New Carrollton Data Dashboard (Phase II)

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Abstract
The City of New Carrollton needed an improved data dashboard to increase public transparency and support open governance. Building on Phase I, which focused on police response data, Phase II aimed to expand the dashboard by including data from additional departments and improving its usability. Deliverables included a new Tableau dashboard, updated visualizations, and a detailed user manual. Due to time constraints, ADA compliance was not fully implemented, but the project prioritized clear, interactive, and easy-to-use dashboards. Key stakeholders for the project were Andrew Facey and Mayor Katrina Dodro. The overall goal was to provide a reliable tool for visualizing city data, improving public engagement, and supporting decision-making.

Methods

To fulfill our project requirements and goals, we followed a very strict schedule. Starting every week, we would outline what needed to get done for the semester, which for the most part either included working on Sprints, Updating our Jira board, or reaching out to meet with the client. For the majority of the semester, when we did not have the data we were promised, when we went to our meetings with our TA, we tried to brainstorm alternate methods. This ranged from looking online for public data information, trying to make a new police dashboard because we could not get the data, and more. When first getting the requirements for the project, the City of New Carrollton stressed the importance of visualizing the data as they are a city that strives for complete transparency when it comes to where their money comes from and how they use the money that they get. When trying to fill out roles for the group, Anthony and Javier felt the most comfortable with Tableau and so they were designated to be the main people who worked with it.

As the Semester moved on, we were tasked with creating a new dashboard that encompassed the different departments of the city, including Public works, Financial, and code enforcement. After two weeks of asking for the data, it became abundantly clear that communication was going to be ineffective, as they were not reading out emails. Even though we had what the department wanted, we were at a standstill until we got the data, because only then could we start cleaning and visualizing it. After emailing back and forth and trying to schedule another meeting, the Mayor of the city ultimately gave us the updated police data, not originally what we were required to do. Seeing this, we had to change our scope to include police data, as this was the only data we had to work on. After getting the data, it was made clear that we needed to clean it first, as there were thousands of rows of data, some containing null values, misspelled streets, as well as

incomplete reports. Javier took it upon himself to use OpenRefine to clean the data, as it gave us a better look at what the raw data looked like.

After About two months of the cycle of asking for the data we were promised, trying to schedule a meeting to discuss it, and ultimately making little progress, in late November we were able to get a meeting with them, there they gave us the rest of the data we needed, excluding financial which we ultimately got. After that meeting, we discussed with them updated project requirements, Mr. Facey also added that we needed a User Documentation Manual on how we create the visualizations, as for the future when they get more information they want to be able to update it and create more visualizations, without having to rely on students to do so, trying to streamline the process and take out the middle man. As the meeting concluded, he then Re-highlighted the goals set for us this semester, to create a working dashboard that anyone could navigate and manipulate to look at relevant information, which we ended up doing.

Process:

1. **Data Collection:** Data were gathered from the Police Department, Code Enforcement, and Public Works.
2. **Data Cleaning:** Utilized OpenRefine to clean and standardize datasets.
3. **Dashboard Development:** Designed a new dashboard using Tableau to replace the previous iteration.
4. **Stakeholder Engagement:** Incorporated feedback from city officials to refine visualizations.
5. **Documentation:** Created a comprehensive user manual and project report.

Challenges and Solutions:

- **Time Management:** Used Agile tools to streamline task coordination and meet deadlines.
- **Data Complexity:** Addressed inconsistencies and format issues with cleaning tools.
- **Resource Allocation:** Leveraged team collaboration to optimize efficiency.

Deliverables

1. **Tableau Dashboard:** An upgraded, interactive dashboard accessible at the provided URL. This Tableau includes the options to manipulate the data itself, making it able to filter data based on months, types of incidents you want to see,

heat maps of areas where crime happens the most, and even where the manholes/drain holes are in the city. It is a way for the residents of New Carrollton to see what is going on with their city and what is a top priority to the city.

