

DATA DASHBOARD

Interaction Design Studio 1

November 7, 2021

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OVERVIEW

Data-driven displays are rich playgrounds for presenting statistics and other information through digestible, engaging design. Workers in many contexts heavily rely on data dashboards to complete analytical and practical tasks—consequently, a well-designed dashboard can make or break their success in doing their jobs.



Through the use of goal-based personas, rapid sketching, iterations, and diverse critique, our team designed a data dashboard for use by various roles at the scooter rideshare company Spin. This culminated in a pitch, through which we realized the impact our dashboard could have on riders, Spin employees, and rideshare critics in Pittsburgh.

The Users



Data Analyst



Policy Analyst



Mobility Advocate



Gig Worker

The Problem Statement

How might we address the needs of multiple SPIN stakeholders who depend on effective information visualization, through the design of an interactive data dashboard?

SURVEYING OUR PROBLEM SPACE

Average Scooter Count
Shadyside 80
Squirrel Hill 76

Best Route



SURVEYING OUR PROBLEM SPACE



Individual Reviews

What is the best way to approach this sea of data and problems...? To get started, we individually reviewed the personas and data provided to extract new insights, which we **jotted down on sticky notes**. Our observations ranged from the personas' personalities and their goals to the types of data they would use.

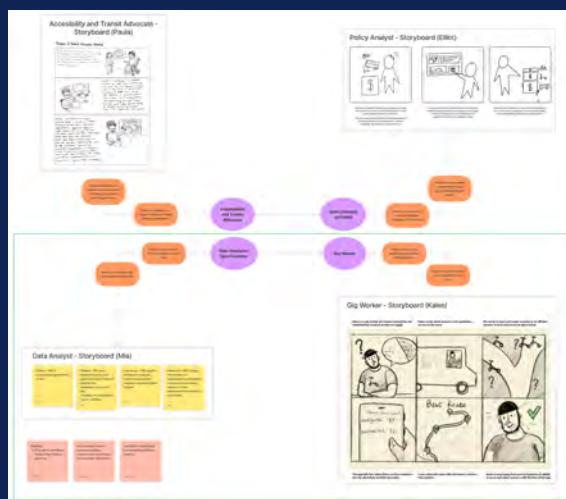
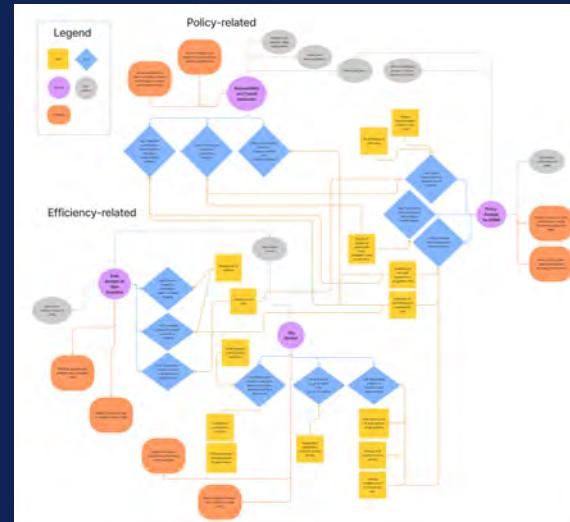
Group Analysis

As a result of this diversity, we decided to group our notes with a **content-centric approach**. This enabled us to uncover themes such as allocation, location, and density of scooter usage; timing and efficiency; scooter as an accessible means of transport, and the employees and policy influencers that have a stake in Spin. We also recognized overlaps in personas and grouped them into **two categories**; the data analyst and gig worker focusing on **efficiency**, and the policy analyst and accessibility advocate focusing on **policy**.

Modeling Our Ideas

The current state model aims to identify each persona's **problems and desires**. Based on the affinity diagram, we split the model into two parts - efficiency and policy-related, in order to explore the relationships between the two groups of overlapping personas and as well as between the two groups.

In general, the efficiency group focused on visualizing **quantitative data with speed**, while the policy group focused on visualizing **qualitative data with precision**. Despite the differences, we also realized how interconnected these seemingly disparate personas are, evident by the fact that **traffic patterns and scooter usage information are needed to satisfy most goals**. This model allowed us to think about essential information needed for the dashboard, as well as narrow down personas for the final model.



The future state model aims to identify potential solutions to help each persona realize their needs. We recognized that isolating each persona would help us to develop a more comprehensive dashboard satisfying all of their needs. Therefore, we made a storyboard for each persona that aims to uncover their main problem and devise a potential solution.

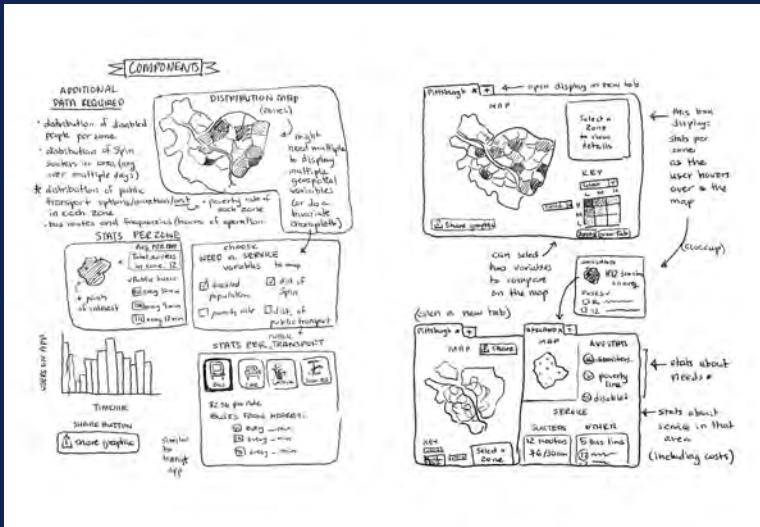
In our storyboards (in which the endings reflect each personas' desired future state), **Mia accurately visualized data**, **Kalen quickly found scooter routes**, **Elliot retrieved digestible information from complex data**, and **Paula saw broad insights covering all aspects of scooter usage**. We found that this model provided us with an in-depth understanding of each persona's needs which assisted us in creating our individual sketches.

SURVEYING OUR PROBLEM SPACE

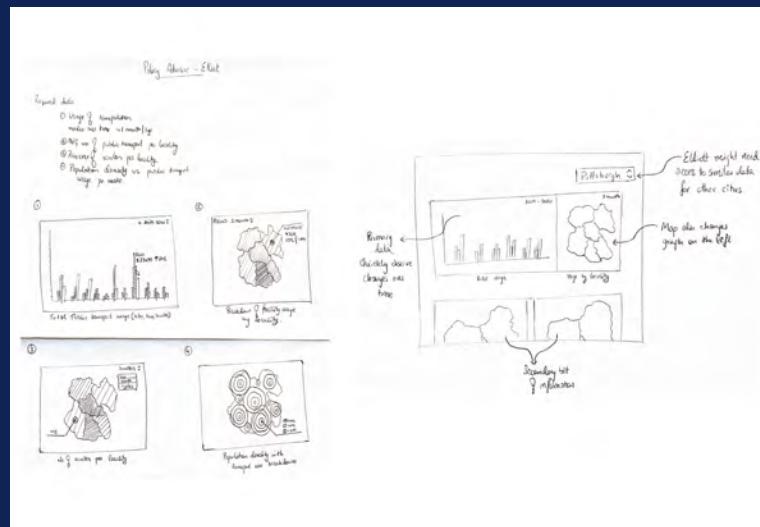
Building on the future state model, each of us sketched one dashboard design for **one persona**, then synthesized our ideas to prepare for the next iteration and decide on the final two personas.

Policy-Related Sketches

Accessibility and Transit Advocate



Policy Analyst

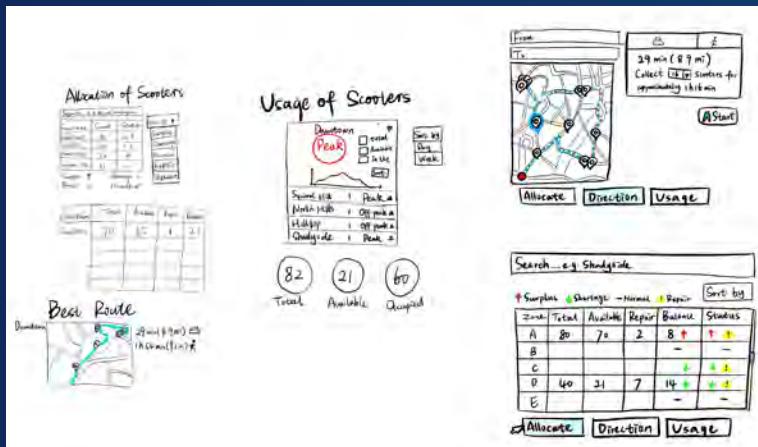


Martina's design focused on geospatial variables related together on an interactive map, for use by the **Accessibility and Transit Advocate persona**. During critique, others appreciated the balanced mixture of text to graphical elements, as well as the smooth progressive disclosure of the hover zones on the map.

