Mapping Urban Decay and Rebirth in St. Paul

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ABSTRACT

We propose a project with an interactive map, to visualize where buildings have been abandoned, compared to where building improvements are being made. Additional map layers will attempt to correlate other economic and social factors such as property value and crime. Prospective residents and investors can use this to explore growth trends in the city. Planners can use this to identify possible cause & effect relationships to

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diagnose and prevent abandonment, while encouraging revitalization.

KEYWORDS
Scientific visualization, urban renewal/decay, social science,

INTRODUCTION

The St. Paul Data Portal has detailed information about abandoned buildings and issued building permits. The datasets contain 559 records of currently vacant buildings in the city of St. Paul, as well as thousands of records of approved building permits. An visualization illustrating where these datasets overlap or correlate with each other will be invaluable to identify trends in urban rebirth and decay in a geographic sense, and, compared with demographic or crime data, in a broader social sense.
The target audience of this work are developers, city planners, or politicians who are interested in areas of intense gentrification versus areas in decline.

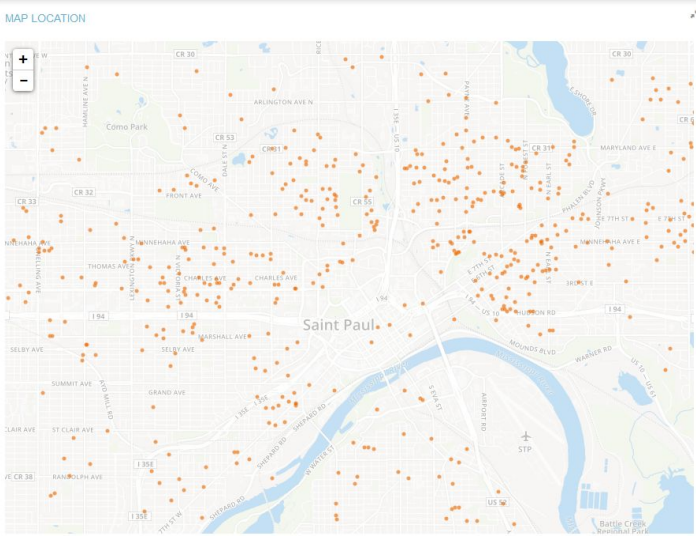

Figure 1: Existing visualization of Vacant Buildings Dataset

PROPOSED WORK

To allow users to perform the tasks described above, we propose a project for use as a display at the Bell Museum, by the end of the Spring semester, in the form of an interactive map, either as a touch screen, or as a non-touch screen with a mouse. The core data will be the location and size of abandoned buildings, and the location and cost of permitted improvements. We will need to experiment with different channels of visualization, including gradients of color and various kinds of glyphs, to see what is most effective. We will also need to experiment with additional map layers of the surrounding area, including things like property value, crime risk, and demographics, gathered from additional public sources. Following are more details about our intended audience, goals for the end of the semester, sources of data, initial design ideas, as well as a timeline of expected tasks.

Intended Audience

There are many people who could benefit from visual information of the locations and intensity of urban decay and renewal. In particular, real estate developers could always benefit from deeper knowledge of ongoing trends in real estate markets and where they can capitalize on opportunities to revitalize areas of the city, as well as politicians and city planners who can make educated decisions concerning where to allocate funds for urban renewal, focus police efforts, or build city infrastructure.

Specific Tasks

The project will evolve as we begin to see what trends exist in the data. However, there are some concrete tasks that can be identified. These will change as the project evolves.

Task 1. Create prototypes of possible implementations and decide on mapping platform to use

Qlik vs. Mapbox vs. Google Maps, etc

Each of these platforms has its strengths and weaknesses. Qlik has the advantage of ease of implementation, but lacks easy animation functionality. Prototypes of basic visualizations on each platform will give us a chance to compare platforms to see which most closely fits with our goals.

Task 2. Decide on which additional data layers should be included based on their relevance to the building data sets

One of the most intriguing possibilities for additional data layers is crime data. To study whether there is a correlation between, not only the frequency of crimes, but also the kinds of crimes that happen in areas that undergoing decay or gentrification.