2. **Visualizations:** Enhanced graphs and maps, including:
    - Incident types by month for Police Response.
    - Counts of inspection types and maintenance for Public Works.
    - Permits and licenses for Code Enforcement.
3. **User Documentation:** This is a manual, that goes step by step on the process of what we did, from first starting with the raw data, to how we cleaned it with OpenRefine, to how we navigated through the internet to get to Tableau Public, to how we log into the system as New Carrollton and create visualizations based on what data we have and what we want to see. We also added different parts based on what types of graphs you want to use, as sometimes using pie charts is more effective than using a bar graph and vice versa.
4. **Project Report:** Comprehensive documentation of project steps and findings.

Rationale: These deliverables align with the project's goals of enhancing transparency and accessibility. They provide stakeholders with actionable insights and ensure maintainability for future updates.

Recommendations

1. **Data Integration:** Future dashboards should incorporate datasets from additional departments, such as Finance, to provide a broader analytical scope.
2. **Platform Transition:** Consider moving from Tableau to a more customizable platform for better scalability.
3. **Web Embedding:** Embed dashboard visualizations directly into the City's website to increase accessibility.
4. **Enhanced ADA Compliance:** Allocate resources to revisit ADA compliance features.

Conclusions

In conclusion, this project successfully delivered an updated data dashboard that effectively supports the City of New Carrollton's objectives of transparency and

community engagement. Despite facing some constraints that limited the scope, we have established a strong foundation for future enhancements and improvements. Mayor Dodro expressed her enthusiasm for continued collaboration with UMD iConsultancy and inquired whether the next team of students could seamlessly build upon the progress we've made.

Looking ahead, one key challenge will be presenting this dashboard to City residents who may not be familiar with tools like Tableau or data visualization in general. To ensure broader understanding and engagement, it will be important to simplify the presentation and provide clear, accessible explanations of the data, possibly through guided tutorials or visual aids. Emphasizing the practical benefits, such as how the dashboard reflects key city metrics and supports informed decision-making, will be essential in ensuring the community fully embraces this valuable resource.

Deliverables

- Tableau Dashboard: View Dashboard

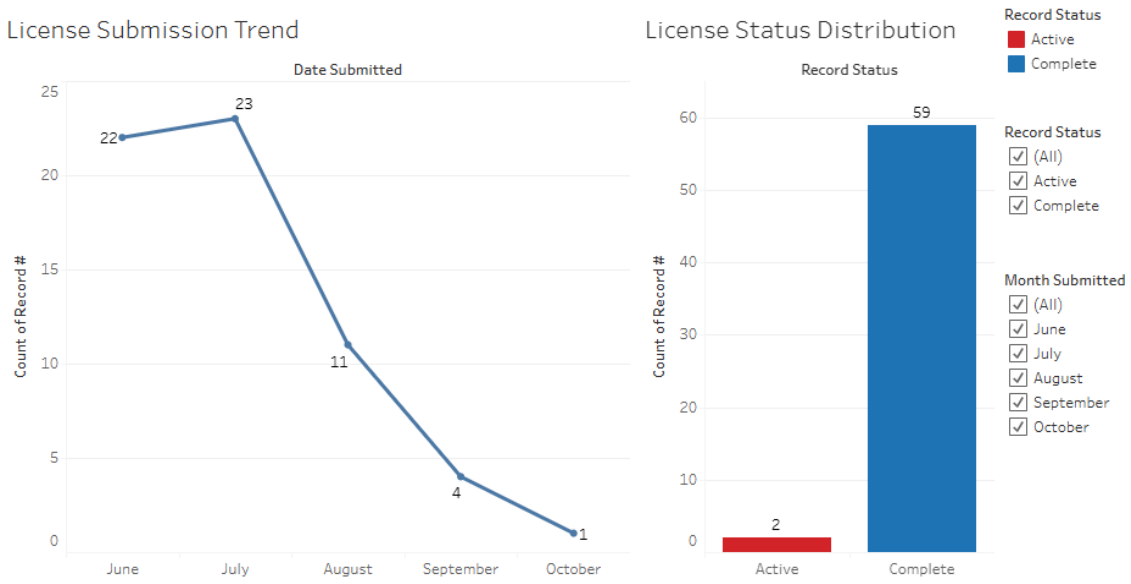


Figure 1. Line Chart / Bar Chart of Monthly Business License Submissions

A Bar / Line graph that illustrates monthly trends with business license submissions, as well as a record of if they are complete or active. You can see as well that you can manipulate months to your liking.

