JANUARY 22, 2025
TEAM 5
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Bachelor Practical Course: Evaluation of User Interfaces

GGSEMPO

Outline

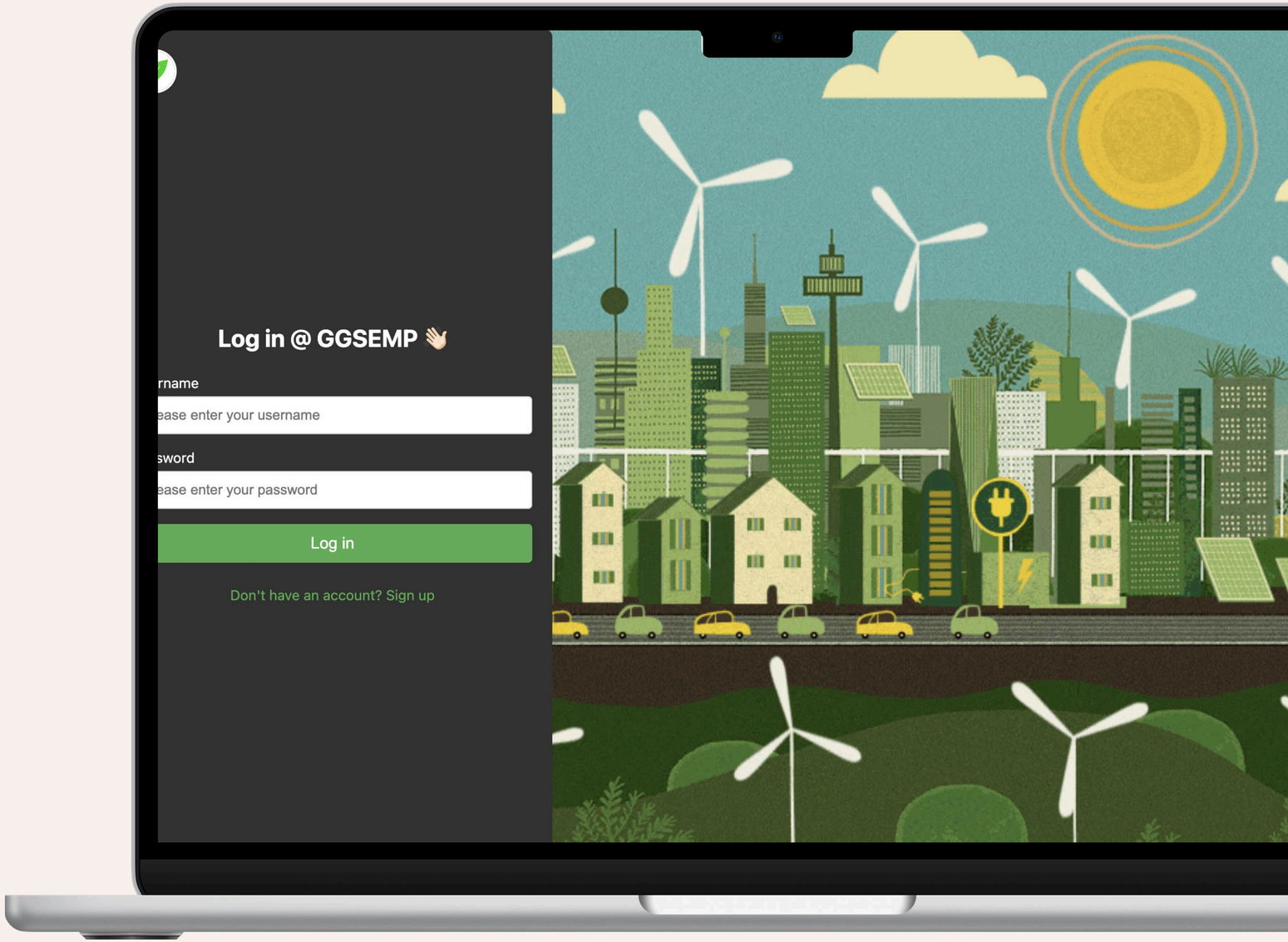
01 What’s new?