Task 3. Fine tune visualization options like exact colors and glyphs that are the most effective

Some early prototypes and mockups that we have played with suffer from issues relating to ADA compliance. Selecting our colors and glyphs carefully will allow us to ensure that the widest possible audience will be able to explore the final visualization and gain insights that they will find useful (Figure 4).

Task 4. Add time component with slider and ability to animate over a time period.
(depends on data detail we can obtain)

One of the shortcomings of the current vacant buildings dataset is that it does not have a time dimension. It's a snapshot of the current state of urban decay but does not tell us what that state was last year or going back further. We have communicated with the St. Paul data curators to see if there are older datasets that could help us to build in a time dimension.
Barring that, we can still add some dimension to the visualization that will show how long a particular building has been vacant and give further insight into where the longest-running areas of urban decay are.

Task 5. Add additional interactivity features, such as the ability to select between a few available data layers, and to tap/click on individual sites to popup more information about the property.

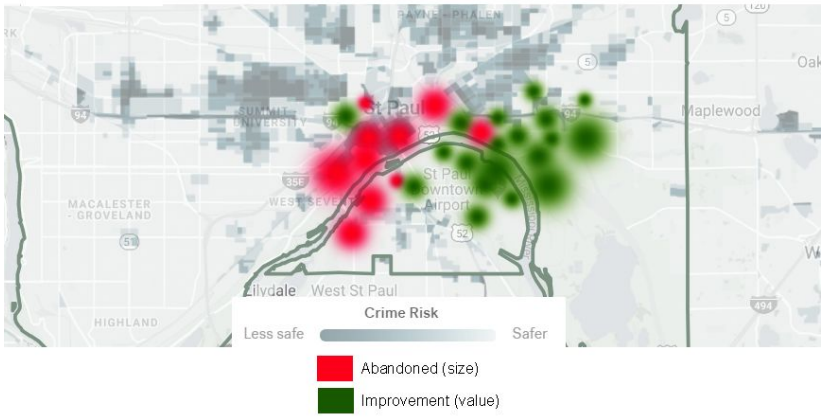

Figure 2: Photoshop mockup with crime risk gradient, color representing abandonment/growth, and size representing significance

Figure 3: Photoshop mockup with crime risk gradient, and glyphs: building bars with height representing abandoned square footage, and open circles with size representing cost of improvements

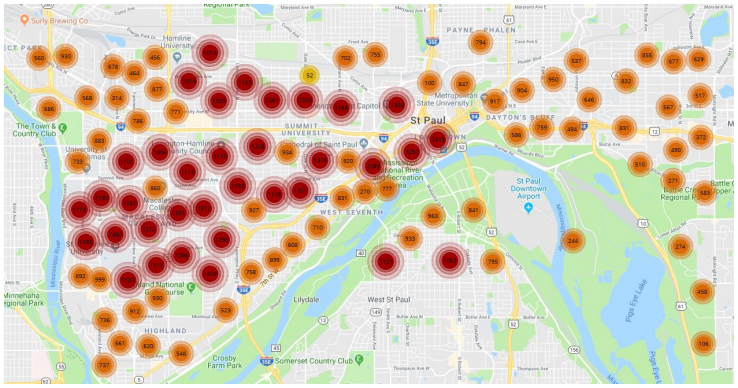

Figure 4: Existing visualization of Approved Building Permits in St. Paul

We would like for anyone interacting with our visualizations to be able to filter the visible data on a number of different dimensions using a touch screen. We intend to build in as much interactivity as possible, and hopefully make this visualization useful to as many people as possible.

Data Sources and Stakeholders

Our key data source is the St. Paul Open Data Portal. The data is comprehensive and detailed, but it doesn't tell the whole story of these buildings that have been abandoned or are undergoing renewal. We will have to scrape some other data from websites such as Zillow to find detailed information about the individual properties, and we have discovered that they have an API and detailed information about the residential properties in our dataset. As far as commercial properties, we may have to look elsewhere.

The crime risk gradient featured in the mockups was obtained from Trulia.

