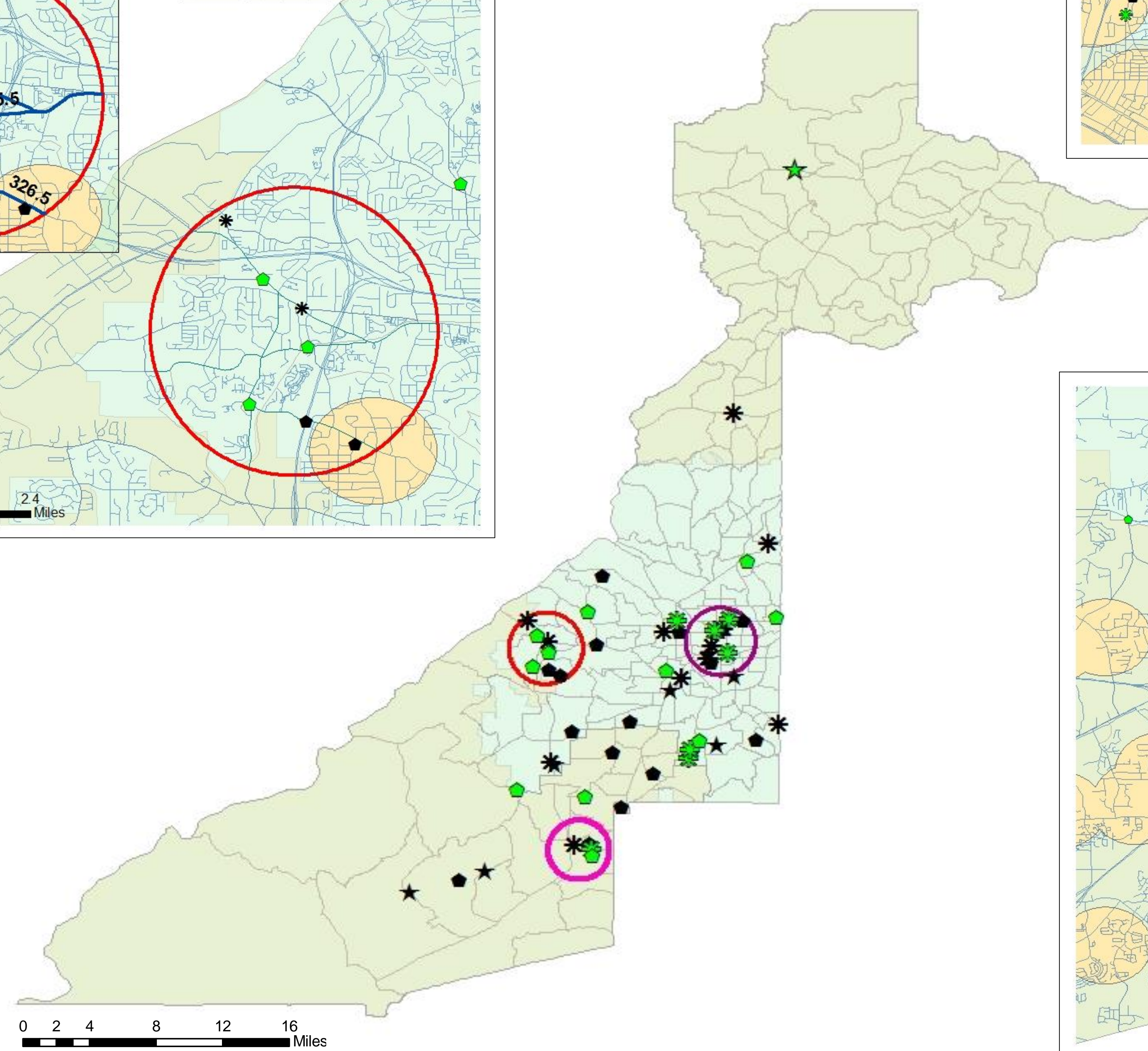
