Computational Mapping of Gentrified Displacement

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Abstract

Globally, most major cities are experiencing some facet of urban renewal. There is a revitalization of decaying urban spaces, with run-down neighborhoods becoming the latest hip spot to socialize and live. During the post-WWII decades, there was a migration of white majorities to the suburbs and an influx of minorities moving to the vacated city. With that majority exodus came the removing of funds from the CBD to suburbs and edge cities, causing the urban center infrastructure to decay. Gentrification has a connotation of being a bad word, oft-linked to the 'whitening' of a city. This study asks, as more cities are redeveloping and trying to become smarter, are they having communities give up their sense of place and self-identity? Traditional mapping techniques tend to show static populations and do not capture the ebb and flow of migratory patterns. This project will examine to what extent gentrification plays in the 'whitening' of reclaimed urban spaces, where the white populations are migrating in from, and where the displaced populations are moving to. Over the last two decades, technology has transformed how the city is used spatially. The use of space within the city does not follow a strict cartesian grid, so data and the use of city space must be looked at outside of the typical Euclidean representation of city blocks. The expected results are that as a city gentrifies, the white populace increases in historically minority neighborhoods, pushing minority populations to surrounding cities and suburbs. Looking at this data is important in understanding how redevelopment impacts certain demographics and how that information can be used to 'smarten' our cities renewal. Cities must develop for mixed-use, mixed-income, and mixed-density, which they cannot do if they only cater to one population.

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The urban landscape is changing. After decades of disenfranchisement, certain neighborhoods within US cities are experiencing a resurgence of investment. This reinvestment is driving development and stimulating declining communities. Gentrification is not a bad process for a city to experience. In fact, it is necessary in order for the continued to growth and expansion of a city, both socially and economically. Gentrification gets a bad reputation due to the displacement associated with redevelopment and the loss distinctiveness that the community once had.

This project will study the effects gentrification has on the socioeconomic demographics within a neighborhood to look at shifts within certain spatial extents. This study will differ from others in that it will be looking to where the displaced population migrates too, looking to see if they move to the same suburb, edge city, or exurb as those moving into the gentrified area. To answer that question, this project will look at three aspects of displacement. Also, access to services will be visualized to highlight any barriers, if any, from one neighborhood to another. First, data will be analyzed to see if the in/out migration go to the same area(s), for example, does the incoming and outgoing populations come from and move to the same general region. Second, will be to see if there is a measurable drop in income for the non-gentrified area. Lastly, using spatial statistics, the project will look to see if there is a quantifiable, connective shift in socioeconomic demographics surrounding a gentrified area in order to see migration patterns following redevelopment.

In order to address those issues, literature will be reviewed to see how it will inform our processes of analysis. Also, the literature on radical cartography and counter-mapping will be consulted to look at ways to map the phenomenon of displacement and gentrification. The

literature will inform the methods that will be used to analyze and present the issues and findings to the reader. A detailed summary of how the literature and analytical approaches will be used to answer the question regarding gentrification and displacement migration will follow the methods section.

Literature Review

Background

During the post-WWII era, there was a mass exodus of the middle-class from central cities, slowing in the 1960s and 1970s (Kasarda et al., 1997). With the out-migration of the middle-class, disinvestment from the city followed. This disinvestment and migration, known as white flight, to the suburbs led to high-density low-income housing in American cities, colloquially known as 'slums' (Knight & Gharipour, 2016). However, beginning in the early 2000s and continuing through today, some of these 'blighted' neighborhoods have seen a resurgence of investment and an influx of middle-class relocation (Sturtevant, 2014), otherwise known as gentrification. The literature will be grouped into three sub-sections: Gentrification & Displacement, Initial Mapping, and Radical Space.