02 Extended User Interface Prototype

03 Controlled Experiments

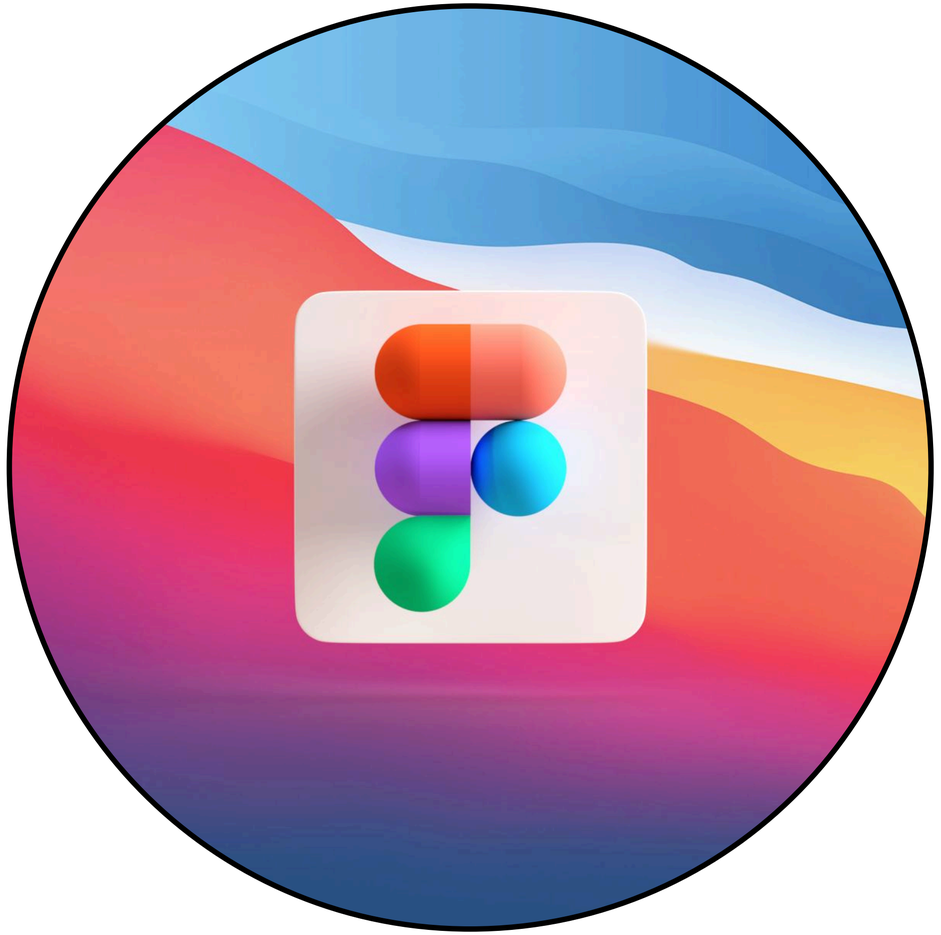
04 Results and Analysis

05 Conclusion



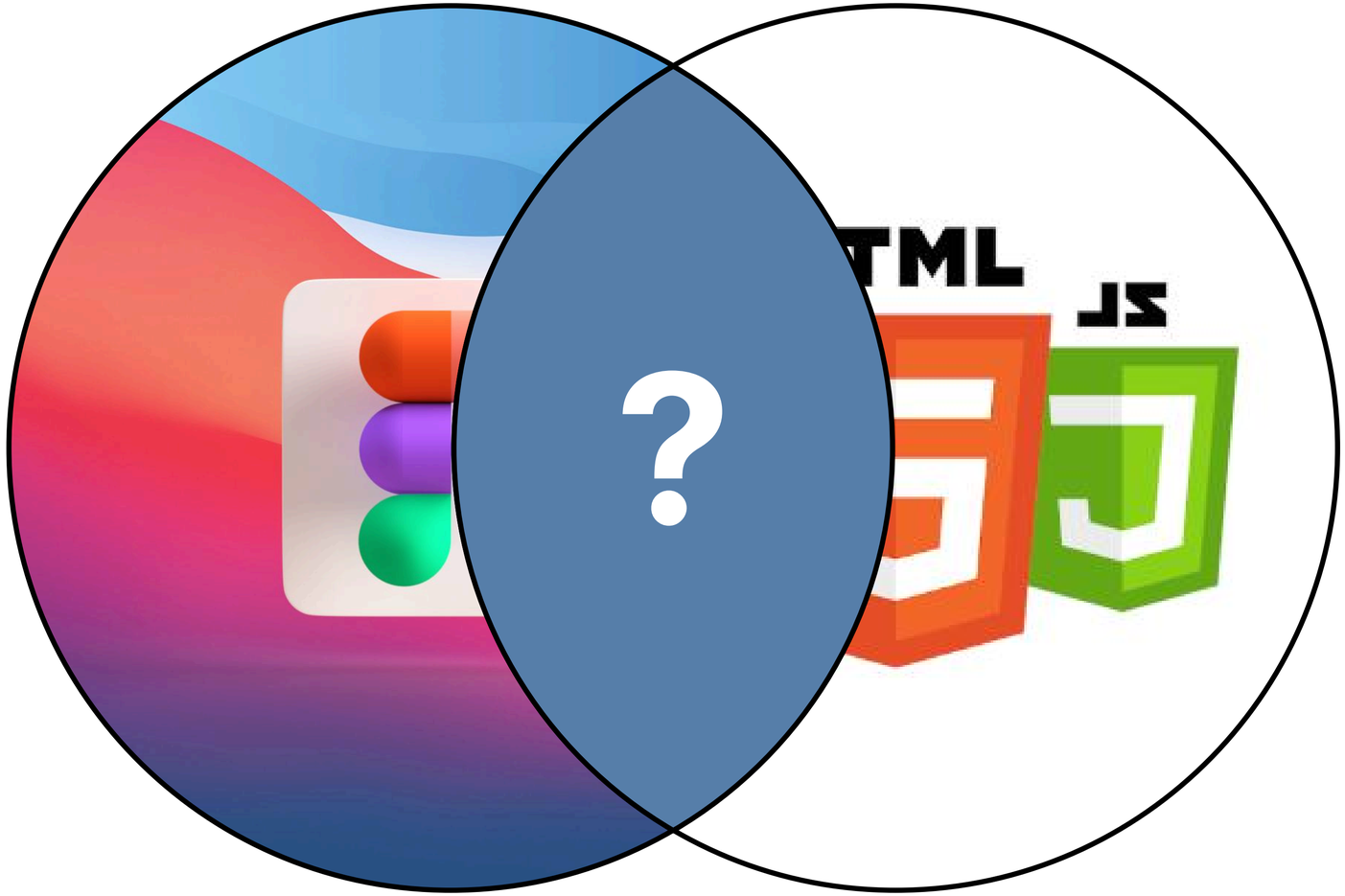
01 What’s new?

Well, up until now, nothing.