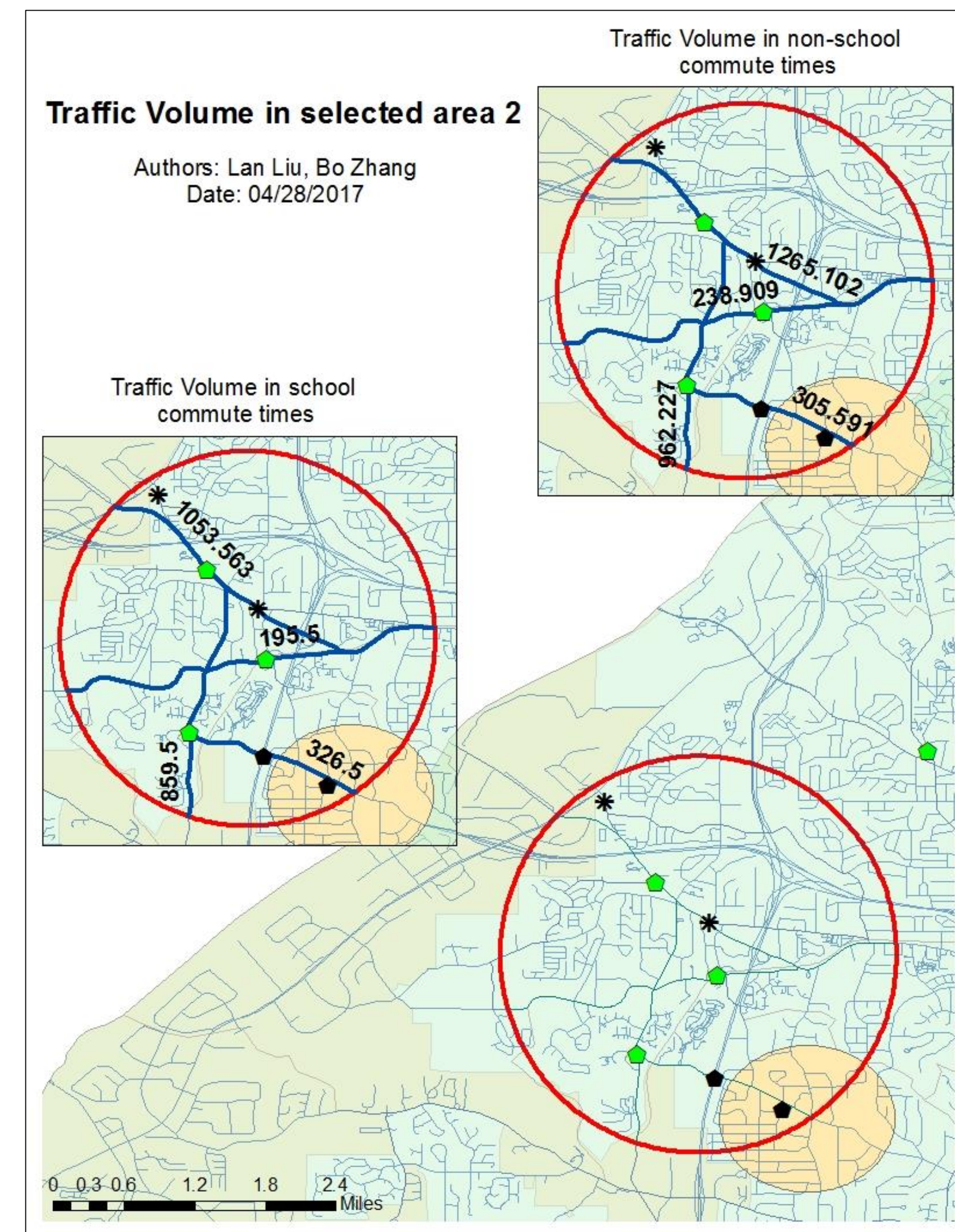
Results