Mahit's design focused on comparing scooter usage with geographic zones and other modes of transport in the area, for use by the **Policy Analyst persona**. During critique, others found the tool tip feature helpful for achieving progressive disclosure, and shadings helpful for indicating small differences.

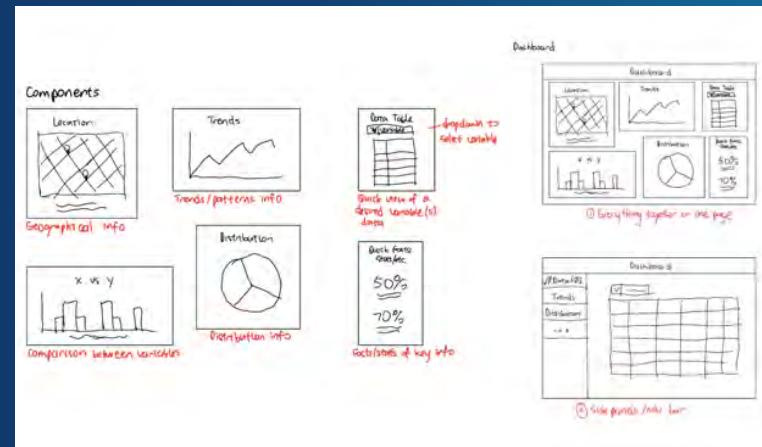
Efficiency-Related Sketches

Gig Worker



Heying's design focused on showing peak trends for scooter usage and employing a route planner, for use by the **Gig Worker persona**. Others found that the variety of numbers, symbols, and colors combined well and provided good signals.

Data Analyst

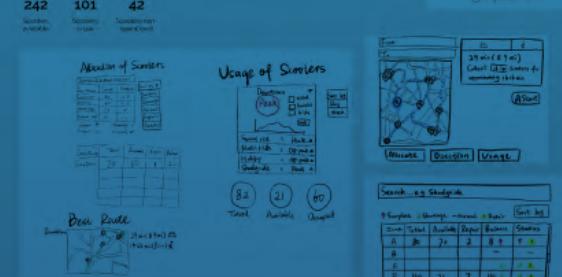
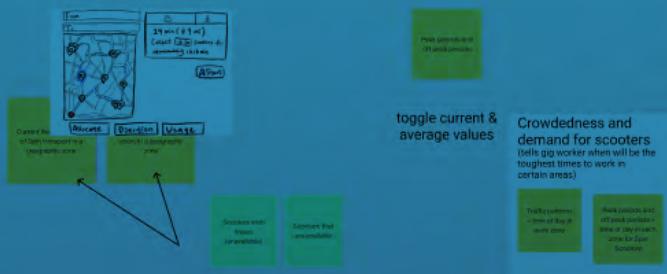


Sally's design focused on possible charts and their arrangements within two configurations, for use by the **Data Analyst persona**. Others perceived the mixed type of graphs as helpful for enhance the user's understandings of the data.

Together, we noticed some commonalities amongs our sketches such as map components showing zones, routes, and distribution information, as well as graphs showing scooter usage information. We also **found wide disparities** in terms of our **dashboard layouts and interactivity features**. Together, these served as a good starting point for us to explore possible directions for the next iteration.

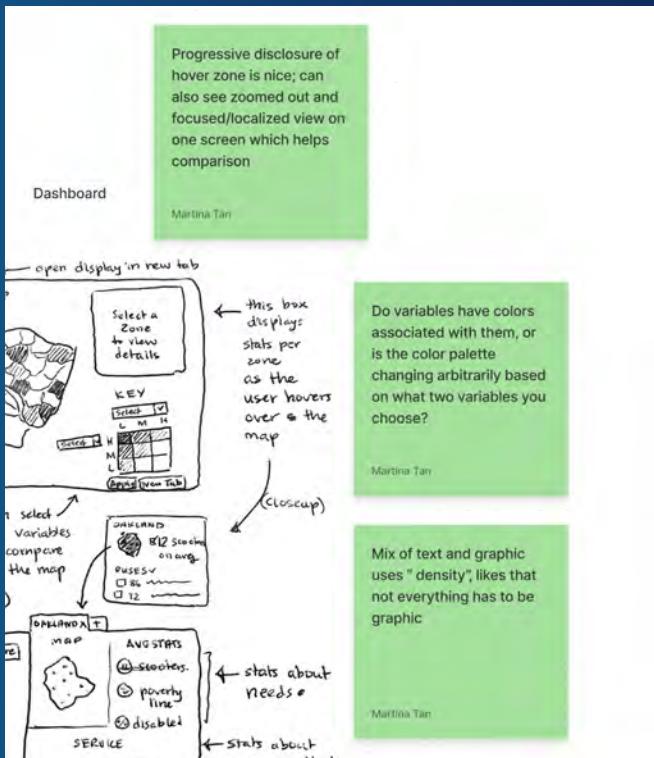
MAPPING IDEAS TO INTERFACE

Lo-Fi Sketch (Data Analyst view)



MAPPING IDEAS TO INTERFACE

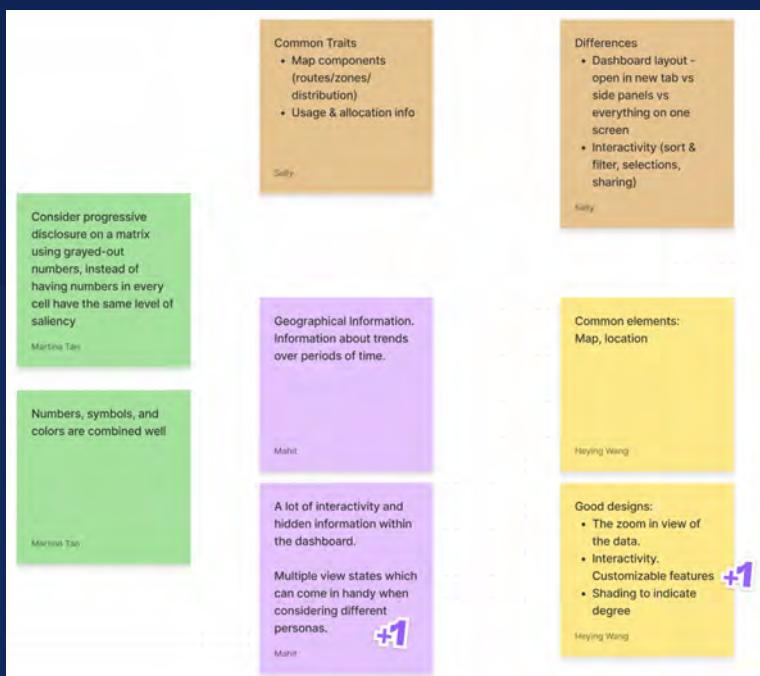
Critique and Debrief



We met to debrief on the critique of our hand-drawn sketches from class, and compiled comments about each others' work on sticky notes. We tried to avoid sticking to our own designs and **paid attention to what classmates did** to meet the same user needs. This pool of information guided our upcoming collaboration on the dashboard.

For example, when it comes to interactivity, we saw interesting uses of sort and filter, checkboxes, toggle switches, and drop-down lists, which **opened our eyes to more design possibilities** and allowed us to choose what suited our personas best.

Despite the fact that we took different approaches to the visuals and contents, **we reached consensus** on the progressive disclosure of the map and real-time data, tool tips that appear on hover, and the integration of colors, texts, and symbols.



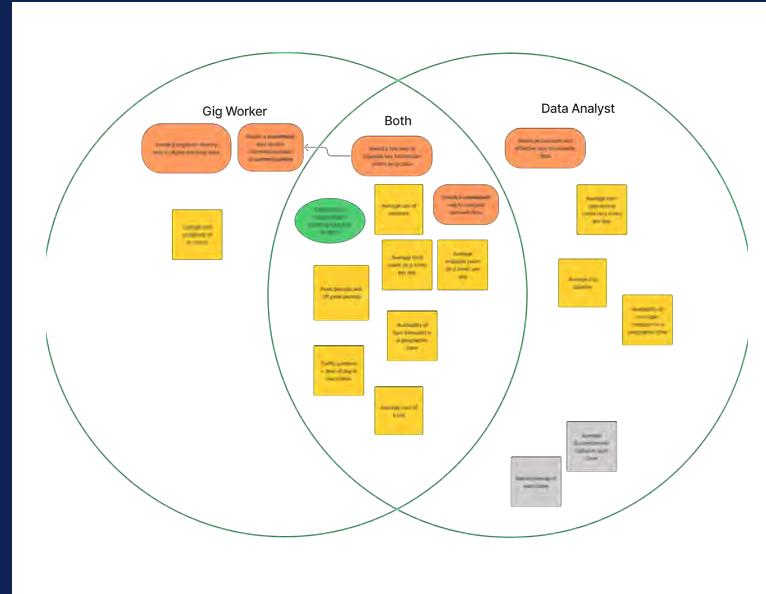
Narrowing Our Scope

In this iteration, we started out by defining our target personas. In order to narrow down the problem scope from the efficiency-related and policy-related persona pairings we previously identified, we had to **choose one of the two pairs** to focus on. We aimed to create a cohesive dashboard experience to serve the goals of both personas.

