Final Report: HomeScope

Project Title: Homescope
Course: INFSCI 1740 - DNID Capstone
Term: Fall 2024
Team Name: Homescope Team
Team Members: Angie Ravi, Eric Hibbs, Alexis Giobbi, Laiba Awan, Samie Rush

1. Executive Summary

Overview

- With Homescope, we aimed to create a user-friendly housing market visualization tool designed for individuals seeking suitable areas to move to and homes that meet their specific needs. The project deliverables included a responsive web application with accurate and vast data, a user-friendly interface, and features tailored for diverse users such as young professionals, first-time homebuyers, real estate agents, and policymakers.
- Key outcomes included the successful implementation of a site with intuitive navigation including a homepage component explaining the tool and our motivations, a general market overview, a page for location-based insights that allows the user to filter down to the county-level via text input and dropdowns, and a prototype page of renters' insights. Iterative development and in-group user testing highlighted significant improvements in engagement and usability, aligning with the original project goals of enhancing accessibility and inclusivity in the housing market.

2. Introduction

Problem Statement

- **Tag:** *Moving and relocating is hard. We help make your search a little easier.*
- **Full Statement:** Finding a new place to live can be an overwhelming process, especially for individuals with unique needs, limited resources, and limited experience. Current tools often lack personalization, clarity, or inclusiveness for a diverse range of users.

Motivation

- We're a group of five college seniors excited about the future, but we know graduating and starting a career often comes with the challenge of relocating. Moving to a new city or state can feel overwhelming, especially when you're unfamiliar with the area, the

people, or the housing market. We wanted to create a tool like HomeScope to help people like us gain a better understanding of the overall market and different areas across the country.

Scope and Objectives

- Our platform was designed to simplify housing decisions by offering valuable insights into demographics, property types, ownership options, and housing market trends. We included/wanted interactive maps to compare data across counties and analyze housing costs over time with our easy-to-understand line graphs. Whether you're a policymaker researching different regions or someone searching for a new place to call home, we wanted HomeScope to help users make tough choices easier and give them access to more information.
- In the future we're looking to expand our site's capabilities by adding real-time listing updates in your area, crime statistics, and neighborhood network graphs.

Deliverables

- **Deployment of Responsive Web Application:** Features like HomePage, LocationBasedInsights, and RentersInsights developed and routed using React. Flask acts as a backend API that is called to load visualizations based on user input. Render used for deployment from GitHub.
    - https://github.com/alexisgiobbi/flask-app
    - https://flask-app-9mal.onrender.com/
- **GitHub repository:** All code in its entirety.
    - https://github.com/angieravi/HousingMarketTool
- **Visualizations:** Initial visualizations completed in Jupyter Notebook and final visualizations incorporated into the site and loading dynamically via Flask (found in VisualizationsUpdates and CensusDataVis in GitHub)
- **Prototypes**: Wireframes/prototypes of the proposed UI

3. Design Process

User Needs Analysis

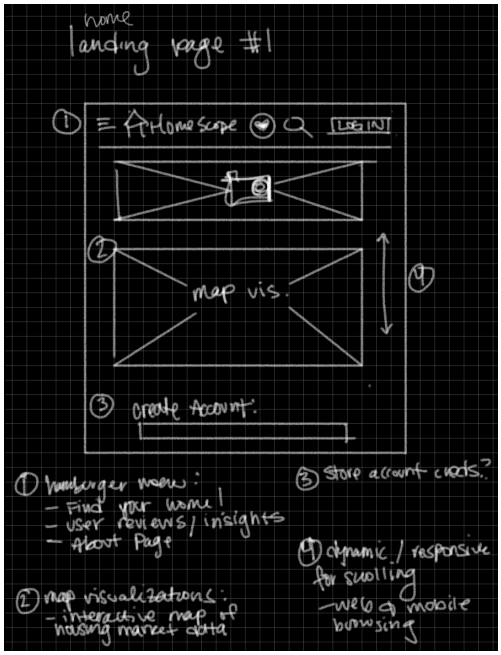
- **Key Insights:**
    - Clear and concise navigation tools. Not too busy or overwhelming like other housing-related sources.
    - Inclusivity and wide ranges of data/demographics were essential for user groups who have various reasons to use the platform.
    - Visual clarity and minimal cognitive load to enhance usability.