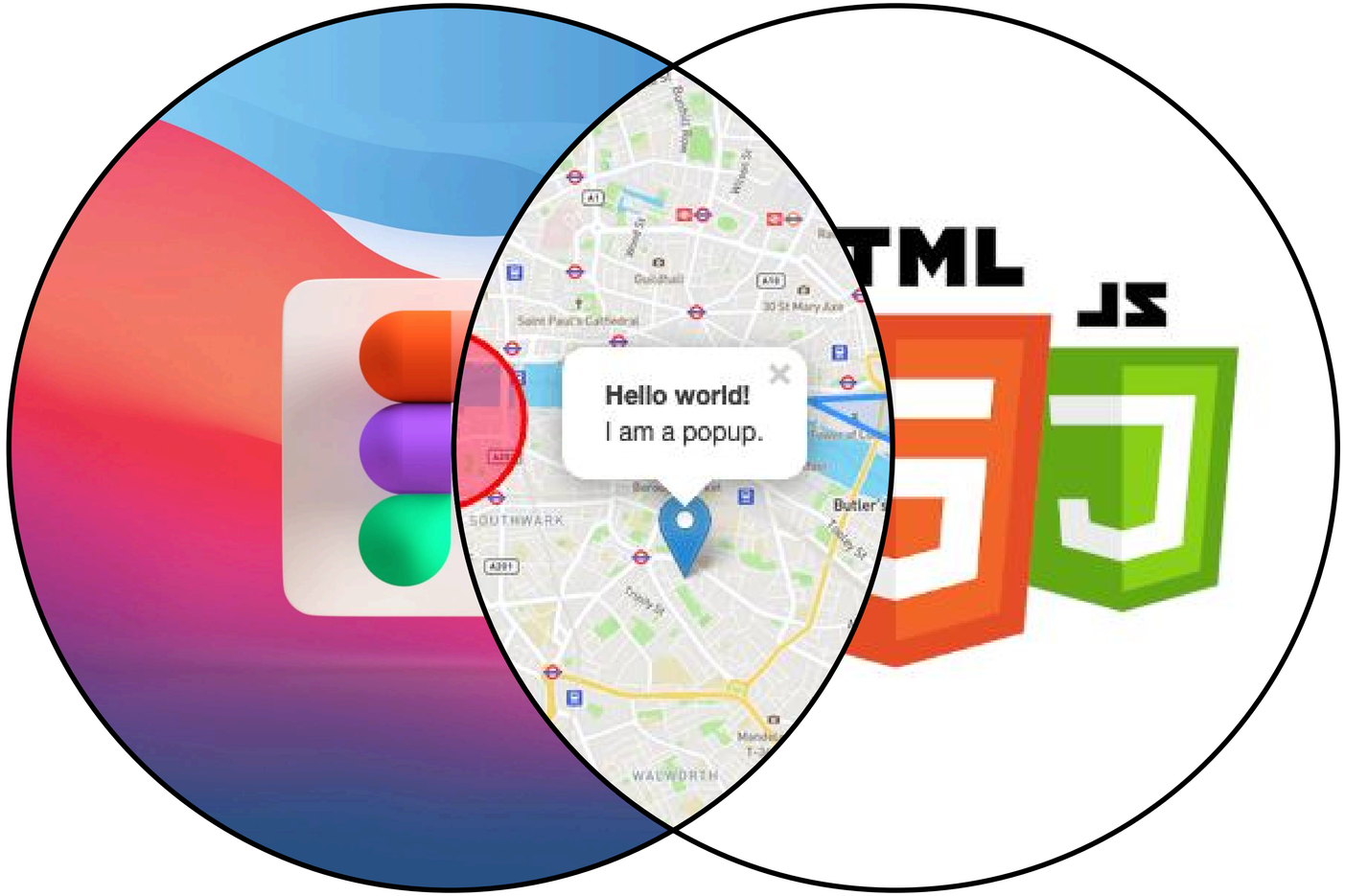


Then, programming came into play.

How can we combine them?