After weighing pros and cons of tackling each pairing, **we chose to go the efficiency-related route**—designing for the data analyst and gig worker—because the common goals between them were more evident to us. We then proceeded to generate the dashboard screens as a team.

Building a dashboard from scratch seemed overwhelming at first. While we benefited from each team member's wisdom, bringing in everyone's ideas resulted in a busy, disorganized collection of graphical elements. It was difficult to begin prototyping, because **we each had different entry points into the design**. Therefore, during brainstorm, we first had to ask: **“What data, graphs, visuals do we need to include?”**

We answered this question by creating a Venn diagram which captured the information that both data analysts and gig workers would want to see, such as average scooter counts and peak hours.



As shown on the next two pages, we wireframed by content, using text annotations to a placeholders for charts and gray boxes to represent the layout of widgets. This quick and dirty technique helped us avoid getting lost in aesthetic details and focus on the big picture of what we needed on our dashboard. After creating this visual hierarchy, we drew inferences from our hand-drawn sketch components to draft the appearance of our widgets. This culminated in two screens that fit our two personas.

In retrospect, **we relied heavily on earlier insights** from our individual hand sketches and our state models to reach a consensus about our design.

MAPPING IDEAS TO INTERFACE

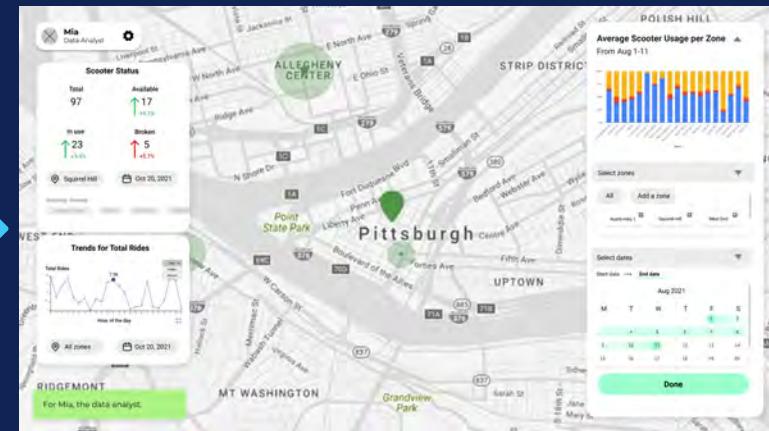
From Content to Widgets to Dashboard



Content



Widgets



Dashboard

For Mia, the data analyst

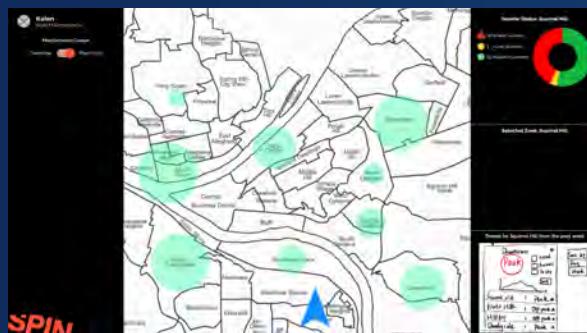
- Scooter status:** Mia can see the scooter status in any particular zone and how that is different from yesterday.
- Average scooter usage per zone:** Mia can use aggregate data across zones to determine areas in need for the company to address.
- Trends for total rides:** Mia can identify trends for total rides during a specified period of time, toggling the filter of day, week, and month.

MAPPING IDEAS TO INTERFACE

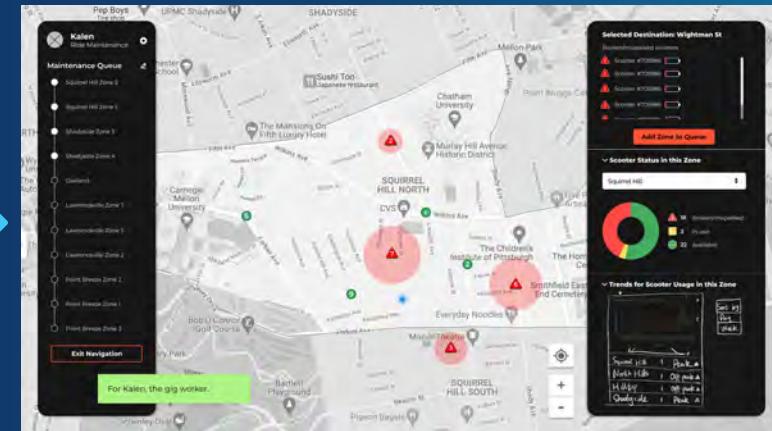
From Content to Widgets to Dashboard



Content



Widgets



Dashboard

For Kalen, the gig worker

- **Maintenance queue:** Kalen can see a full route in order of stops and what to do at each stop.
- **Map view:** Kalen can pinch in and out, tap and drag within the map, or select a zone and view a tool tip.
- **Real-time stats for current map:** Kalen can view the scooter information about the entire city, a specific zone, a selected scooter hub, or any individual scooter.

Tren... Past Tren... Past Tren... Past Tren... Past Tren...

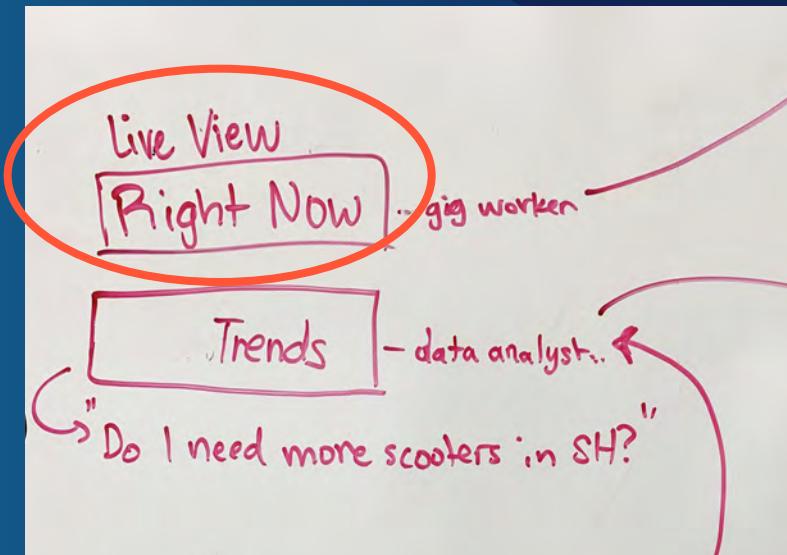
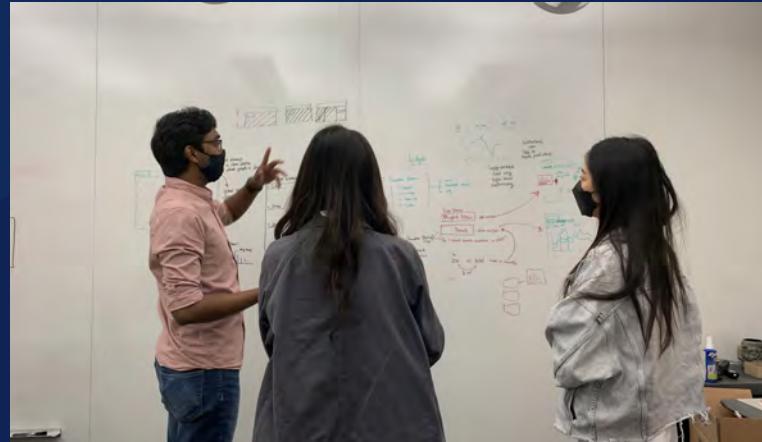


SETTING DATA INTO MOTION

SETTING DATA IN MOTION

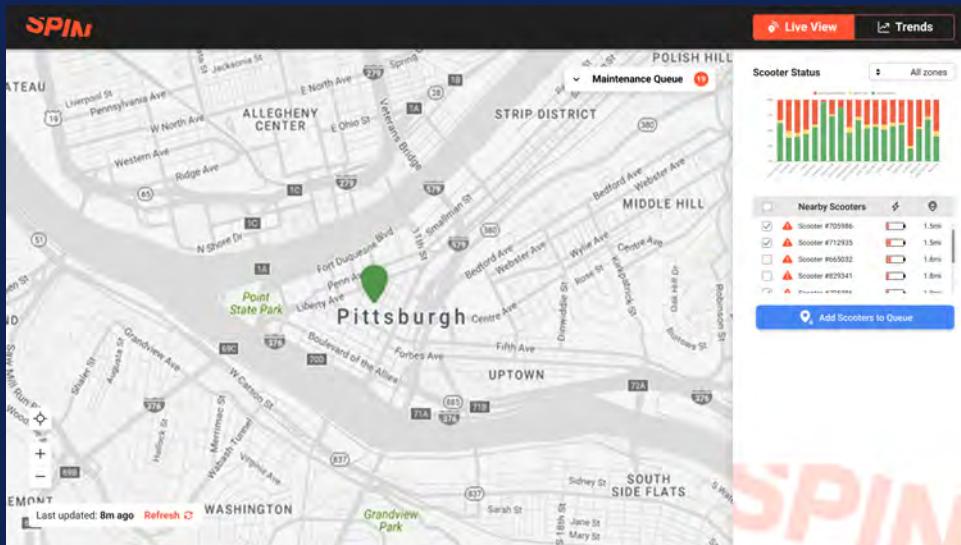
Critique and Debrief

We had our first in-person meeting to go over the critical feedback from the critique on iteration 2 and discuss what motions to incorporate in iteration 3. The main takeaway from the critique was that we needed to create **one dashboard that would be used by both personas** instead of changing the interface altogether based on which persona was logged in. The two screens we had for our first mid-fidelity prototype, while each successfully meeting the needs of one persona, were **vastly disconnected from each other** in terms of layout, content, and style.