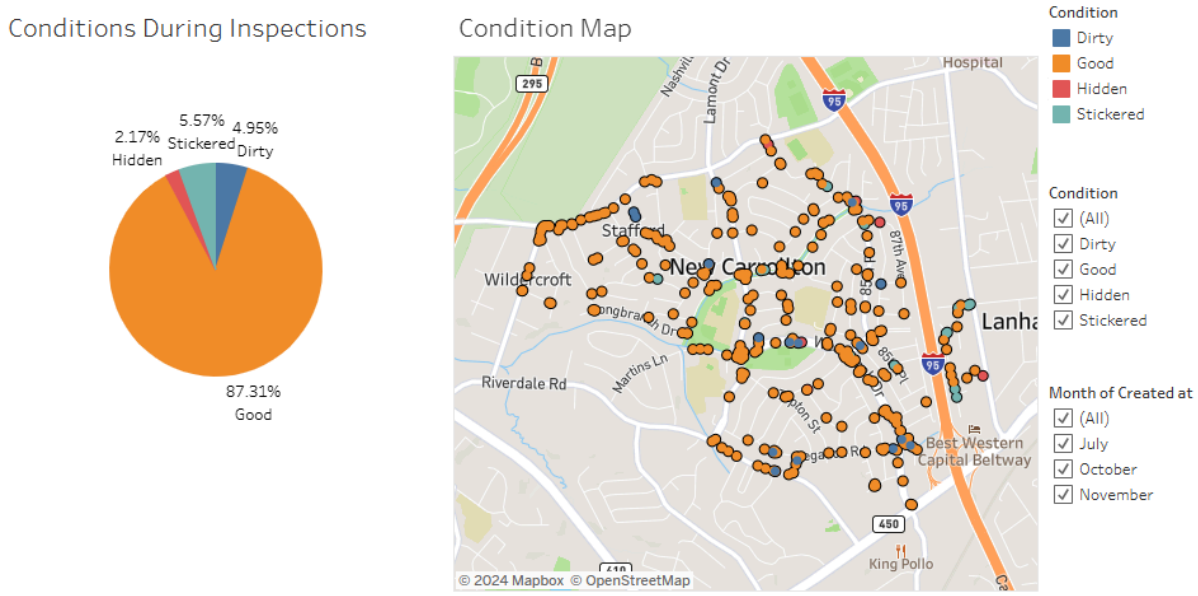


Figure 2. Geographical Map of Condition Inspections

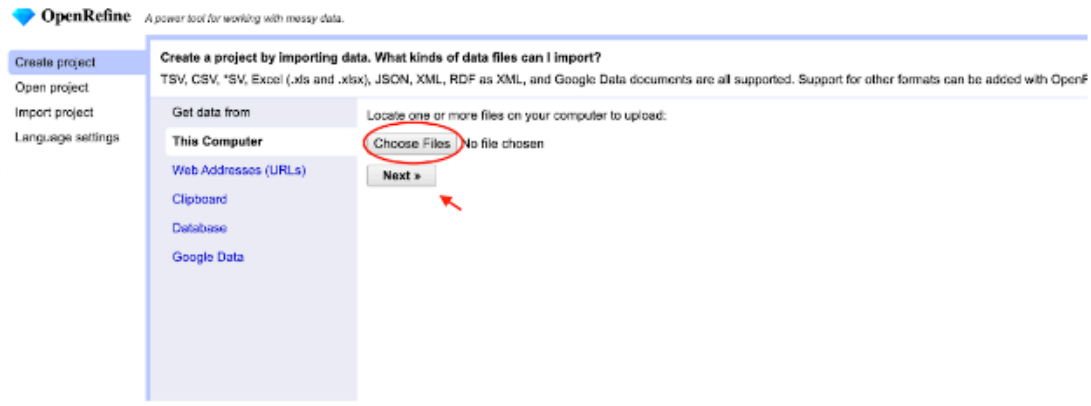
This Pie Chart/Geographical map shows the distribution of conditions during inspection and where they are, as most of them end up in good condition with a few outliers.