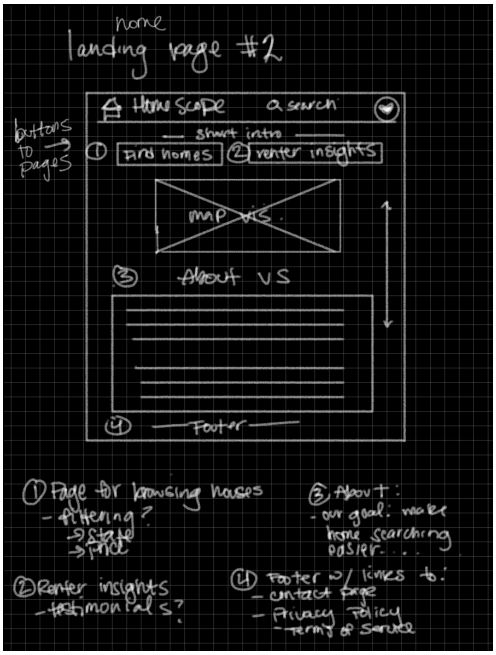
Design Principles

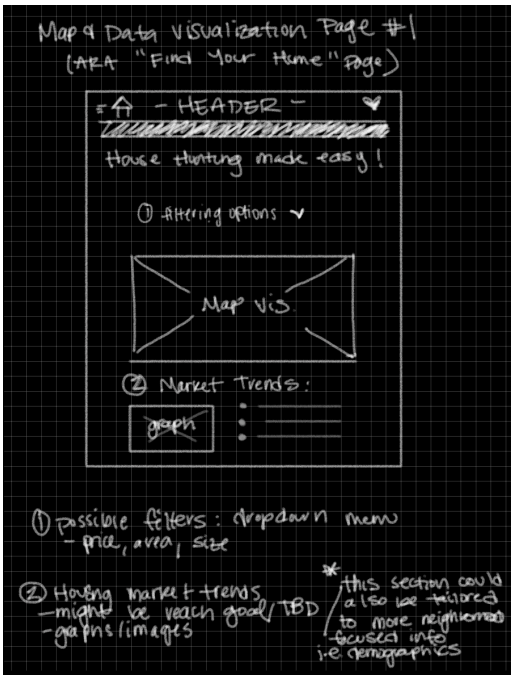
- **Usability:**
    - **Intuitive Navigation and Layout:** Simple and intuitive design to emphasize our mission statement and ideals regarding how we want this to make homebuying/renting simpler.
    - **Responsive and Mobile Design:** The site is optimized for PC and laptop use with a wider screen, however we did design with mobile and responsiveness in mind, and scales accordingly on smaller screens with styling like flex displays
    - **Error Handling and Messaging**: If the data cannot be retrieved for interactive maps, an error message is displayed “Failed to fetch housing occupancy map. Please try again.” so the user knows something is wrong, and this is often fixed upon reloading and trying again, which it prompts the user to do. In the open-ended county search, if the user types in something that does not match, they will receive the error “Failed to generate graph. Please try again and make sure county is in the following format ex: Butler County”, which prompts the user to re-try in the correct format.
- **Accessibility:**
    - **Font text and color:** Font color has a contrast ratio of at least 4.5:1. Color is never the only visual means of navigation. San-serif font and left-alignment used for large blocks of text for readability. No use of excessive all-caps or italics.
    - **Color and design elements:** Visualizations are inherently visual tools, but when information can be conveyed in multiple ways, it is (ex: color-coded key for market overview visualization lines, as well as ability to hover over lines and see the metro area, counties colored red-yellow-green based on value, but clicking on counties gives full statistics.)
- **Personalization:** Customizable filters, various sorts of information you can find on site.