GIS Maps

These three maps display the traffic volumes on the roads within three selected areas based on the distribution of pedestrian crashes.

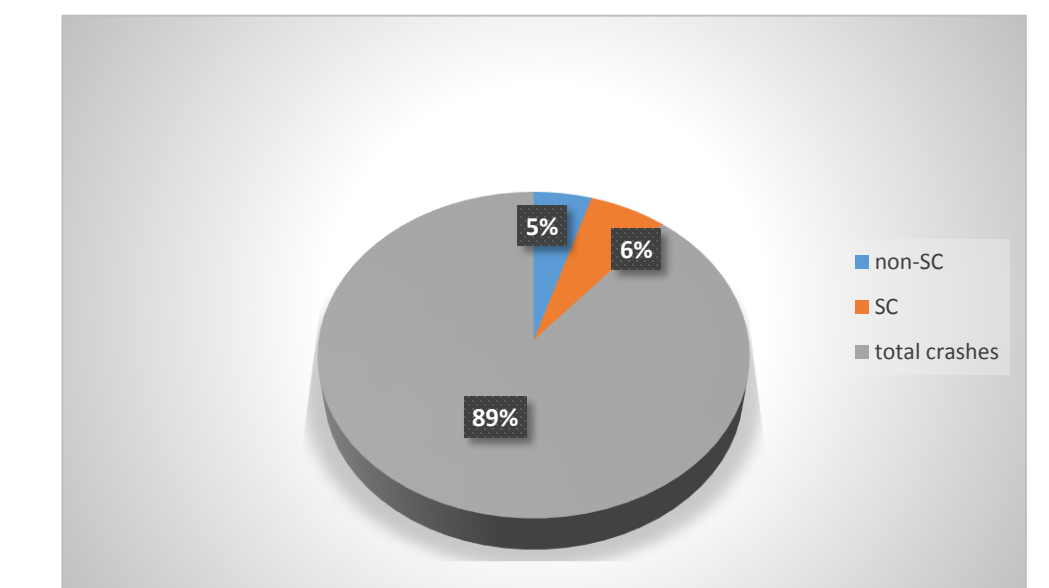
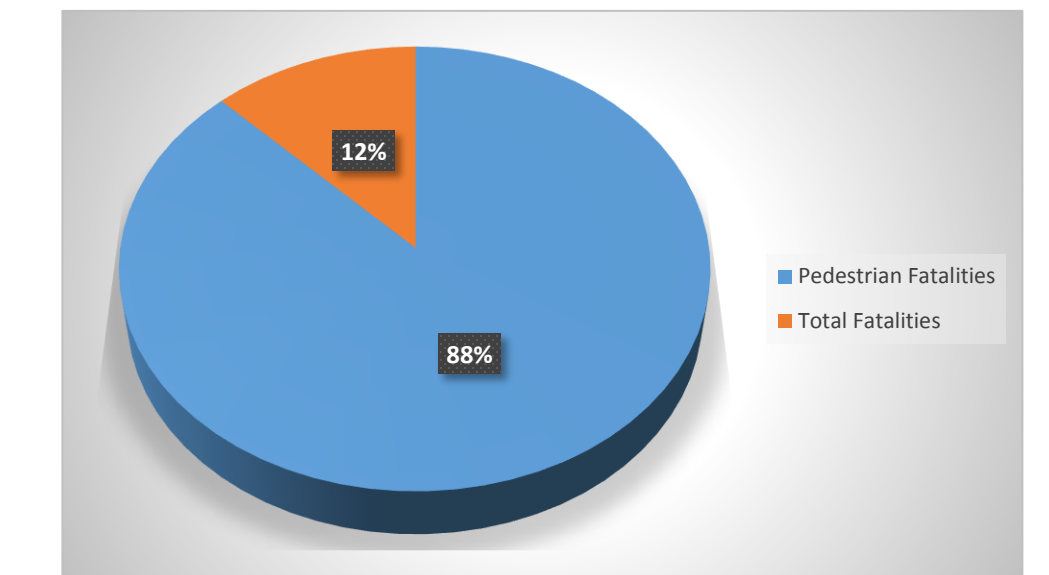
Legend

- ▲ 2012 SC
- △ 2012 non SC
- ◆ 2013 SC
- ◇ 2013 non SC
- ▼ 2014 SC
- ▽ 2014 non SC
- Roads in Fulton County
- Selected Area 1
- Selected Area 2
- Selected Area 3
- School areas in Fulton County
- School Districts
- Fulton County
- Roads in selected areas



STATISTICAL ANALYSIS

- Display the proportion of pedestrian fatalities in total traffic crashes by using the table of USA pedestrian crash from 2012 to 2014.
- Organize the pedestrian crash dataset, display the proportions of crashes happened in school commutes and in non-school commutes (non-SC) in total crashes from 2012 to 2014.



CONCLUSIONS

- Most crashes happened outside of the school areas, which suggested that people should concern more about controlling the traffic around complex intersections instead of setting signs in school areas to reduce the pedestrian crash during school commute times.
- For the case that pedestrian crashes took place in school areas:
- The traffic volume increased in school commute times, which influenced pedestrian crashes.
- For the case that pedestrian crashes did not take place in school areas:
- The traffic volume did not influence pedestrian crashes (traffic volume during school commutes was smaller).
 - The major factor was geometry complication, the complex intersection was the major cause of pedestrian crashes.

FUTURE WORKS

The limitation of this project is the problem of crash data source, the integrity of crash data needs to improve. The ideal crash data was from GDOT website which was not found in this project. With this completed crash dataset, the spatial clusters of pedestrian crashes in Georgia could be displayed to present the distribution of crashes clearly.