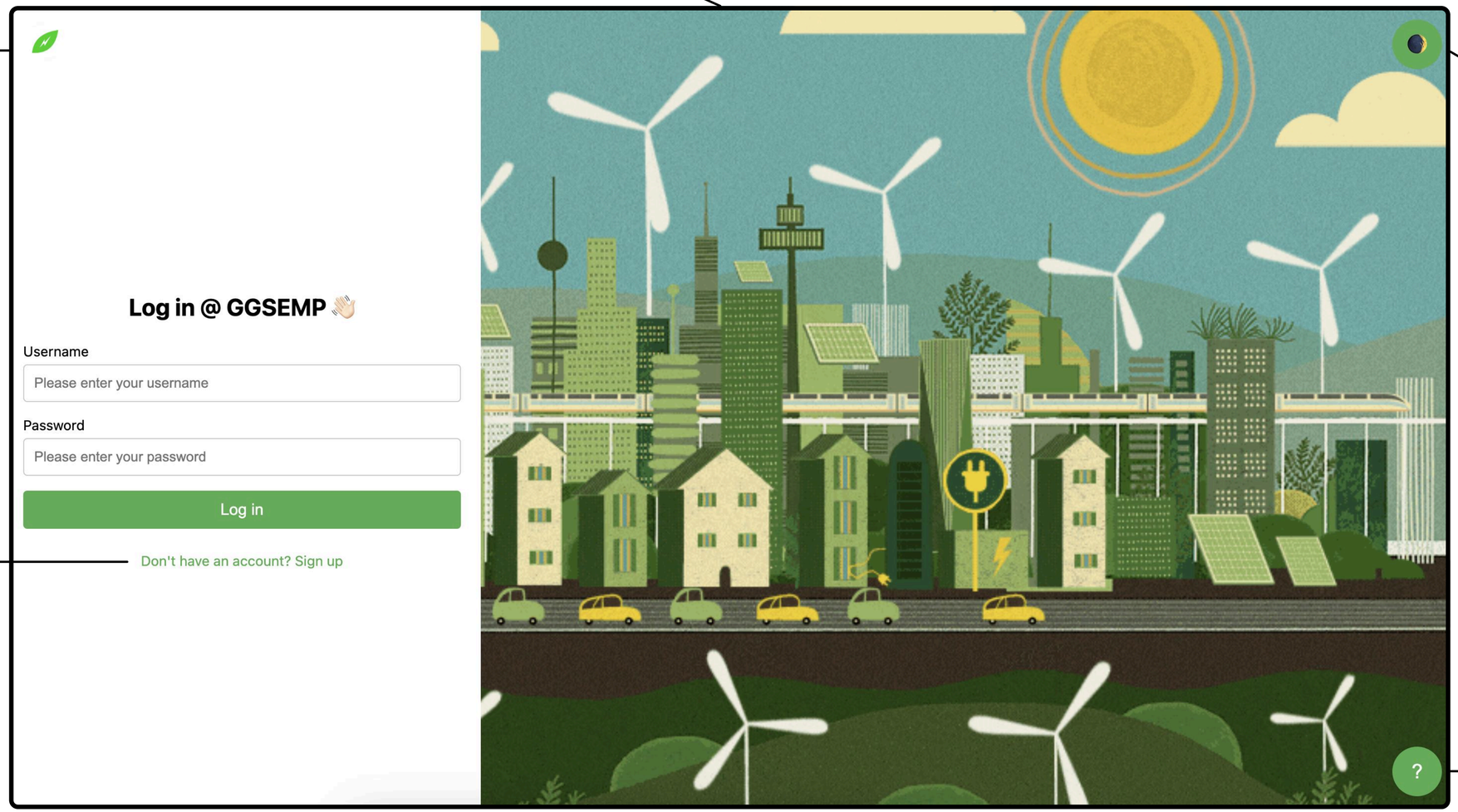
We created the Provider Selector 🗺️



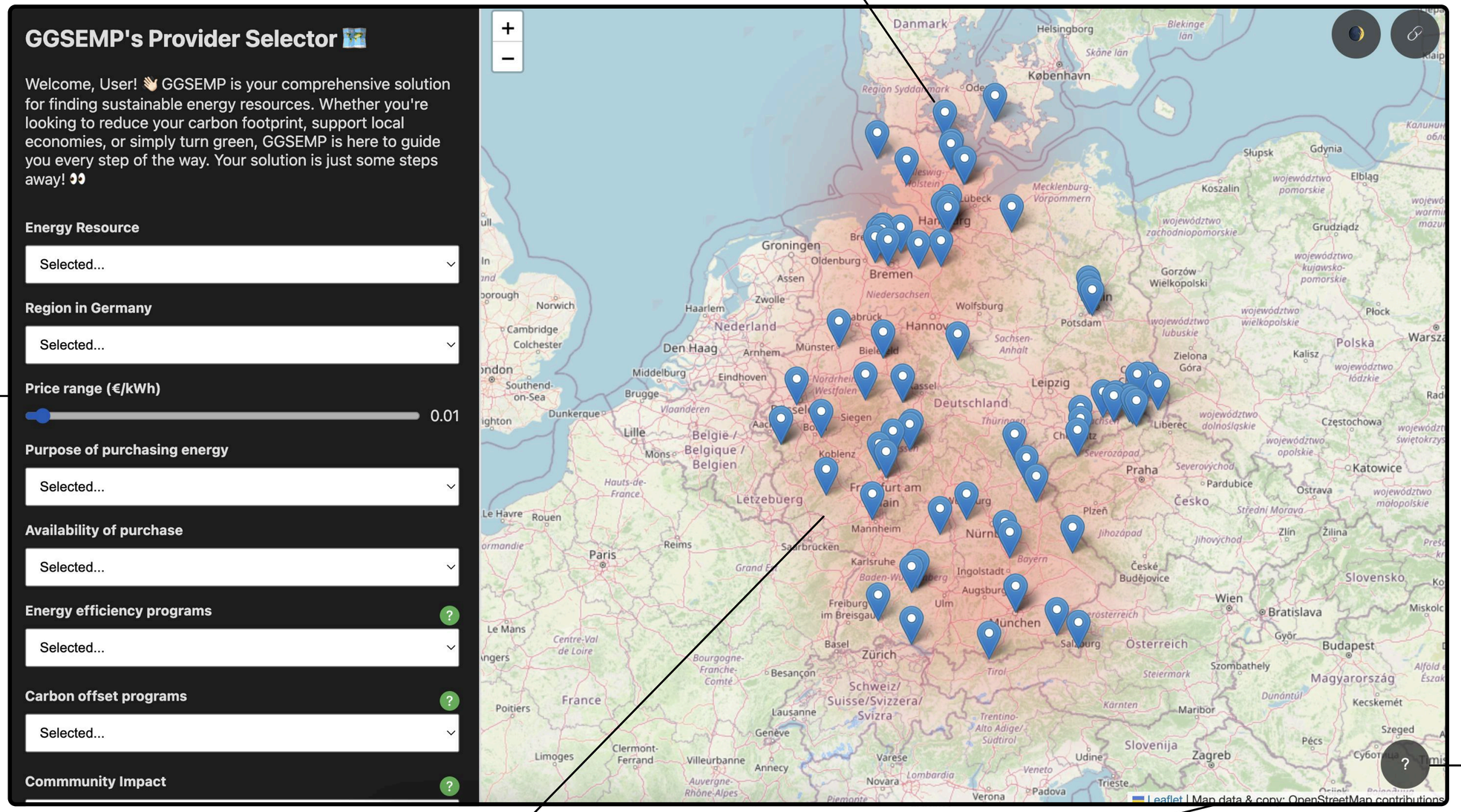
02 Extended User Interface Prototype

GGSEMP's Provider Selector

Log in/Sign up 👋



GGSEMP's Provider Selector 🗺️



Location Pins of Providers

Filters of Selection

Help Button

Heat Map indicating Density of Providers

Leaflet & OpenStreetMap Tiles

GGSEMP's Provider Selector

Helper buttons

Link to Figma Prototype

Dark/Light Mode

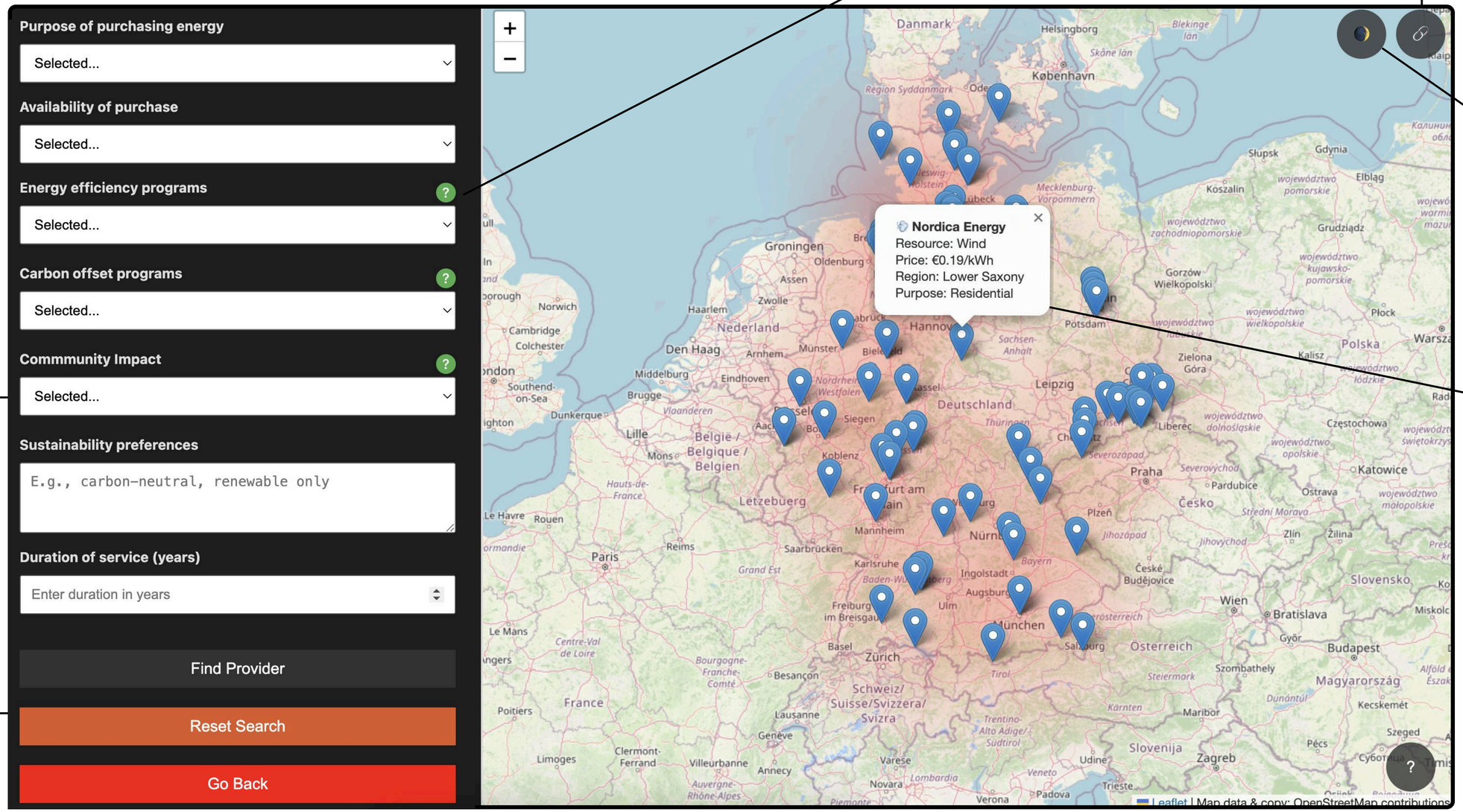
Rest of Filters (related to UN SDG)

On-click Provider Info

Submit

Reset

“Log out”



03 Controlled Experiments

Independent Variables

- 🗺️ **Map Visualization 1:** Both Zoom in/out and Move left/right function **vs** Only Move left/right function
- 🗺️ **Map Visualization 2:** Heat Map **vs** Standard Map
- 👀 **Provider Details**: Compact view **vs** Detailed view
- 🌓 **Layout:** Dark mode **vs** Light mode
- 🟢 **Button Shape:** Square buttons **vs** Round buttons
- 🚀 **Filtering Options:** Detailed filtering **vs** Compact filtering
- 😐 **Hover Descriptions:** Enabled **vs** Disabled

Dependent Variables

Objective DV

- ***Time*** *taken to complete tasks*
- *Number of* ***clicks*** *to achieve a specific action*

Subjective DV (Google Forms)

- *Ease of Use*
- *Responsiveness*
- *Information Clarity*
- *Feature Effectiveness*
- *Platform Preference*
- *Satisfaction and Appeal*

User Tasks for the Experiment

Task 1: Finding a Provider by Location 🌍

This task evaluates how well users can find a provider in a specific area by using the filtering and navigation tools available on both platforms.

Task 2: Viewing Provider Details 👀

Evaluate how easily users can access and understand provider information, considering the differences in workflow between the Figma prototype and the code-based platform.