Whiteboarding helped us rethink alternative approaches to the presentation of data. Ideally we would have two views focusing on different aspects of the data, yet exist in the same space, allowing the users to toggle between the two. While the personas might stick to one view more than the other, they would be benefited from both views at a certain point.

The question was: what would be the two views? We reassessed the data presented to each persona and tried to **recognize patterns** that would make our visual and conceptual designs more cohesive. We realized that most information the gig workers focused on fell in the category of **real-time data**, while the trends that data analysts cared about were mostly **historical data**. This realization essentially helped us come up with the two tabs: Live View and Trends view.

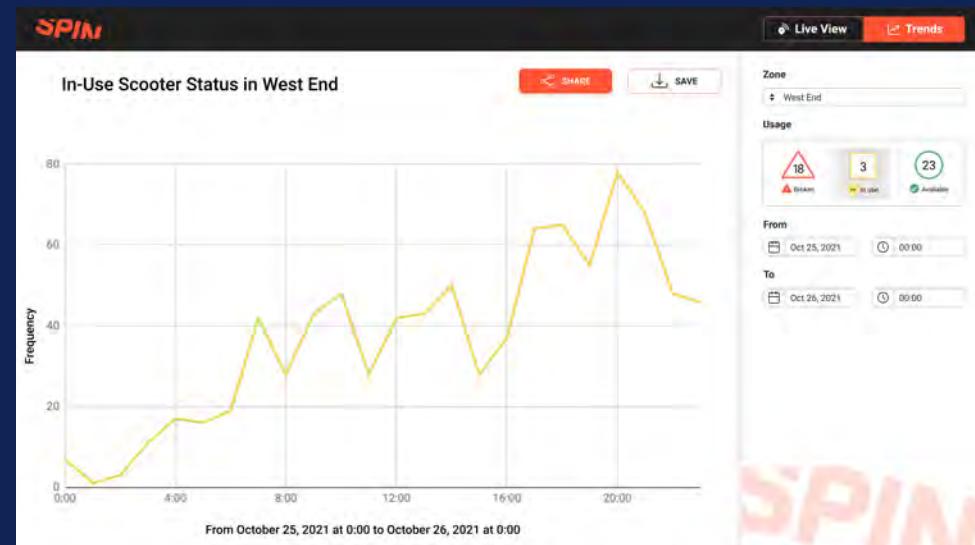


Live View

- **Interactive map with zoom/pan tools:** The map shows pins to represent the scooters or zones that are in focus on the sidebar.
- **Sidebar widget (Scooter status):** Helps users examine Scooter Usage across All Zones, individual Neighborhoods, or a custom-drawn area created by the user.
- **Collapsible maintenance queue widget:** Shows an ordered list of destinations, which the user can re-order or delete.

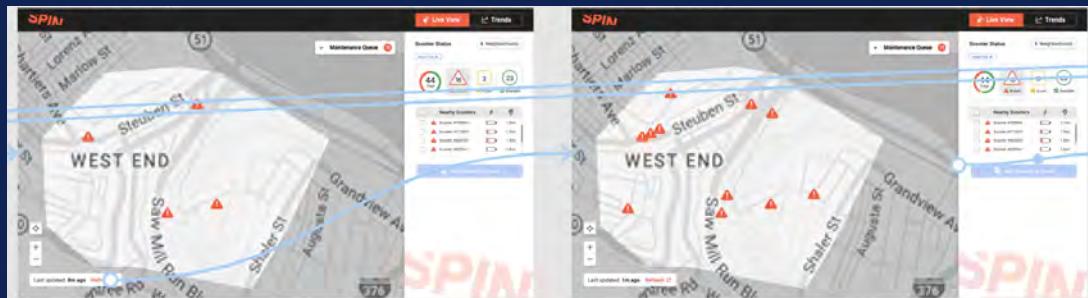
Trends View

- **Interactive line chart:** The users can view, for any selected zone, three categories of scooter status, each of which can be toggled on and off. They can also select the desired date and time range for the line charts to span across.
- **Tool-tip:** Hovering over a point in the line chart reveals the detailed time and date of the data point, as well as the exact value of each line at that point.



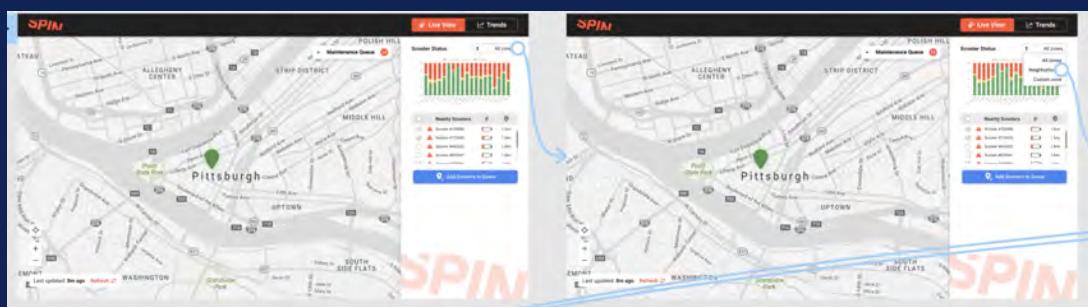
After improving our design based on the feedback, we proceeded to make our dashboard come alive for the users. The question was: **What motions do we want to incorporate and how they can add depth to the design?** Through group discussions, we animated the following features that we believed to best enhance the user experience.

Setting the Live View in Motion:



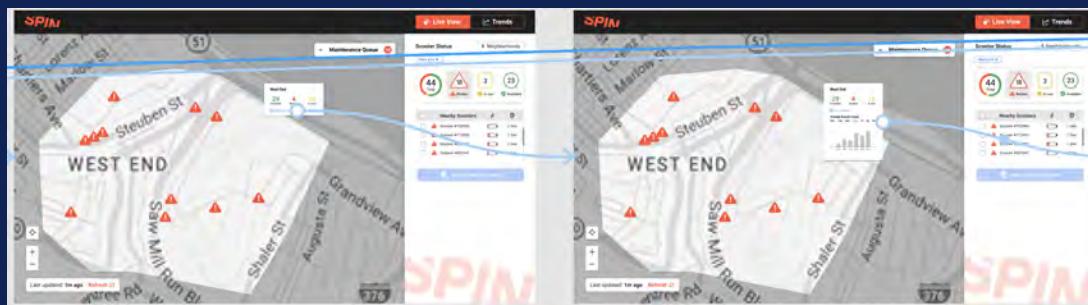
Map Zoom:

Zooming in or out changes the view on the map correspondingly, which confirms the users' action. The clouds of scooters change into icons of individual scooters as the users zoom in.



Widgets:

Clicking the “All zones” box reveals the drop-down list, which provides a visual feedback and hints what will happen on the map when the user selects an option from the list.



Tool-tip:

Hovering over a region appears the tool-tip, which brings a new visual stimuli onto the screen. The motion of the tool-tip puts emphasis on the details about the scooter status and peak hours in that region.