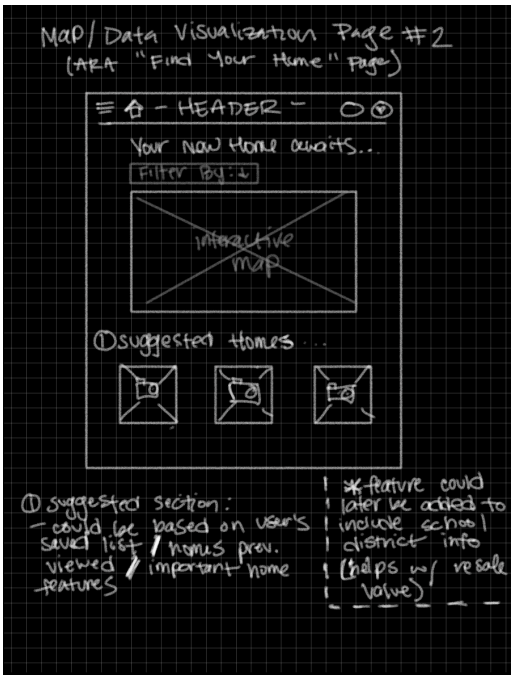
4. Design Iterations

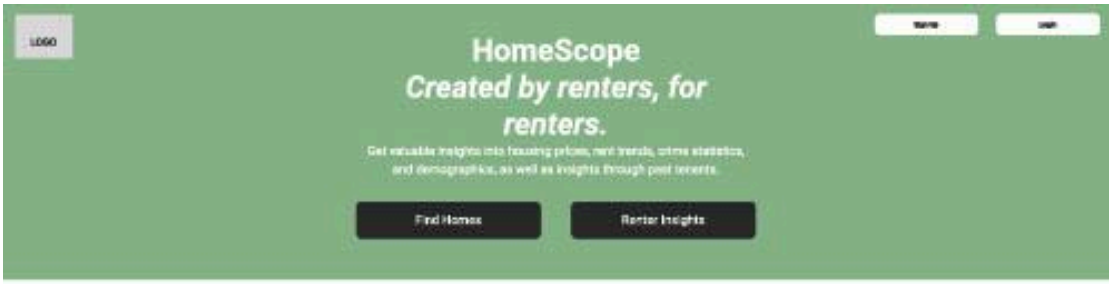
Wireframes






Map & Data Visualization Page #1
(AKA "Find Your Home" Page)
- HEADER -
House hunting made easy!
① filtering options
Map Viz.
② Market Trends:
graph
① possible filters: dropdown menu
- price, area, size
② Housing market trends
- might be reach goal/ TBD
- graphs/images
* this section could also be tailored to more neighborhood focused info i.e demographics


Map/ Data Visualization Page #2
(AKA "Find Your Home" Page)
- HEADER -
Your new home awaits..
Filter By:
interactive map
①suggested homes...
① suggested section:
- could be based on user's saved list / homes prev. viewed / important home features
! *feature could later be added to include school district info (helps w/ resale value)


LOGO
HomeScope
Created by renters, for renters.
Get valuable insights into housing prices, rent trends, crime statistics, and demographics, as well as insights through past tenants.
Find Homes
Renter Insights


Visualize housing market data on an interactive map for better understanding.

Featured Properties Near You:

Cityscape Residences
$2000/month

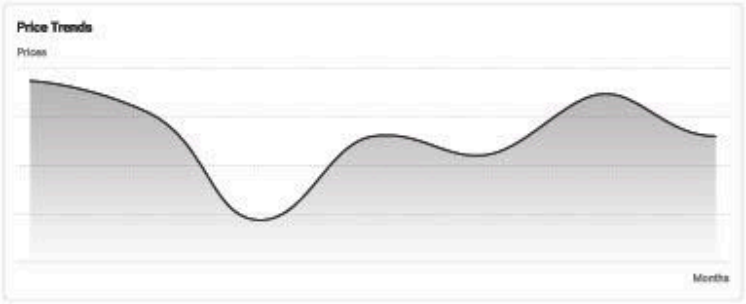
Green Meadows Villa
$1800/month

Seaside Heights Penthouse
$5000/month

Market Trends

Key metrics to understand the housing market

View Details



Average Price
$xxx,xxx

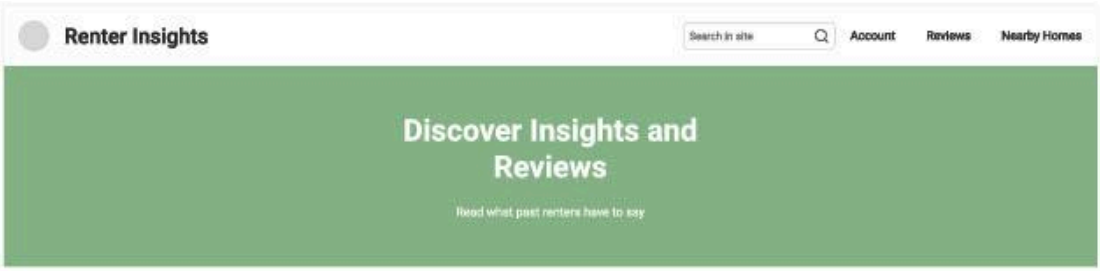
Rent Price Index
xxx

Crime Rate
xxx

Customer Testimonials

See what our customers have to say about their experiences

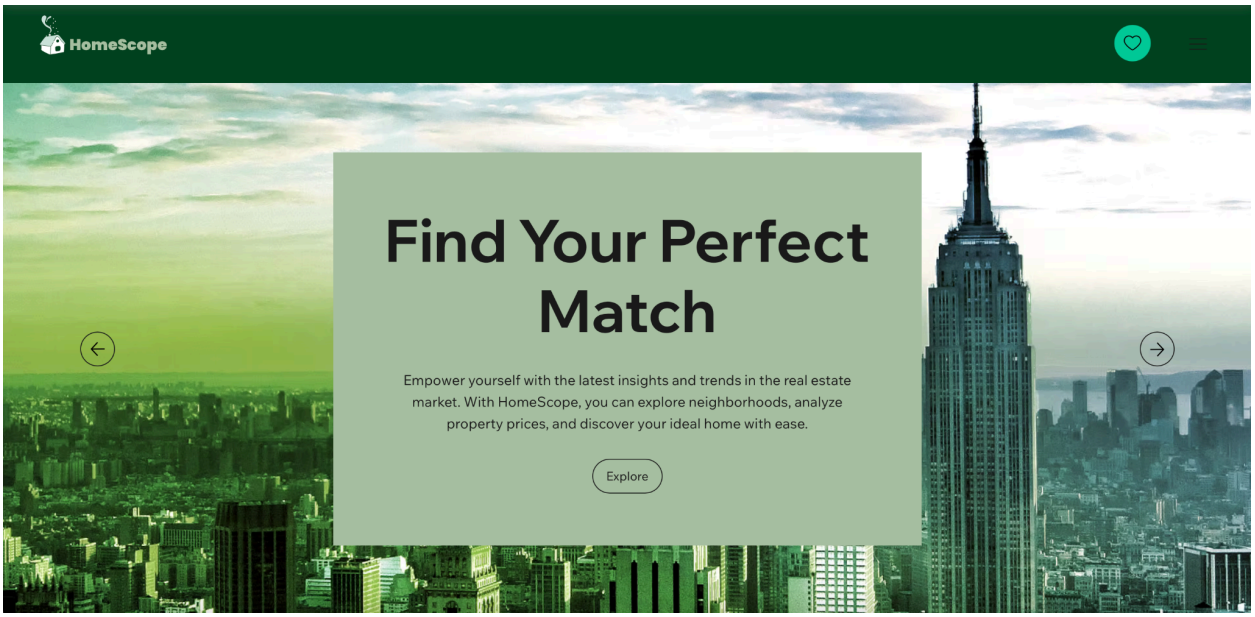
Contact Us Privacy Policy Terms & Conditions