Task 3: Filtering Options 📩

Assess how easy and effective it is to use the additional filtering options in the code-based platform compared to the simpler filtering options available in the Figma prototype.

Task 4: Price Selection Function 😐

Assess whether the hover descriptions in the code-based platform enhance users' understanding of filter options compared to the Figma prototype, which does not contain any hover descriptions.

04 Results and Analysis

Null Hypothesis Significance Testing

Finding a Provider by Location

Null Hypothesis (H_0): There is no significant difference in the time taken in a specific region between the Figma prototype and the coded platform.
Alternative Hypothesis (H_1): There is a significant difference of clicks for finding a provider in a specific region between the Figma prototype and the coded platform.

Null Hypothesis (H_0): There is no significant difference of clicks for finding a provider in a specific region between the Figma prototype and the coded platform. (Note that all participants were obligated to fulfill the selection form completely. Hence there are significant more clicks and filters compared to Figma prototype.)
Alternative Hypothesis (H_1): There is a significant difference in the time taken in a specific region between the Figma prototype and the coded platform

Filtering Options

Null Hypothesis (H_0): The additional filtering options in the code-based platform will significantly reduce the number of clicks to find suitable providers compared to the limited options in the Figma prototype.
Alternative Hypothesis (H_1): The additional filtering options in the code-based platform will not significantly reduce the number of clicks to find suitable providers compared to the limited options in the Figma prototype.