Setting the Trend View in Motion:

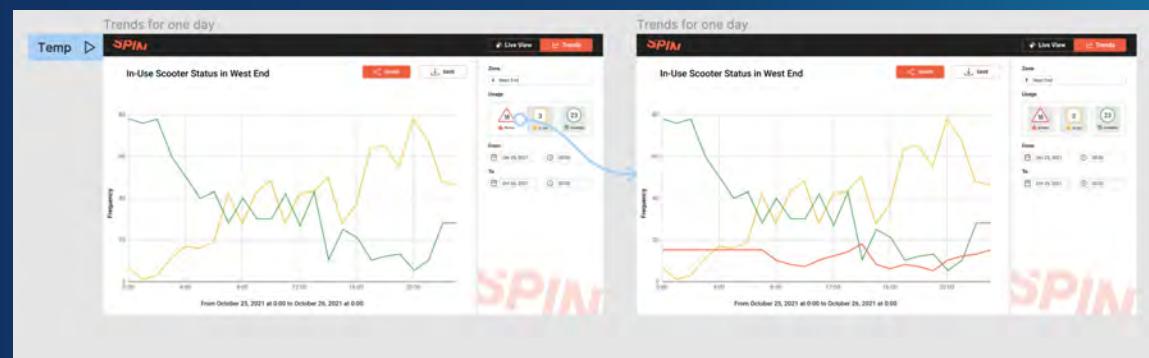


Tool-tip

The tool-tip is attached to each data point on the trend line. The motion of the tool-tip helps to draw the users' attention to the detailed time and date of the data point. The information displayed on the tool-tip further explains the graph and doesn't contain anything that's necessary for completing tasks, which makes it reasonable to **only appear when triggered by the user.**

Trend Filters

The drop-down list of the zones, the toggle of scooter status, and the time filter together provide users with the **freedom to make comparisons** and dig into certain aspects of data.



As the users make a selection in the filters, the line graph will change accordingly to confirm the users' choice. The interface will redraw the entire graph when the users choose another zone,

indicating a **drastic change in state**. When changes take place in scooter status or dates/time, the motions are more mild, indicating minor manipulations.

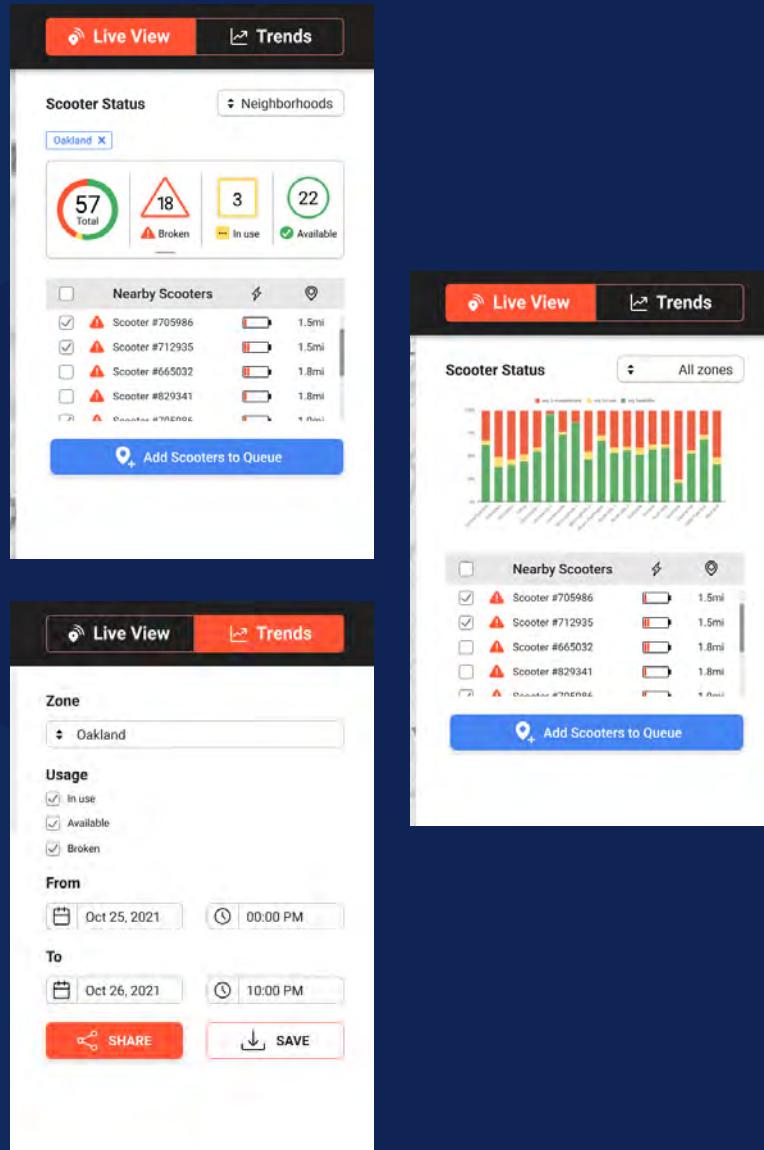
FINE-TUNING CONTROL

FINE-TUNING CONTROL

Critique...

Our design so far was the most detailed iteration of the data-driven dashboard yet. However, there were still a few issues that were highlighted during our critique and feedback session which needed addressing.

- Showing all the scooters in a **particular region** according to their statuses was appreciated. Additional functionality can be added to enable users to **quickly filter** through the different states, with appropriate visual treatment.
- The graph used to show and compare different scooters across all region in Pittsburgh was **congested and illegible**, because of its small text sizes that left very little breathing room. Instead, we could consider a **horizontal stacked chart**.
- The use of different shapes and colors for the three scooter statuses was appreciated. We could consider using that notion **across the dashboard** instead of just in one place.
- When different scooters are selected to add to the queue, there needed to be some sort of **visual feedback** on the map along with the table itself.
- The line graph animation was **startling** and needed to be mellowed down to be more palatable.

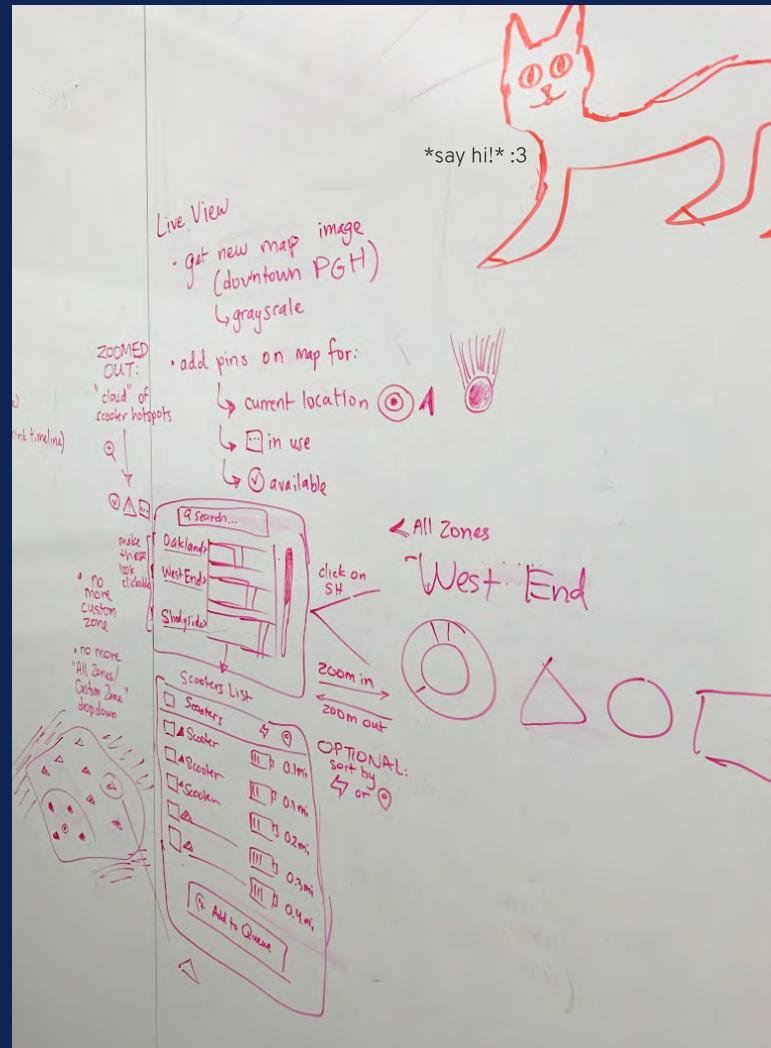


...and Debrief

Taking into consideration all the feedback and critique received, we went back to the drawing board to reimagine the dashboard.

We realized the importance of **maintaining consistency across our two tabs** for clarity, especially in terms of icons, colors, and word choices. Although our animations successfully provided users with clear feedback, their large and active scale might have overwhelmed the users and served as an inaccurate reflection of the scale of changes on the graph. On the Live View tab, there was a lack of feedback on the map and on the side widget when users selected certain scooters.

Therefore, for this iteration, we refined our Dashboard with **focuses on consistency, clear visual feedback, clean layouts, and appropriate motion**. We strived to show more differentiation on the map and side widget to remind users of scooters experiment with different animations in response to aggressiveness in changes (e.g. growing for changing zones, morph for changing times, fade for changing usage).