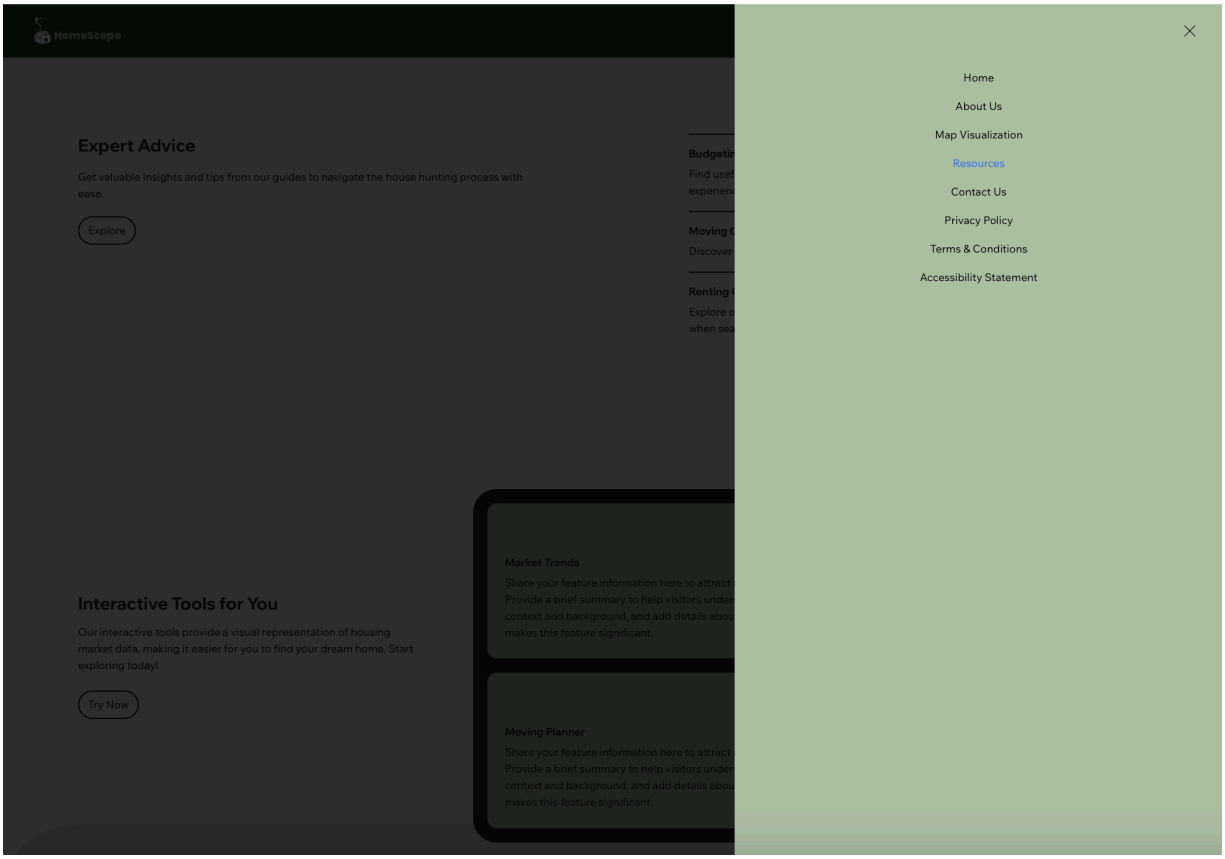


Recent Reviews

Insights

Most Compatible Homes Near You


HomeScope
Find Your Perfect Match
Empower yourself with the latest insights and trends in the real estate market. With HomeScope, you can explore neighborhoods, analyze property prices, and discover your ideal home with ease.
Explore


HomeScope
Expert Advice
Get valuable insights and tips from our guides to navigate the house hunting process with ease.
Explore
Interactive Tools for You
Our interactive tools provide a visual representation of housing market data, making it easier for you to find your dream home. Start exploring today!
Try Now
Market Trends
Moving Planner
Home
About Us
Map Visualization
Resources
Contact Us
Privacy Policy
Terms & Conditions
Accessibility Statement

Interactive Map Tool for Home Search

Our innovative map tool simplifies your house hunting journey. Explore neighborhoods, view property details, and find your dream home with ease.