Null Hypothesis (H_0): The additional filtering options in the code-based platform will not significantly reduce the time taken to find suitable providers compared to the limited options in the Figma prototype.
Alternative Hypothesis (H_1)*:* The additional filtering options in the code-based platform will significantly reduce the time taken to find suitable providers compared to the limited options in the Figma prototype.

Viewing Provider Details

Null Hypothesis (H_0): Users will not access or comprehend provider details significantly faster or more intuitively in the code-based platform compared to the Figma prototype.
Alternative Hypothesis (H_1): Users will access and comprehend provider details significantly faster and more intuitively in the code-based platform compared to the Figma prototype.

Price Selection Function

Null Hypothesis (H_0): Price selection function in the code-based platform will not significantly reduce time taken for users to find and compare the prices of certain providers of a certain area.
Alternative Hypothesis (H_1): Price selection function in the code-based platform will significantly reduce time taken for users to find and compare the prices of certain providers of a certain area.

*Note that all participants were obligated to fulfill the selection form completely. Hence there are significant more clicks and filters compared to Figma prototype.

Normal (Gaussian) Probability Distribution

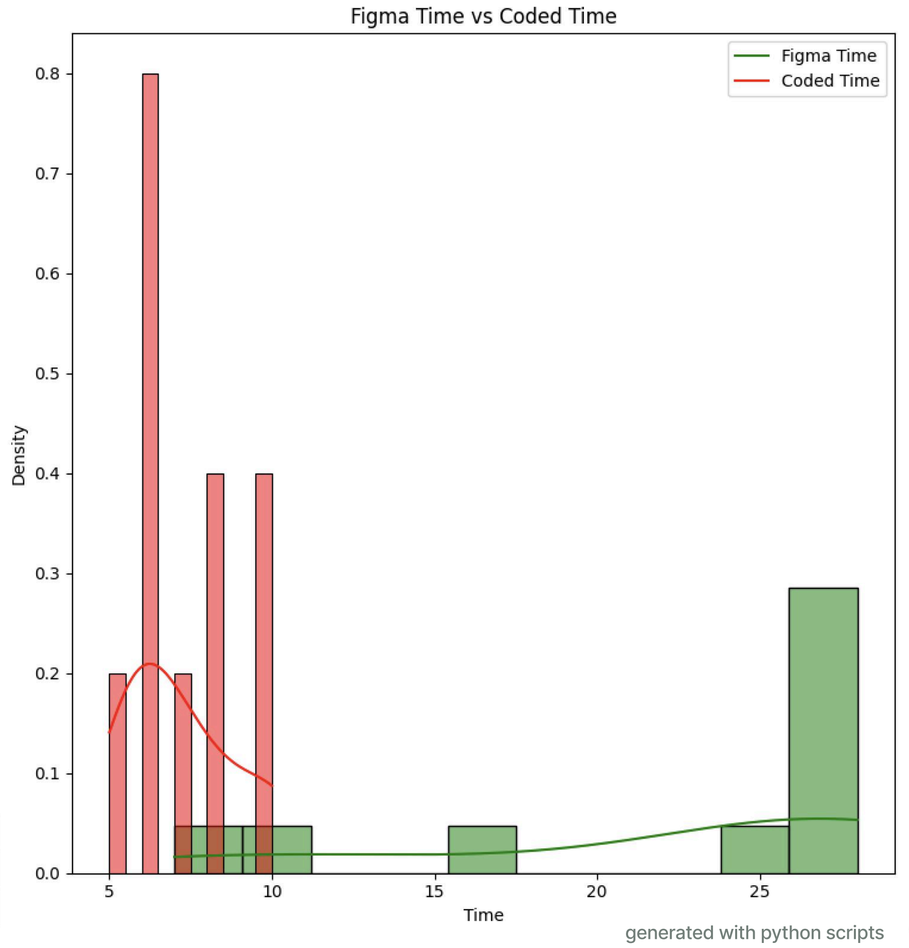
Example:

Task 2 Viewing Provider Details

The given graph analyses Figma against coded time merged into 1 graph representation, revealing significant differences in task durations.
Figma tasks generally require longer time, as shown by their distribution peaking in the higher ranges, whereas coded time is more consistent and concentrated in the lower range.

Measurements:

DV\Participants	1	2	3	4	5	6	7	8	9	10
Figma_Time	10	16	26	28	7	25	27	27	28	28
Coded_Time	6	6	7	8	10	10	5	6	6	8