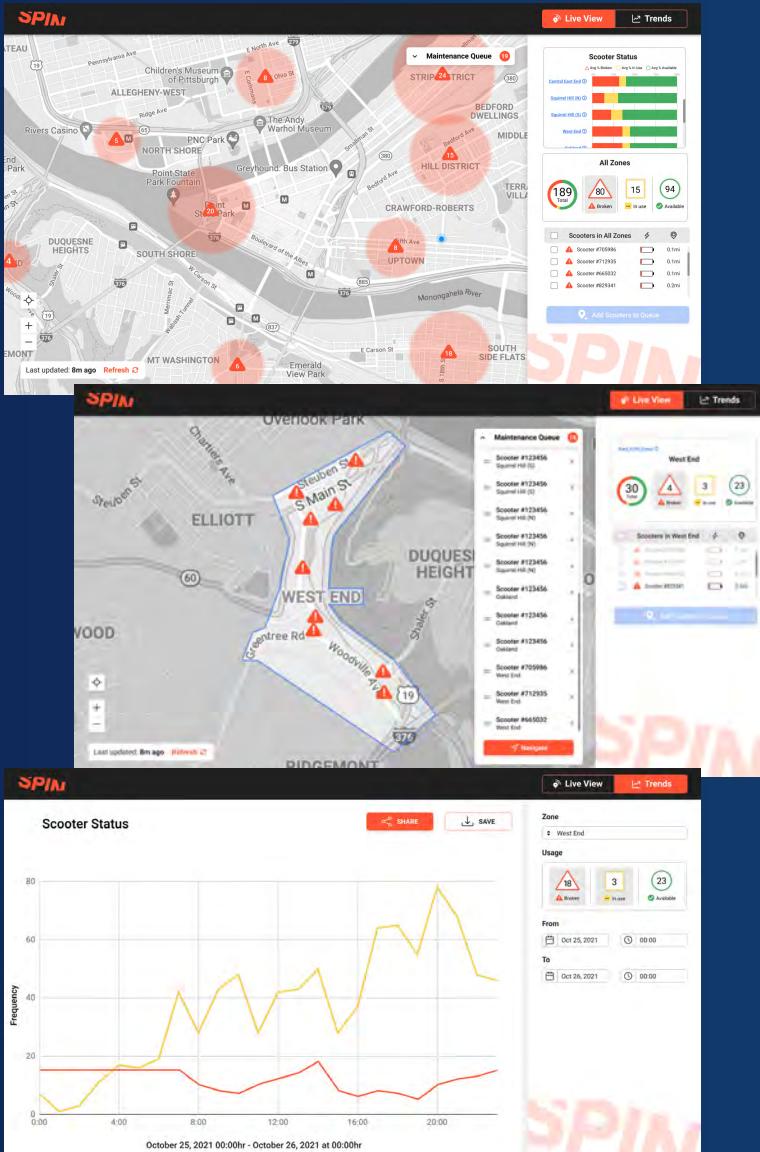


Rehashing Animations

Iteration 4 was all about consistency. We streamlined the different icons and color schemes used. Along with this, we highlighted components on screen that can be reused across the dashboard. An example of this is the use of the same scooter status widget across both the Live and Trends view, and even the tool tips use the same iconography and layout.

On the animation front, the line graph on the trends view was redone from the ground up. The motion style now differs for different types of filters; the “line redrawing” animation is now used solely when the zone is changed. When the user toggles through the different scooter statuses, lines emerge from the bottom, depicting the addition and removal of filters. We hoped that this would not only mitigate the somewhat “startling” movements from the last iteration, but also more accurately reflect the data changes on the line graph.

The Share and Save options on the Trends view were highlighted as important features and we needed to detail it out. Due to time constraints, we tackled this after submitting Iteration 4.



P2

- animated slide effects
- FAQs
- alignment on Figma prototype
- practice (tomorrow :))
↳ print out speaker notes!!
- re-hash slide 3 vs. 18
(bookends for our story)

11/3/21

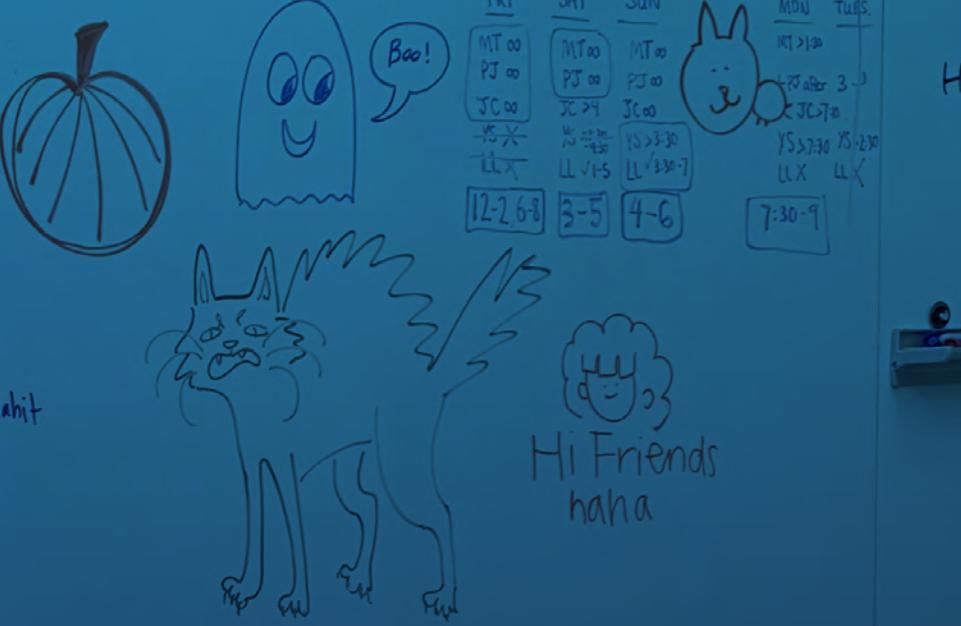
- practice/draft Q&A
- create share feature
Screens → GIF
- record demo
- make product launch vid

- Storyboard
- build animation
- record & edit w/music

Mahit

- rewrite feature set
slides
(add design princ.)
- ✓ (add emotion/urgency)

PLOTTING THE PRESENTATION

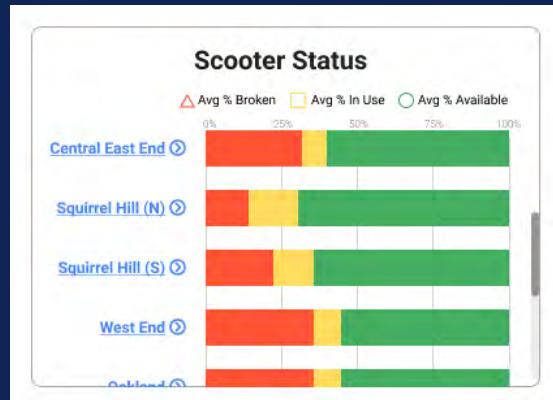
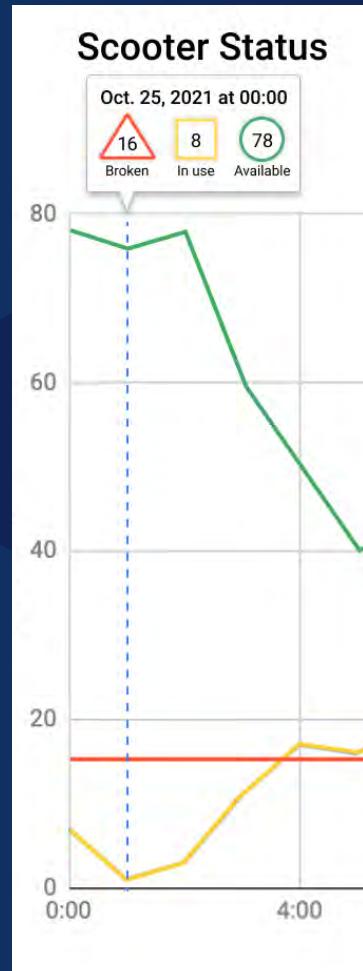


PLOTTING THE PRESENTATION

Tying Up Loose Ends

Before diving into the pitch and presentation for this project, we regrouped over the feedback and critique we received for our fourth iteration of the dashboard. Here are some of the potential next steps we would have implemented over future iterations of this dashboard.

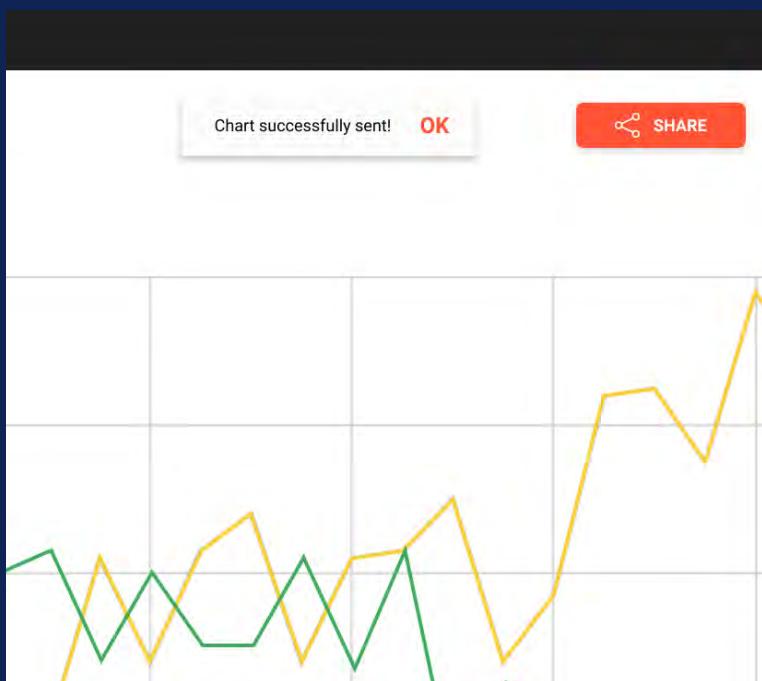
- The animations and motion used to **zoom** into the map and to **control** the graph were appreciated.
- A few pointers on the visual design of the dashboard:
 - The use of blue links for buttons seemed out of place.
 - The horizontal bars for the graph on Live View are overwhelming.
 - The share button comes across as the primary call to action.