Try Now

Property Details

Access detailed property information including price, size, and amenities to make informed decisions.

Discover More

Custom Filters

Tailor your search with filters for price range, number of bedrooms, and more to match your criteria.

Get Started

Save Favorites

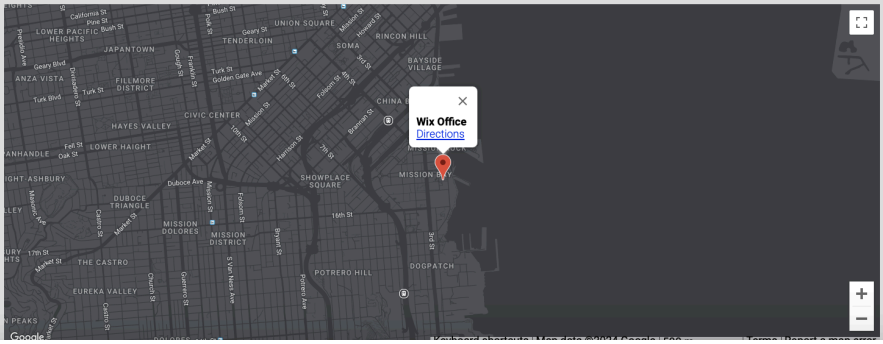
Save your favorite listings to easily revisit and compare properties that catch your eye.

Learn More

Real-Time Updates

Receive real-time updates on new listings, price changes, and market trends to stay ahead in your search.

Find Out More



HomeScope

Our Purpose

Empowering your house hunting journey is at the core of our mission. We provide a professional online tool that visualizes housing market data through interactive maps, making it easier for renters to find their future home.

Explore

Our Journey

HomeScope was founded with the vision of simplifying the house hunting process for renters. Since our inception, we have been committed to providing innovative solutions and exceptional service to our users.

Read More

Design Justification

- We wanted designs with user-centric methodologies, based on common concerns with similar platforms and our criticisms of them.
- Adjustments included enhancing visibility, improving layout responsiveness, and simplifying search functionalities while making it clear the opportunities that the platform brings to the table.
- We maintained a consistent professional, friendly voice. We want HomeScope to be welcoming to all users, appealing to them emotionally while still remaining professional. Design elements, colors, font is repeated throughout the site to maintain consistency.

5. Lessons Learned

Challenges and Solutions

- **Challenge: Implementing real-time data and getting access to housing API's.**
    - Solution: Instead of API based information gathering, we instead used public sources such as CSVs and other datasets, as well as other open source and accessible information hotspots like Open Source Map, Redfin, Zillow, and Census data.
- **Challenge: Balancing simplicity while also wanting many ways to filter housing data.**
    - Solution: Iterative feedback from each of us as we periodically tested the site and all worked on various UX/UI design possibilities to see which felt the most comfortable for our goals.
- **Challenge: How to dynamically load data and visualizations according to user input**
    - Solution: Visualizations were originally created and displayed in a Python Jupyter Notebook, and exported as very large HTML files for each county in the country, which was not feasible for loading and integrating into the site. We utilized Flask to dynamically load the data based on a drop-down of the states.
- **Challenge: How to connect Flask back-end with the Node.js and React front-end that was already built**
    - Solution: Set up routing on the Flask side that the front-end calls with Axios (an HTTP client for Node.js). So when a user selects a state from the dropdown then clicks 'generate map', Axios sends a request to the flask application to fetch the data. Flask processes the data and sends the response (an HTML file or an image file), and then React updates the UI
- **Challenge: How to deploy final version of site**
    - Solution: The dynamic, complex implementation of the site made the deployment of the site a little more complicated. After some research, we decided to use a hosting platform called Render which can run off of a GitHub repository. We ran npm run build on the React project to generate a build folder that was transferred into the flask application. This makes the React app available at the root URL.