Homoscedasticity

Task 2 Viewing Provider Details

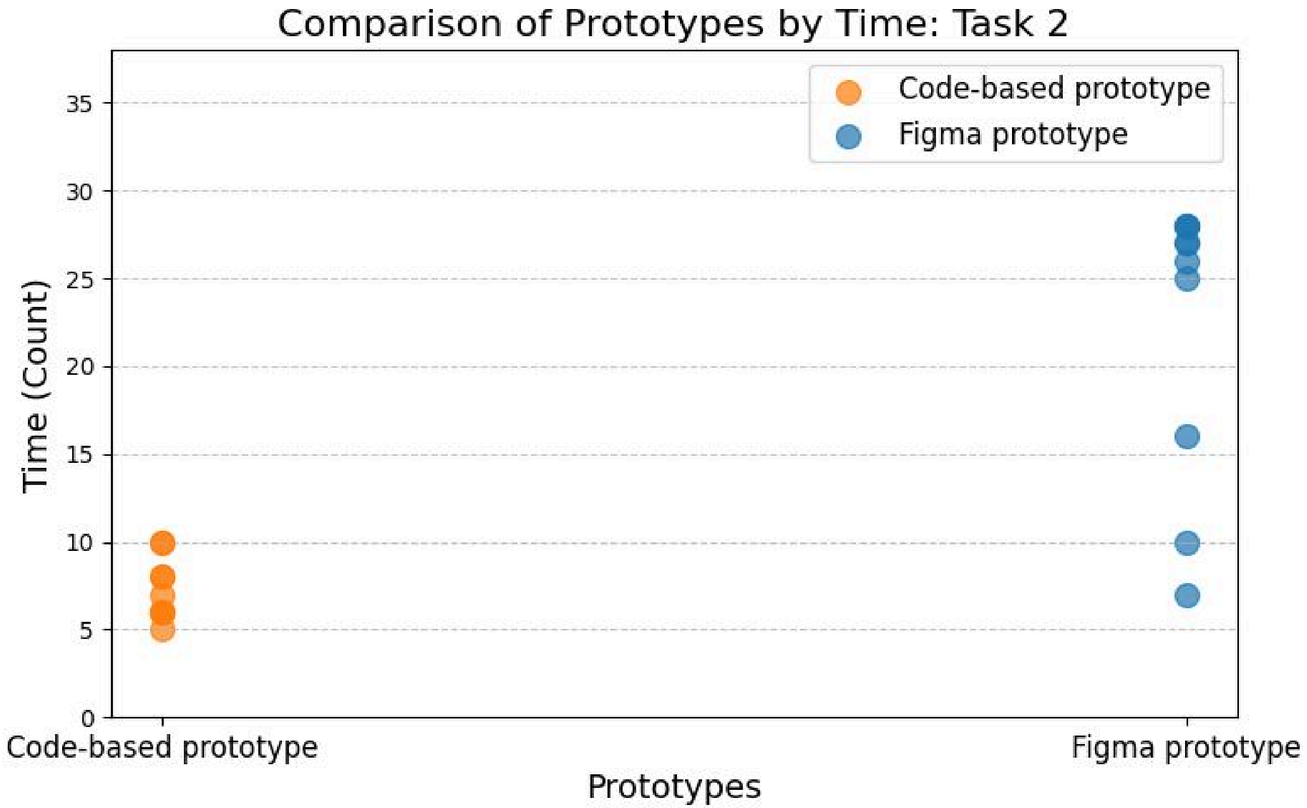
Notes:

X1 - Code-Based Prototype
X2 - Figma Prototype

$\bar{x}1 = 7.2;\ \sigma^2 1 = 3.06$
$\bar{x}2 = 22.2;\ \sigma^2 2 = 65.25$

$\Rightarrow \bar{x}1 < \bar{x}2$

$\Rightarrow \sigma^2 1$ & $\sigma^2 2$: Markedly different, does not exhibit homoscedasticity.



generated with python scripts

Normal (Gaussian) Probability Distribution

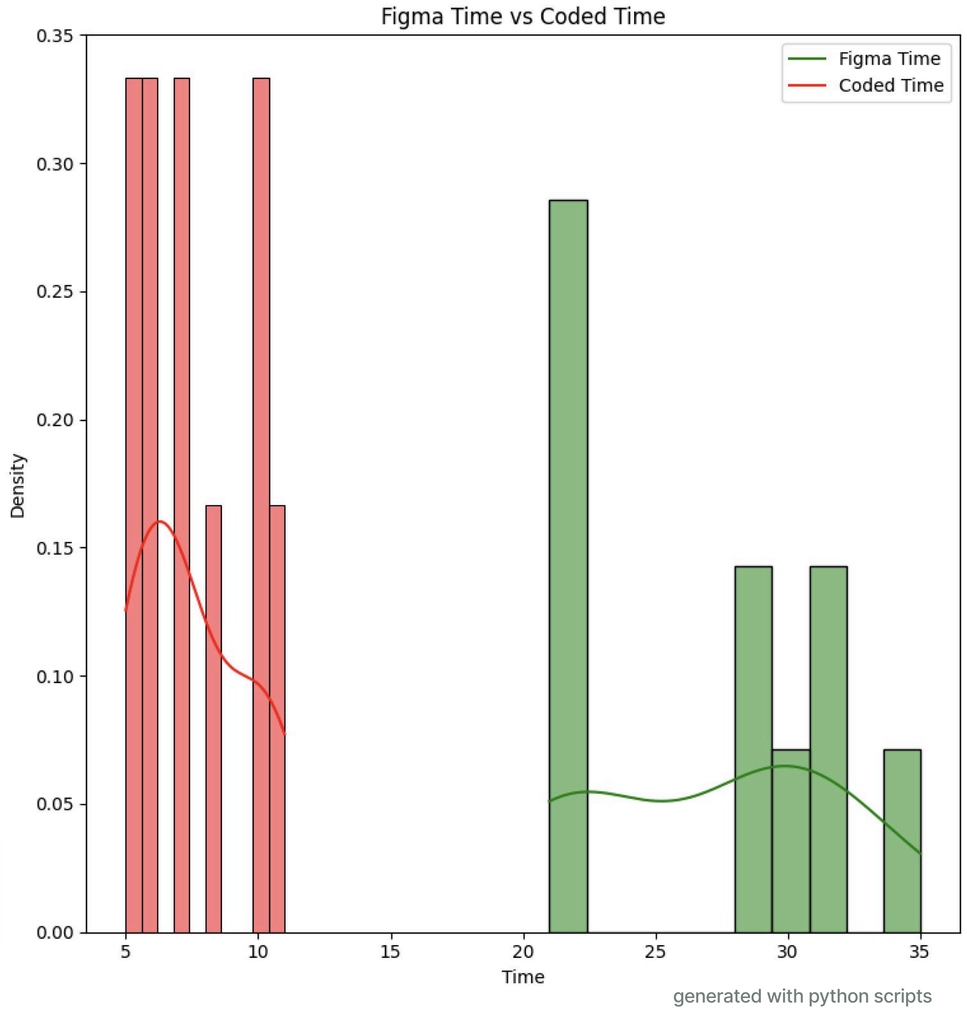
Example:

Task 4 Price Selection Function

The given graph compares Figma time to coded time. Figma time consistently requires significantly longer durations compared to coded time, as shown by the density curves. Coded tasks exhibit lower variability and shorter completion times, whereas Figma tasks show more dispersion, reflecting higher interaction complexity or task intensity.