- Project Demonstration: Access Project Demonstration Video

- User Manual: Access User Manual

We used **OpenRefine** for this process.

1. **Download and Open OpenRefine:**
    a. Open OpenRefine and it should open in your Web Browser
2. **Create a project:**
    a. Upload the dataset file that you want to clean and click **Next**



    b. Make sure the data is showing clearly in the table
        i. If there are issues, you can change the 'Columns are separated by'
            1. *This works by separating the columns by different options such as commas, tabs, or custom option*
    c. Click Create Project in the Top Right corner
3. **Clean the data:**

Figure 3. Product User Manual Picture

This is an example of our User Documentation Manual, as it has vivid descriptions of what to do step by step, as well as pictures illustrating what click.

1. **Start Building Visualizations:**
    a. Drag and drop fields from the Data Pane into the Rows and Columns shelves to create charts.
    b. Use the "Show Me" panel (top-right) to choose chart types, such as bar charts, line graphs, or maps.

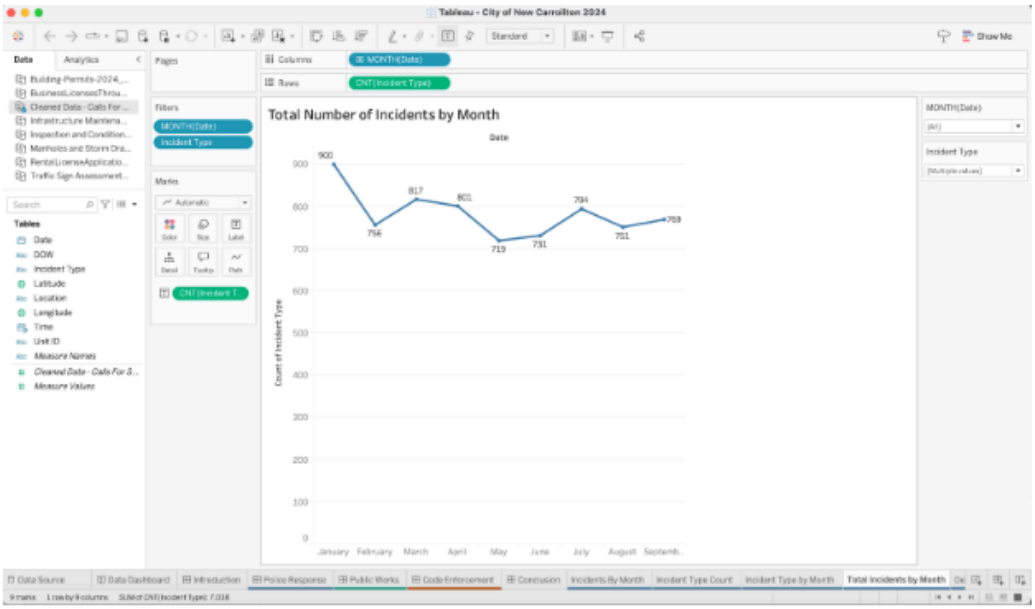


Figure 4. Building a Visualization in Tableau

Our User manual also goes in-depth on how to create visuals, as oftentimes people are not familiar with tableau and need a guide.

- Project Report: Available upon request.

Attachments: All files, including the user manual and backup datasets, have been uploaded to a shared Google Drive folder.