Then Flask can handle the backend logic mentioned above, and the API endpoints were changed to be hardcoded into the sites URLs as the relative URLs were causing issues.

Insights Gained

- Users value information and sleek UI over polluted and strict platforms that seem more catered to providing as much as possible in a non-digestible format.
- Accessibility features improve engagement for a broader audience, and can be difficult to completely accomplish in the context of an application so heavily dependent on visuals.

Reflections

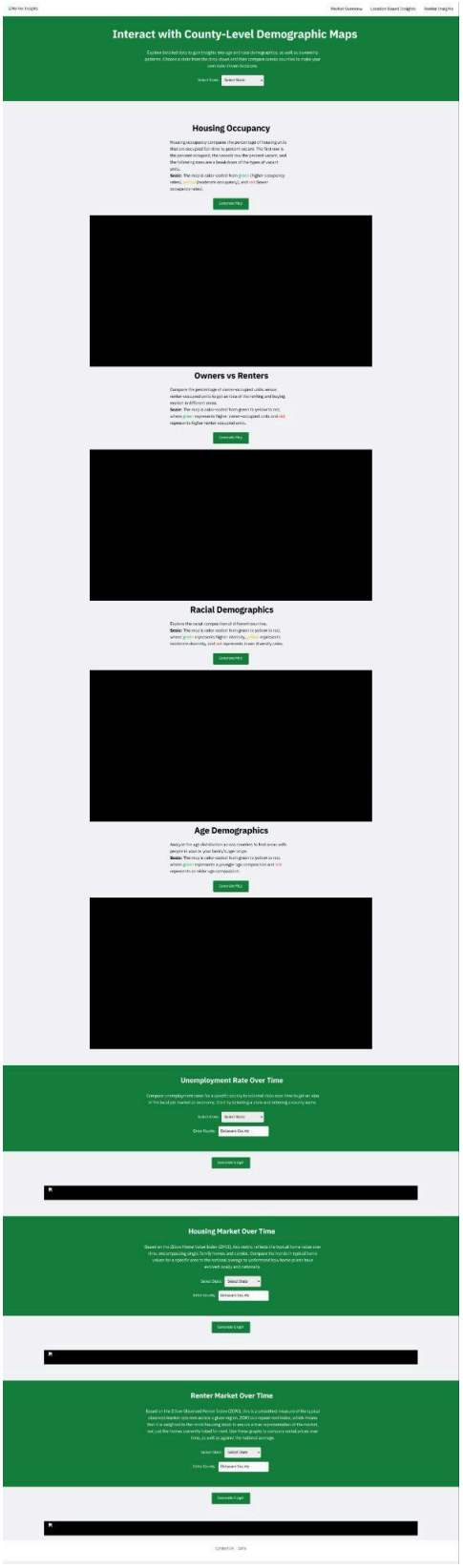
- **Teamwork:** Effective teamwork led to boundless amounts creativity and problem-solving. Everyone was given tasks throughout the process and if anyone couldn't complete it or was struggling, we were quick to share and work with one another to rectify said issues.
- **Communication:** Frequent updates and feedback loops ensured good communication, as well as ensuring everyone felt comfortable enough to criticize the website or the process if things weren't going ideally and had a say in how to better the project.
- **Project Management:** Having an efficient and collaborative team makes it easy for a project manager to succeed in their job. If tasks are stated early in the process and assigned, in a sense, to members of the group, work gets done efficiently.