Measurements:

DV\Participants	1	2	3	4	5	6	7	8	9	10
Figma Time	21	30	35	31	22	31	28	29	22	22
Coded Time	5	6	7	10	11	6	7	8	5	10



Homoscedasticity

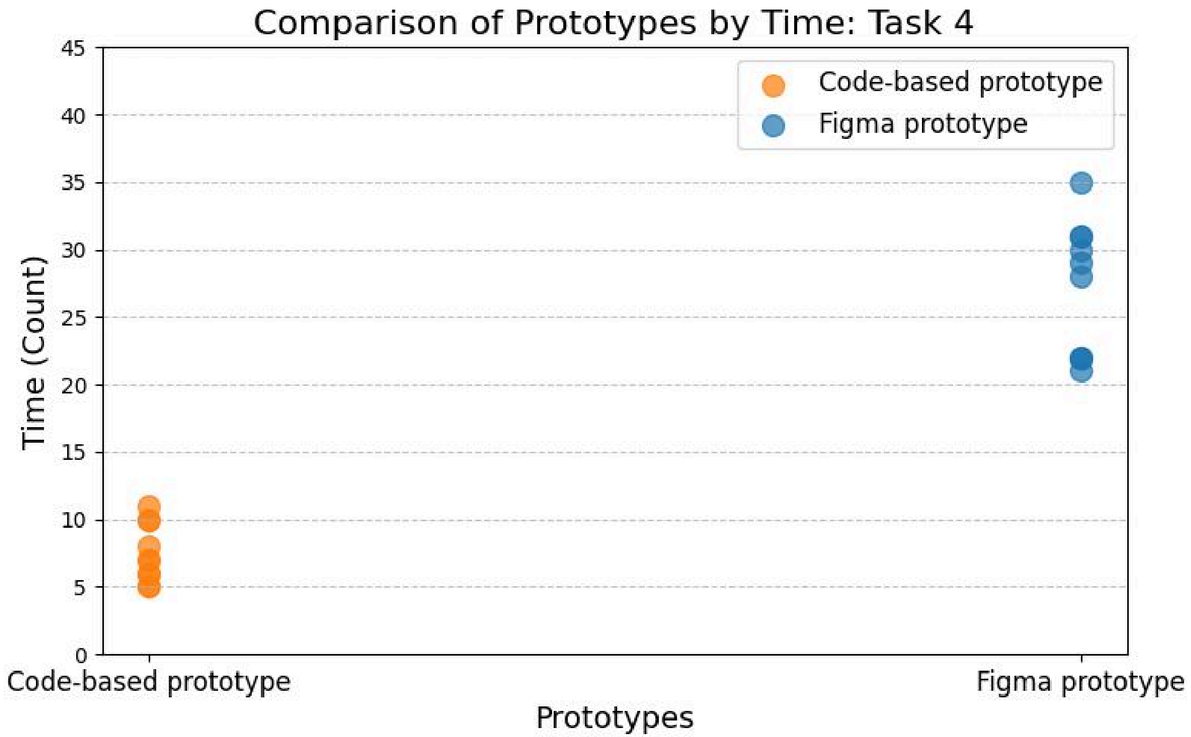
Task 4 Hover Descriptions - Understanding Filters

Notes:

X1 - Code-Based Prototype
X2 - Figma Prototype

$\bar{x}1 = 7.5$; $\sigma^2 1 = 4.72$
$\bar{x}2 = 27.1$; $\sigma^2 2 = 24.54$

$\Rightarrow \bar{x}1 > \bar{x}2$
$\Rightarrow \sigma^2 1$ & $\sigma^2 2$: Markedly different, does not exhibit homoscedasticity.



generated with python scripts

Two-Sample T-Test Results

Task 2 -Viewing Provider Details

Null Hypothesis (H_0): Users will not access or comprehend provider details significantly faster or more intuitively in the code-based platform compared to the Figma prototype.

Result: The p-value (0.00001938) is much smaller than the significance level (α), meaning H_0 is rejected. The test statistic (T = -5.7375) falls outside the 95% region of acceptance, and the effect size (d = 2.57) is large.

The time it took to access and understand the details of providers varies very highly statistically between the Figma prototype and the coded platform.

Users are much faster and more intuitive on the coded platform.

Task 4 - Price Selection Function

Null Hypothesis (H_0): The price selection function in the code-based platform will not significantly reduce the time taken for users to find and compare the prices of certain providers in a specific area.

Result: The p-value (1.044e-9) is much smaller than the significance level (α), meaning H_0 is rejected. The test statistic (T = -11.4678) falls far outside the 95% region of acceptance, and the effect size (d = 5.13) is extremely large.

There is a statistically highly significant difference in time taken for finding and comparing prices between the Figma prototype and the coded platform.

On the coded platform, users take significantly less amount of time in finding and comparing the prices.

05 Conclusion

Conclusion

The new features have successfully addressed usability gaps in the earlier version, providing a more intuitive and effective user experience. However, ongoing user testing and optimisation are recommended to further enhance areas where improvements were less pronounced.

Overall, the code-based platform shows clear advantages in usability, advanced features, and enhanced user satisfaction. However, there are areas, such as filtering options, that need further optimisation in order to streamline the user experience without compromising the added functionality. The statistically significant results confirm that the coded platform is indeed a better option than the Figma prototype for most tasks.

Are there any questions?

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Thank you for your attention!