Gentrification & Displacement

Hwang and Sampson (2014) describe gentrification as "the process by which central urban neighborhoods that have undergone disinvestments and economic decline experience a reversal, reinvestment, and the in-migration of a relatively well-off middle- and upper-middle-class population." While at its heart gentrification is not bad for a neighborhood or city, it has become a 'bad word' within urban planning and studies. Rupasingha et al. (2015) found that over the past two decades there has been more migration from metro to non-metro, which is a shift from previous decades.

Changing demographics within a neighborhood, also alter its socioeconomic makeup. As more middle-class move into a predominantly minority area, goods and rent command a higher median price. This increase in prices displaces those on the lower socioeconomic scale forcing them to leave an area. Not all predominantly black neighborhoods are facing this 'white' invasion, in fact, according to Freeman et al. (2015), only about 10 percent are, Figures 1 & 2. However, those neighborhoods facing gentrification are at risk of losing not only its identity but the very people that helped create the culture that made it alluring to suburban immigrants in the first place. Additionally, Freeman et al. (2015) identify numerous metropolitan areas that have seen displacement due to gentrification.

Many studies have looked at the in-migration and its effect on a gentrified urban area. This study will be looking at the migration pattern from the suburbs but also the displacement migration to see if there is movement to and from the same general areas. This is significant because if those who are displaced are moving into formerly or still currently white enclaves, they may not have ready access to services or specific needs being met. Also, it would allow follow-on research into the subject of whether the displaced population affects the socioeconomic demographics of the area they moved into to the extent that the middle-class has on gentrified neighborhoods.

Initial Mapping

Before displacement can be mapped, this study needs to determine which metropolitan areas have gone through gentrification in order to look for areas affected by 'white invasion'. There are many markers by which gentrification can be analyzed. This study has selected a number of ways by which to look at, transit-oriented development (TOD) along metro rail transit systems (Dong, 2017), recent addition of bike lanes to a neighborhood (Hoffmann, 2016), and

Shelton's (2018) definition of racially/ethnically concentrated areas of poverty and affluence (Table 1).

Once the gentrified areas have been identified, this study will then move on to finding where the displaced population settled. To find those areas, a reverse of the previously used table (Shelton, 2018) will be used to. Additionally, Holm and Schulz's Gentrimap (2017) model will be used to measure displacement as well as gentrification.

Radical Space

Shelton (2018) also stresses how one thinks of urban space needs to change. The spatial extent of cities is changing with the advent of technology, which affects how people move through a metropolitan area. Gentrified areas are not the "apartheid-like landscape" (Freeman et al., 2015) of post 'white flight' urban spaces. The usage of space within the urban environment is complex (Forer, 1978) and more relational, instead of absolute than ever before. (Harvey, 2006). The use of urban space is no longer defined solely by Euclidean geometries. Traditional mapping of these new spatial urban extents may not highlight the relation between two areas effectively.

This study will use techniques of radical cartography (Denil, 2011) to highlight how the middle-class and displaced are connected in a way that traditional mapping techniques cannot show. Because radical cartography moves away from the "absolute, Euclidean and Cartesian perspectives on space" or the "as the crow flies" distances (O'Sullivan et al., 2018), this study looked to how fictional mapping in literature (Reuschel & Hurni, 2011) and humorous map, such as those examined by Caquard and Dormann (2008), were created and theory behind them.

Relational mapping is not a new practice, Bill Bunge and the Detroit Geographical Expedition and Institute did it in the late 1960s and 1970s (Thatcher, 2017). Bergmann and O'Sullivan (2018) have been doing more modern relational mapping, with their "relational

representation of the global flights' network" map, see Figure 3. "Blockmodeling" (Bergmann and O'Sullivan, 2018) is a way to combine both Euclidean and Cartesian perspectives on space (O'Sullivan et al., 2018) with radical cartography. The association between the gentrified and displaced lends itself to be mapped relational as the spatial distance matters less than highlighting how those communities and demographics have now shaped and impacted each other.