PLOTTING THE PRESENTATION

One feature we did end up implementing is the workflow to **share historical trends** beyond the current dashboard. Multiple critique sessions highlighted the importance and value of this workflow.

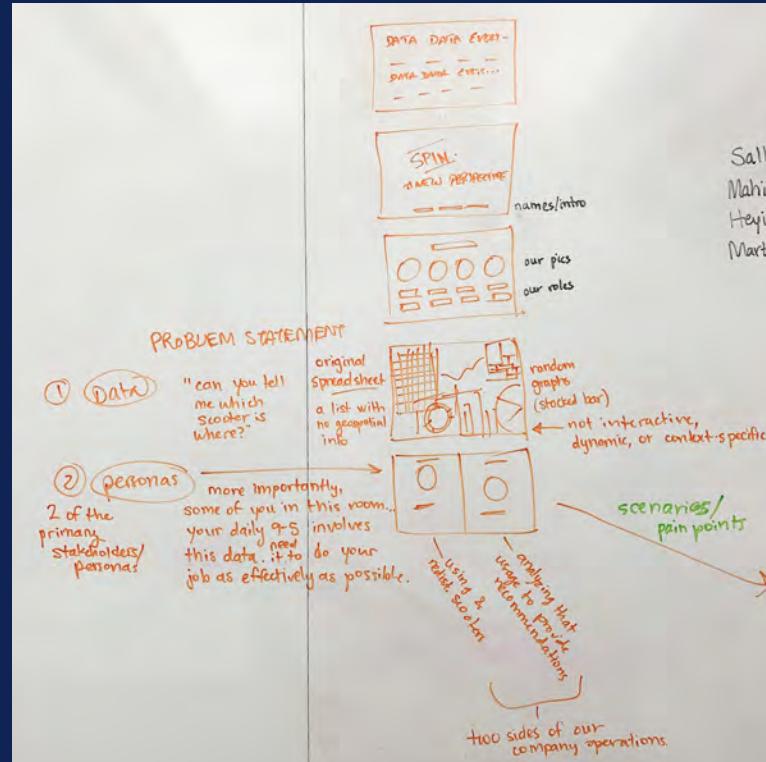
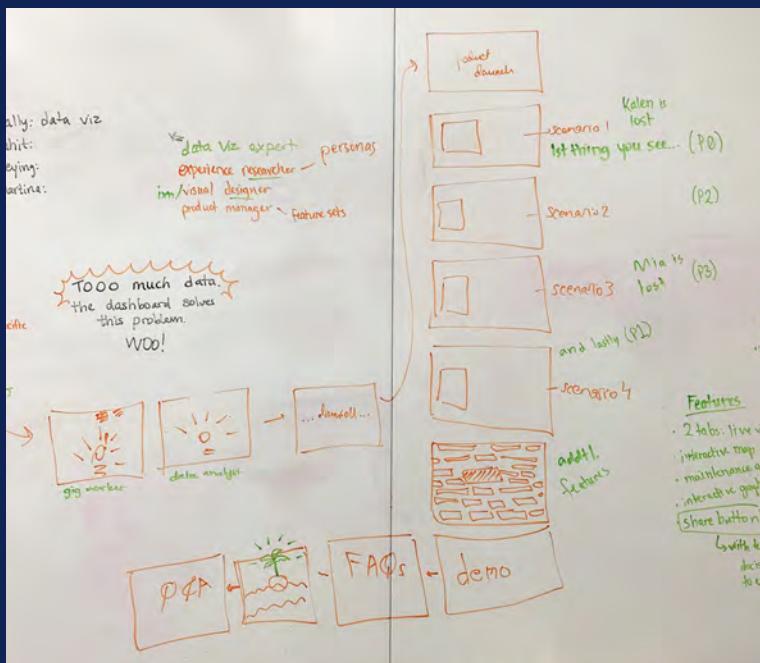
- A data analyst will now be able to quickly capture and forward graphs to an intended recipient by email.
- The user can further edit the graph to include tooltips for particular timestamps.



Drafting the Pitch Deck

We drafted our pitch and presentation with a clear goal of encouraging our direct stakeholders, Spin's gig workers and data analysts, to adopt this new dashboard. Our approach involved brainstorming and storyboarding the flow of the pitch with a “**problem → solution → benefits**” structure.

We intended to include a “**launch**” video to highlight key features of the dashboard in an engaging manner. In our script, we used scenarios to show how the dashboard benefits our stakeholders.



A peer review session with a fellow project team highlighted some glaring issues with the presentation:

- We needed to introduce context of what to expect, which could be resolved with a **Table of Contents**.
- We needed to better highlight **how the dashboard features could benefit** our personas.
- We can **reduce the amount of text** on the slides and make them more concise.
- On the bright side, they liked the color scheme!

Swinging For the Fences

Our first pitch draft got our message across fairly well. While addressing the issues pointed out during the critique, we put in time to add elements that would make the pitch more engaging.

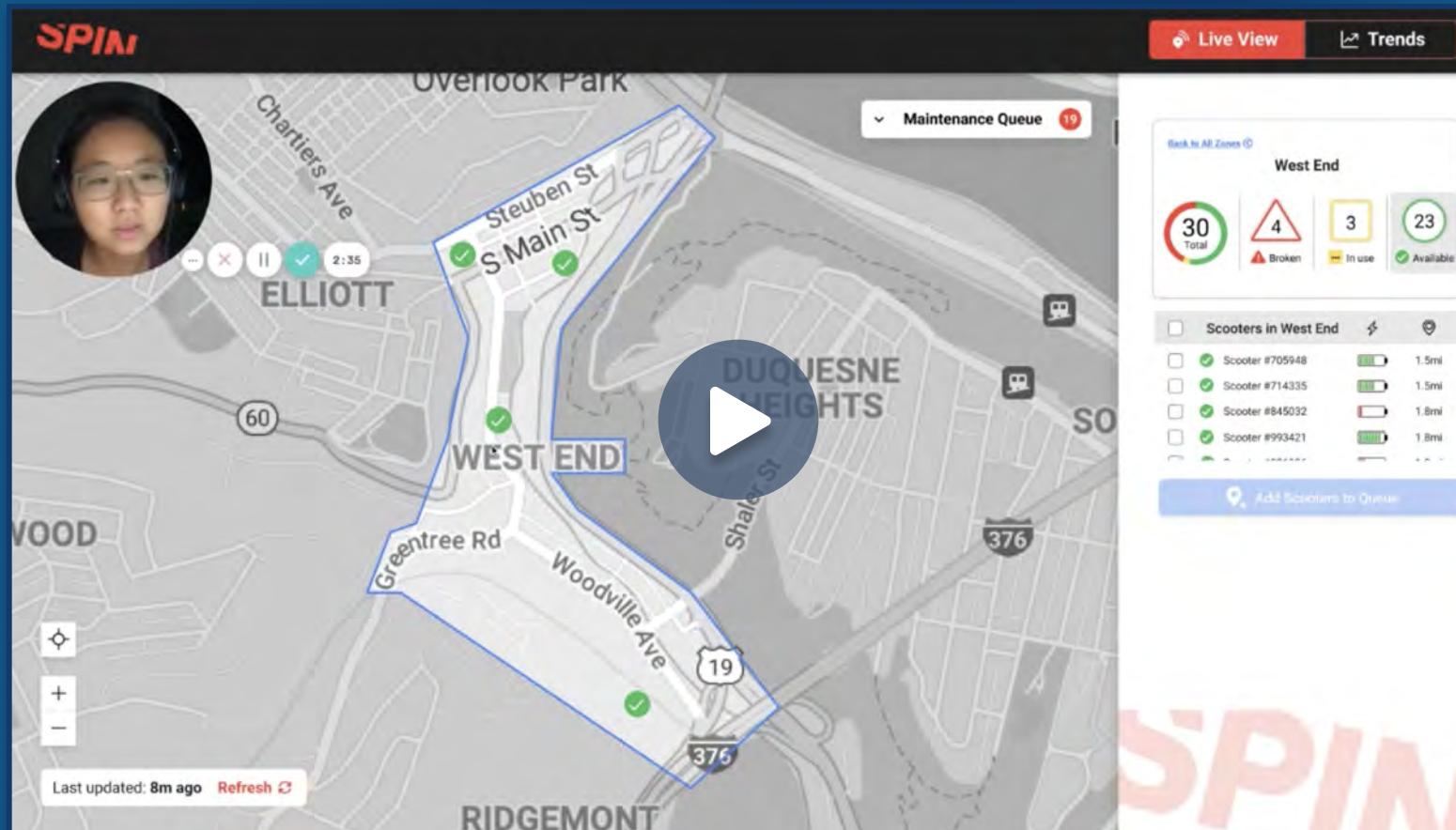
- We **rewrote the script**, which resulted in a briefer and more succinct presentation.
- We created a **40 second product launch video** with simple animations and background music. This showcases the most important features of the dashboard with the intention to generate excitement.
- Our slides progressively disclose information with the help of **slide animations** so that we can control what the viewer sees at any given point in time.