Early Ideation and Sketching

Figure 4 shows a possible design for the visualization. The color red is used for abandoned building locations, where the size represents the square footage of the building. Green is used for improvement sites, where size represents the cost. It is overlaid on a gradient representing crime risk. Although the red/green gradient is intuitive, there are 3 problems to overcome: 1. red/green color blindness issues, 2.lack of clarity against a different gradient for crime, and 3. possible lack of clarity if red and green areas overlap a lot. Another color scheme may work better.

Figure 5 uses the same crime risk gradient, but demonstrates a glyph approach. An advantage of glyphs is that they can stand out from the background gradient better. Orange bars that can be made to look like stylized buildings can represent size by varying their height. Figure 6 also demonstrates glyphs, this time with "empty" circles metaphorically representing "unused" abandoned buildings. Arrows serve to both pinpoint the locations of improvements, and also to represent the intensity of the improvement (cost) by the

height of the arrow, a representation of the influx of investment capital at that site.

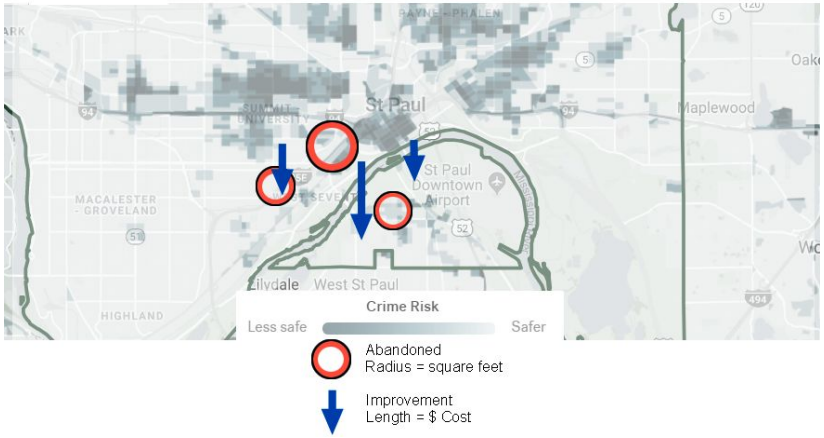

Figure 5: Photoshop mockup with crime risk gradient, and glyphs: open circles with size representing abandoned square footage, and arrows with height representing size of improvements

Timeline with Milestones

The timeline for this project is subject to change, but certain milestones are built into the project.

- 3/12 Data Wrangling
  - Finalizing chosen datasets. Beginning to build basic visualizations with datasets individually
  - Basic layering of datasets to begin investigating which ones reveal hidden correlations.
- 3/28 Prototype #1
  - Platform chosen and data loaded and basic visualizations created
  - Test glyphs and dimensions established for testing. Spotting trends and deciding which dimensions work the best for our project.

- 4/4 Prototype #2
  - Final glyphs/colors and dimensions established.
  - Testing basic interactivity, seeing what works and what doesn't.

- 4/11 Present Prototype 2
  - First public offering of the dataset. Invitation of critique from fellow coursemates and other stakeholders.

- 4/18 Project near complete
  - Planning final presentation.
  - Determining which equipment is needed
  - Make any final changes to project before code freeze.

- 5/4 Final Demonstration
  - Final presentation to stakeholders and fellow coursemates.

DEFINING SUCCESS

It would be tremendous to create a software product that is able to be deployed in the Bell Museum for public use, but this is not the only way that we can define success for this project.

For the visualization to be complete in our eyes, we want the users to be able to pan and zoom over map to see the data, and select from several data layer options.

Demonstrable utility for the use cases of 1. attracting prospective residents and investors, as well as 2. helping planners set well-informed policy as pertains to urban renewal, development, and community policing.

A bonus would be to implement the ability to summon pop-ups on specific properties, and animate the map over time.

CONCLUSION AND OUTLOOK

Our biggest concern at this point is the fact that our project lacks some focus. We are aware of this and are working to narrow and focus our mission with respect to this project. We believe that we can synergize all of the elements in this product to build a cohesive story that people will find at least interesting and useful.

REFERENCES

[1] Approved Building Permits - St. Paul Open Data Portal. Jan 2019.

[2] Vacant Building Permits - St. Paul Open Data Portal. March 2019.