The maps developed need to be as such that the reader can visually process and interpret the information being expressed. As with the maps in 'Mapping Literature' (Reuschel & Hurni, 2011) and 'Humorous Maps: Explorations of an AlternativeCartography' (Caquard & Dormann, 2008) the maps need to be recognizable to the reader. Yet, the maps need to be presented in such a way that they step away from the modern Geographic Information Systems (GIS) computational representation and analysis of Newtonian space (Bergmann & O'Sullivan, 2018).

Radical cartography and counter-mapping can inform a reader of a topic that normally would not be mappable by absolute spatial extents. The linkage of displacement and gentrification in one such scenario which unconventional mapping can help visualize a problem that would normally only be able to be described via text. The literature supports that displacement follows gentrification and that more work had been put into studying gentrified areas than following those displaced by redevelopment. This study will build on the methods applied to find gentrified neighborhoods, by expanding on and reversing them to find areas, where those displaced, have moved in to.

Methods

This project will look at how in and out-migration, following gentrification, potentially connects a gentrified area with a surrounding geographic area. It will attempt to answer three

questions in order to explore that. First, it will answer if there is a measurable shift in

socioeconomic demographics surrounding a gentrified area. The second question will attempt to

answer if the in/out migration go to the same area(s), for example, does the incoming and

outgoing populations come from and move to the same general areas. Thirdly, the project will

look at if there is a measurable drop in income for the non-gentrified area. A series of maps will

be produced to highlight the patterns and phenomenon discovered.

In order to answer the first question, three cities will be selected from research performed

about gentrified cities. The research will focus on finding cities that have gentrified districts that

are known to have had a shift in socioeconomic demographics, i.e. the 'whitening effect'. The

work of Freeman et al. (2015) will be consulted to narrow down a list of cities that have seen a

major demographic shift from 2000 to 2010, see figures 1 & 2. Using Shelton's table (2018),

maps will be produced showing racial/income disparity. By means of those methods, the top

three cities will be designated. Once the cities are selected, socioeconomic data will be collected

for those cities. Data collection will the US Census, along with any relevant state and county GIS

portals. Census block group level information will be consulted to get socioeconomic and

demographic numbers. The data collected will range from before and after gentrification, taken

from the 1990, 2000, 2010 censuses and the latest American Community Survey.

It will be displayed in such a way that it will be normalized by socioeconomic standards

of that area, most likely by county data rather than by state or national data. Normalization

methods used will be to find the median income for the areas of study, not against a state or

federal standard. That way it will be based on percentages, not a figure that will change from

region to region. With the data normalized and displayed, through the use of spatial statistics,

connective patterns will be looked for over the years for shifting socioeconomic demographics.

Those patterns will be used to answer the second question of if the displaced population goes to the same area(s) as those that moved into the gentrified area. Standards will be created to maintain close percentages (+/-) of in/out migration as not to skew the results in case the data does not produce a pattern or desired results. Much like the standardization of income data discussed above, race demographics will have to assessed in the same manner. High minority neighborhoods from one census will need to be compared against a later census to see if there is a drop in minority and an increase in white population indicating 'white invasion'. Similarly, a reverse of that will need to be applied from the outer lying regions looking for a decrease in the white population, followed by an influx of minority residents.

A series of maps will be produced at this point, one for each city, highlighting the phenomena found. Data will be used to draw/bend/fold the two points in such a way to highlight their non-cartographic connection. Unnecessary data will be stripped away to further emphasize what the map(s) are trying to tell the reader. The intended result is to have a map series, such as figure 2 (Bergman and O'Sullivan, 2018), where the reader sees that the spatial distance between two points is no longer important, but the relation between them is what is significant.

To answer the third question, just economic data will be analyzed from the areas found answering the second question. While the second question looks to find a linkage between neighborhoods, the third looks to see if there is a significant drop in income in the non-gentrified area. While it is expected that income will rise within the gentrified areas, there is a question as to if the opposite happens where the displaced population moves to.