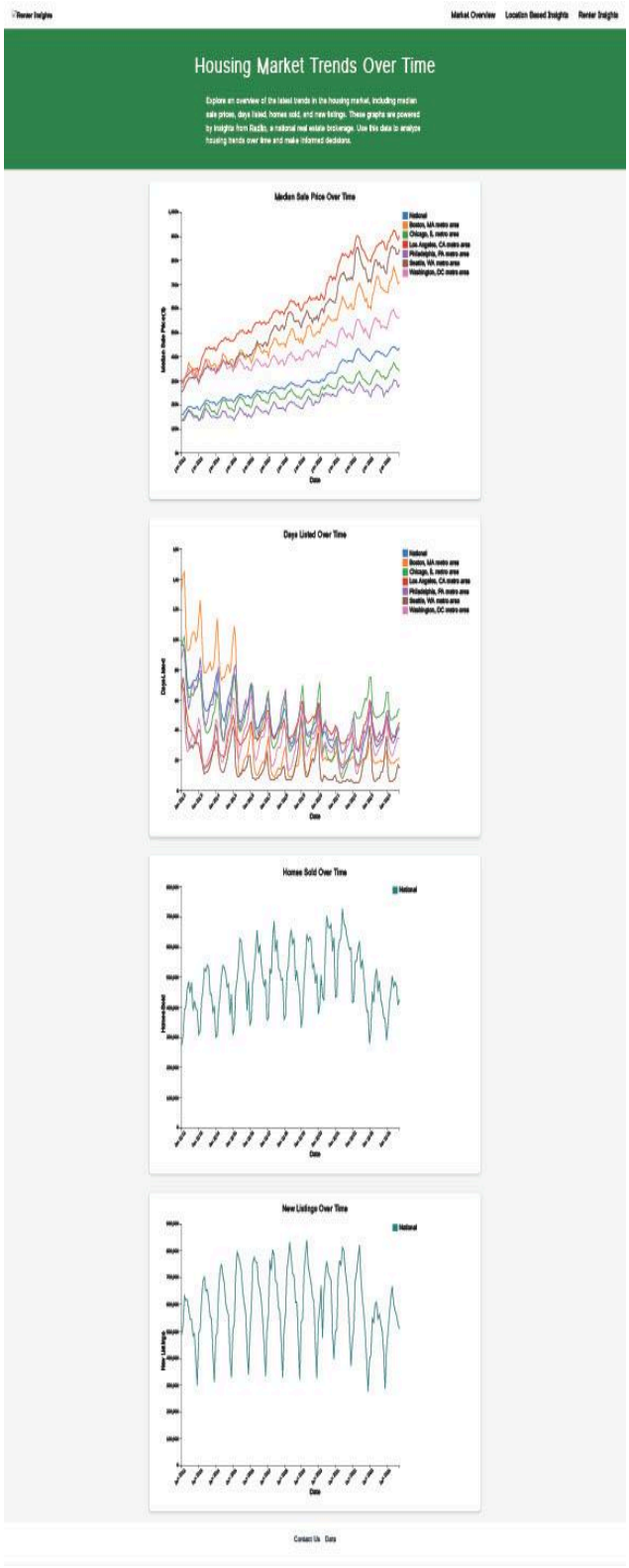
6. Conclusion

- Homescope successfully addressed the challenges that we talked about when it came to navigating the housing market. We worked hard to offer a simple, intuitive, and accessible web platform. The site's search filters, data visualizations, and responsive design will hopefully provide a seamless experience for any users seeking a variety of housing and area information, whether that's overall market overviews, demographic information, local economic data, or typical home/rental values.
- In the future, if we were able to somehow attain API access, it would be a great benefit. I believe we exceeded expectations considering the fact that the initial plan for the platform was more heavily reliant on the usage of APIs from places like Zillow and Redfin. And although we are content with our work, it would definitely be interesting to possibly advance our site with more specific content rather than easily accessible public data that isn't as consistently and accurately updated as we would've liked. It would be also be great to break things down beyond a county-level, which just was not possible working with static datasets as data is harder to find for something like zip code, and when it can be it is really too large to work with statically.

8. Appendices

- Site Screengrabs





- Basic Google Analytics Incorporation