The final presentation went smoothly and was well-received by the audience.

[View the Slide Deck](#)



DASHBOARD DEMO VIDEO



[Watch the Demo on Loom](#)

[Try the Figma Prototype](#)



REFLECTION, FROM FOUR PERSPECTIVES

HEYING'S REFLECTIONS ON...



...Data-Driven Displays

While it was not my first time tackling dashboards, the project fundamentally **refreshed my beliefs** of what constitutes a good dashboard design. If my answer to that were aesthetically pleasing layouts and fancy animations, now I believed that what laid the foundation for successful data-driven displays were **digging into the data** and **thoroughly analyzing personas**. It's crucial to **avoid rushing into the design phase** when we have not yet acquired a deep understanding of the users' goals, needs, contexts, and perspectives. In the ideation and analysis phase, we started out by carefully examining the raw data and employing methods such as Venn diagrams and affinity diagrams to capture the information that our personas wanted to see. Designing a dashboard is **not dumping data at the users** but **telling them a cohesive story**.

...Preparing a Group Pitch

Group pitching pose different challenges than individual pitching as it **requires solidarity as a team**. I've learned how to ensure **smooth transitions, back each other up**, and **allocate questions to answers** during Q&A, which were things that wouldn't come up to me when pitching individually. Through combined efforts and wholehearted support from each other, we were able to give a informative, successful pitch.

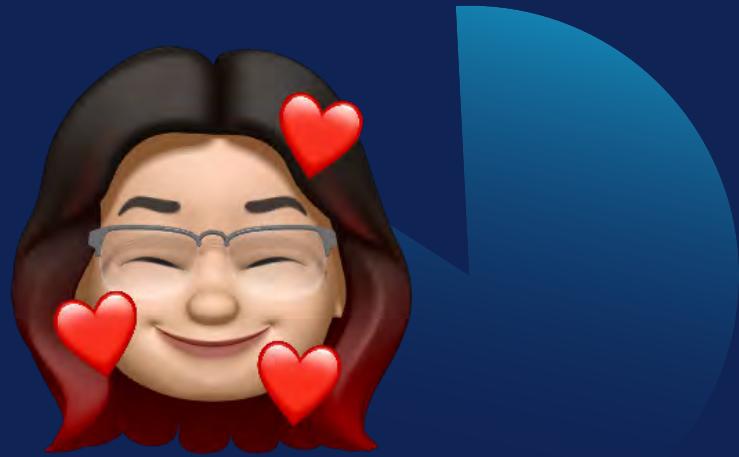
...Working On a Team

I've really enjoyed working with my teammates who come from different backgrounds with their own strengths and skill sets. I've learned that effective teamwork is based on a **balanced workload, being receptive to contrasting views**, and **embracing constructive criticism**. It has been great to **celebrate individuality** and make accomplishments as a team.

...Giving and Receiving Critique

I consider the peer critique to be a wonderful opportunity to learn. Observing what works and what needs improvements in others' designs **shed light on what we can change about our own designs**. Before proceeding to any upcoming iteration, our team spent a considerable amount of time debriefing on the insights from the critique: we appreciated how one group utilized close-up views of the widgets to draw the viewers' attention, so we brought that idea into our final pitching. We also embraced another team's suggestion about being more enthusiastic when introducing the personas to show that we **put ourselves in the personas' shoes**.

MARTINA'S REFLECTIONS ON...



...Surveying a Problem Space

Much of our beginning discussions centered on analysis of our personas' goals. I found it satisfying to break down pain points and data needs in an affinity diagram before sifting through and uncovering priorities. **I'm most proud of** how we came to align the personas in terms of policy-related and efficiency-related goals, a direct result of our modeling activity.

...Data-Driven Displays

This project broadened my understanding of how integral dashboards are to our daily lives. By building our interface from scratch, I realized **how many design patterns I take for granted** such as data filters, geospatial navigation, and animations. In the designer's seat, I had to carefully choose and tweak these patterns to make sense within our system.

...Preparing a Group Pitch

Just like any other designed artifact, our slide deck and script went through multiple iterations. I was able to **holistically craft** our presentation, first ensuring that it covered crucial talking points. I then progressively **refined our flow** with succinct, emotive sentences and a cohesive storyline. I'm grateful for my teammates' creativity, as it encouraged me to **embrace the role** of public speaker *and* performer. I've never overseen question-taking in a group format before, and doing so has added that to my toolkit.

...Giving and Receiving Critique

The dimensions of critique offered in this project parallel the diverse channels of feedback one can expect in industry. I found myself consciously trying to **practice good critique etiquette within my team** during our work sessions, aiming to probe at teammates' choices and not barge in with criticism. For each iteration, we gained experience **debriefing on & prioritizing critique** from class sessions.

...Working On a Team

Although teamwork can be daunting, I really loved working with Sally, Heying, and Mahit because of their diverse skillsets and ideas. I feel we **communicated our strengths and reacted to critique well** as a team, and I'm inspired to re-enact our dynamic in the future!

MAHIT'S REFLECTIONS ON...



...Surveying a Problem Space

I greatly enjoyed breaking down the space of scooter mobility. **Slicing and dicing data** on the spreadsheets brought out insights that simply cannot be noticed through simple interviews and that was exciting to witness. What I learnt the most was to be able to **step into the persona's shoes** as required and visualize using the dashboard from their perspective.

...Data-Driven Displays

The multiple cycles of iterations brought out different ideas, explorations, and questions and it just goes to show **flexible and fickle** it can be designing data-driven displays. I learnt the importance keeping the **user at the forefront** of everything we were trying to design so as to not deviate from the eventual goal of helping the personas.

...Preparing a Group Pitch

This was the most exciting and fun part of the unit for me. The entire team came together to **brainstorm, ideate, and explore** different ways to present the same information. The process of creating visualising interesting slide decks and videos required closely working with the team and I learnt how to balance requirements across the team. The most challenging bit was **juggling the time we had** for the presentation with the amount of information we wanted to convey to the audience. **Scripting proved to be crucial here.**

...Giving and Receiving Critique

Our dashboard and pitch came together thanks to the feedback and critique we received over the weeks. I learnt how to give and receive feedback in a **structured and constructive manner**. This also included **prioritising** what feedback to work on and when. This applies to feedback sessions within the team as well, where teammates provided feedback to each other at critical stages of the process.

...Working On a Team

I thoroughly enjoyed working with this team over 3 weeks. We each brought to the table **different strengths and skillsets** that enriched the final output, while being considerate of each other's needs. We **communicated and collaborated very effectively!**

SALLY'S REFLECTIONS ON...



...Surveying a Problem Space

This part was an insightful way for me to **transition** into the problem space. I was initially overwhelmed by the large amounts of data and possibilities. However, the modelling exercise allowed me to **narrow down** my scope of focus and keeping a persona in mind enabled me to take a different point of view to **discover** more user needs and pain points.

...Data-Driven Displays

Designing an interactive Dashboard made me realize the amount of constraints behind such displays, from showing data in a digestible way, maintaining effective spatial layouts, to ensuring smooth user interactions. My **focus on the data and visual aspects** allowed me to learn more about

tradeoffs of different types of visualizations in regards to the personas' needs, and consider more edge cases in my designs such as how an interactive graph should behave when a user turns on all filters.

...Preparing a Group Pitch

I was able to not only improve upon aspects from my **personal pitch** such as stronger delivery, but also practice more on maintaining smooth **group presentation dynamics**. Things I found helpful include creating transitions between speakers & maintaining audience engagement when others are speaking.

...Working On a Team

This was an invaluable way for me to **learn** from my teammates who possess diverse backgrounds, and learn about effective collaboration under **time and design constraints**. I found great value in meeting as a team to ensure consistency then delegating individual work to maximize productivity.

...Giving and Receiving Critique

I found feedback sessions both within and between groups extremely constructive in **realizing tradeoffs of my ideas**. Through my peers, I was also able to learn more critique techniques such as offering possible alternatives and design ideas.