Timeline

- February

  · Research for Lit Review (2 weeks)

  · Lit Review (1 week)

· Draft Proposal (1week)

· Peer Review and Proposal edits (1 week)

- March

  · Proposal edits (1 week)

  · Proposal Presentation (1 week)

  · Submit Final Proposal (1 week)

  · Begin to gather data (4 weeks)

- April

  · Research cities to focus on (2 weeks)

  · Finalize cities (3) (1week)

  · Start to analyze data, looking for phenomenon (3 weeks)

- May

  · Initial mapping of phenomenon (1 week)

- June

  · Start Final Paper (6 weeks)

  · Initial (final) visualization of maps (2 weeks)

  · Gather feedback from peers and capstone committee (1 week)

- July

  · Start final visualization of map(s) (2 weeks)

  · Rough Draft of Paper (2 weeks)

- August

  · Final edits to paper (2 weeks)

· Final review of paper (1 week)

· Final edits to project/maps (2 weeks)

· Final review of project/maps (1 week)

· Finalize paper & project/maps and submit (1 week)

Summary

Displacement during and following gentrification happens, the current literature informs of that. What the literature does not fully explain is where those uprooted move to and how those communities have changed, socially and economically. Through spatial statistics and elements of radical cartography, a computational map of gentrification highlighting displaced populations will be produced in order to visualize that phenomenon.

Through the methods outlined above, this study will answer three questions. First, do the in/out migration go to the same area(s), for example, does the incoming and outgoing populations come from and move to the same general areas? Second, is there a measurable drop in income for the non-gentrified area? And third, is there a measurable shift in socioeconomic demographics surrounding a gentrified area in order to see migration patterns following redevelopment?

The expected outcome for the first question is that the displaced populations would move to the same general areas as those that moved back into the city. Those moving would need to find housing at a rate close to what they would be currently paying and an area that suffered an exodus of people would be able to provide that affordance. Because those moving into the outlying areas would be on the lower end of the socioeconomic scale, it would go to reason that the area they moved in to would see a dip in the overall income as they filled a gap left by middle-class migrants. If there is a shift in socioeconomic standing for both the gentrified and

'displaced' areas, there should be a quantifiable change that can be computationally analyzed and mapped.

While the study of gentrification is important for the continued smart growth of cities, there are other spatial extents that are affected by the change. The shifts of those regions cannot be overlooked. The migration of the displaced is just as important as those who's migration brings investment into a city.
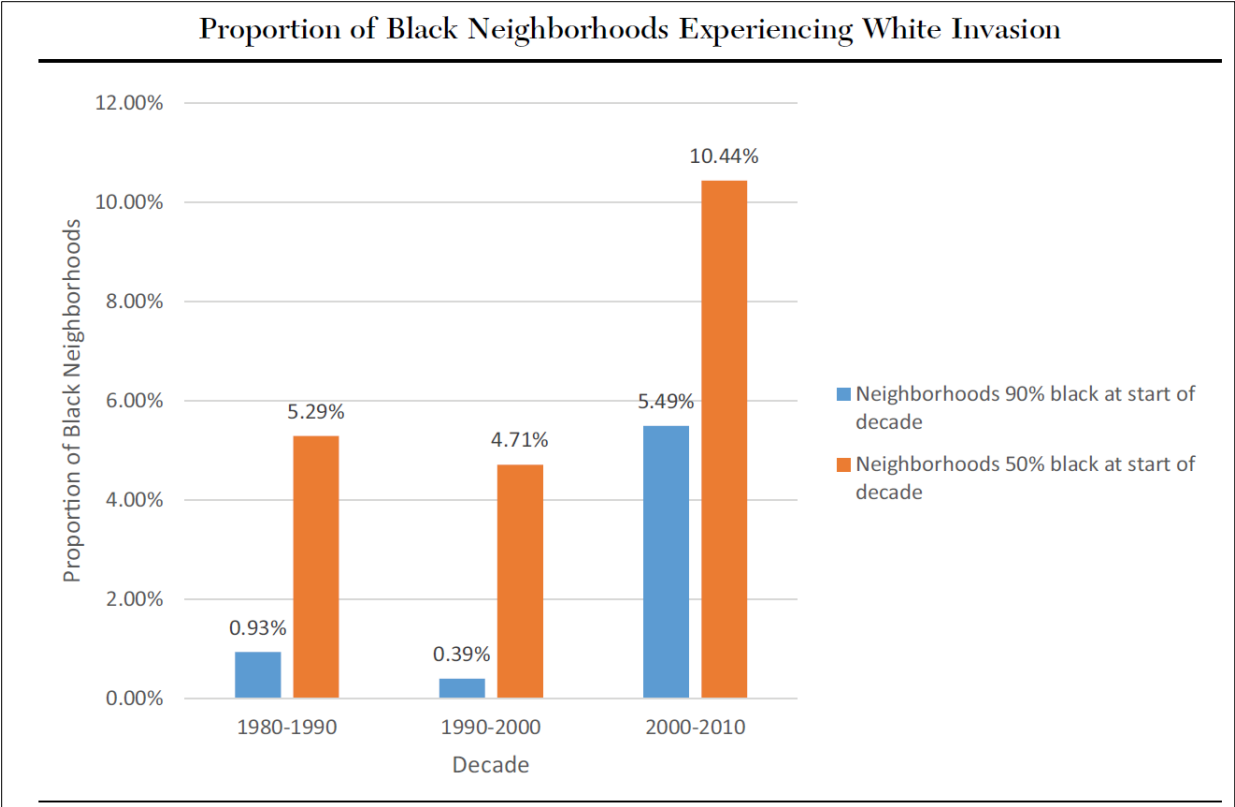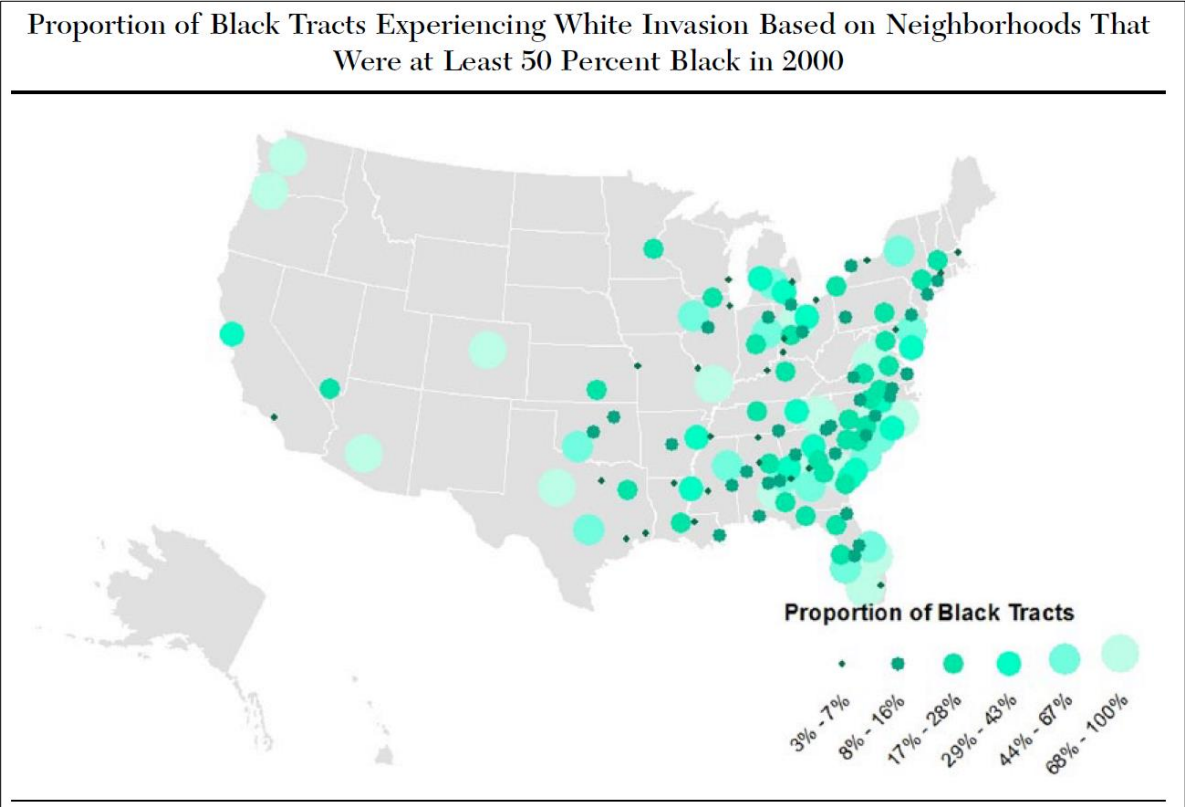
Figure 1 Freeman et al. 2015
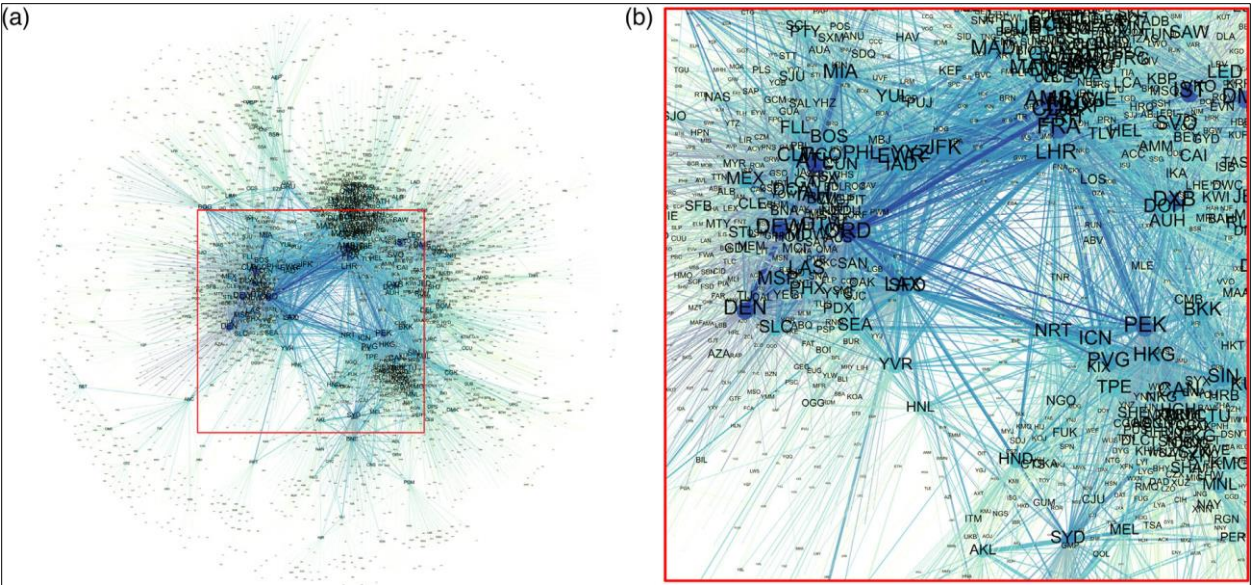

Figure 2 Freeman et al. 2015

Figure 3 Bergmann & O'Sullivan 2018

	Race/Ethnicity	Poverty Rate	Median Household Income
RECAP	Majority non-white	>40%	<50% of citywide median
RECArP	Majority non-white	20-40%	50-80% of citywide median
RECArA	More white than the city as a whole	<5%	150-200% of citywide median
RECAA	More white than the city as a whole	n/a	>200% of citywide median

Table 1 Defining racially/ethnically concentrated areas of poverty and affluence. Shelton 2018

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