

Critical Reflection Essay

In this essay, I will critically reflect upon the design process of my Space-Scale website. I will discuss how global trends regarding web technologies and design techniques have influenced the design and development process of the website and explore how I created meaning in my website through the use of UI and UX. I will also touch on how I leveraged the interactivity of the web to influence the user experience and data interpretation of my website. The project presented several challenges, which I will address, along with the strategies I used to overcome them. Lastly, I will reflect on how this website aligns with professional standards and practices in the international industry.

Global Economics of Artistic Implications

Throughout the development process, I made extensive use of free web tools and technologies that significantly aided the production of the website. The reliance on these tools reflects web technology has become democratised and how the growth of the digital economy has made valuable tools accessible to new developers. The abundance of these resources also reflects the shift towards inclusivity, where beginner developers can make use of powerful technologies without a taxing financial investment.

Web Technologies

The developer technologies that significantly supported this project were GitHub and the Live Server extension on VS Code. These tools streamlined the production process, enhancing both the efficiency and workflow of the project. GitHub provided free version control, allowing me to track and manage changes seamlessly, while also serving as a hosting platform for the static website. The Live Server extension allowed for real-time feedback by auto-refreshing the browser with each code change I implemented. This is possible through the local hosting of static code that reflects how the code would run on the web. The ability to get immediate feedback on the changes I implemented removes the wait time required for GitHub to deploy your most recent change to GitHub Pages. This saves time on both debugging and implementation of features.

The abundance of code libraries and free API's allow developers to share tools and information with each other that save each other time whilst offering them a powerful tool that can be used to develop complex websites. I made use of Solar System OpenData which is a free API that allowed me to gather intricate data about the celestial bodies within our solar system. I could then display this data efficiently using the D3.js library. D3 consists of many pre-coded functions and methods that

developers can use to create data visualizations. The integration of a code library makes the development of a project less tedious due to the black-boxing and abstraction of external code.

Design Techniques

I adopted the minimalistic design trend frequently showcased on award-winning portfolio sites featured on platforms like Awwwards and The Webby Awards. This design technique leverages whitespace, streamlined elements, and clean layouts, allowing users to navigate the site effortlessly and focus on the core content without getting distracted. Minimalism has seen a burst in popularity in recent years, with major tech companies such as Apple, Instagram, and YouTube gradually refining their logos and products to embrace a more modern, minimalistic aesthetic. Minimalism gains its appeal due to its timelessness. Its simplicity transcends temporary trends and creates a look that remains engaging and relevant over time.

UI & UX

A key aspect of web development is creating meaning through user interface (UI) and user experience (UX) design. The UI determines the look and what users will interact with to engage with the website. UX is how the UI influences the users' overall experience with the website with notable experiences being its intuitiveness and accessibility. Thoughtful UI and UX design allows a website to stand out and leave a strong impression on its users. Interestingly, ineffective UI and UX design can also leave a lasting impression, but for the wrong reasons.

Recurring Design Themes

The background of the website is a subtle black and dark purple gradient immersing the user in the cosmic theme of the website. The subtle gradient transitions as the user scrolls down the page creates a sense of drifting through the void of space. Although this is not a realistic depiction of the experience, it is the fantasy that popular cinema has imposed on its audience, I am leveraging that part of pop culture to create an immersive UI.

A recurring design feature on my website is the use of a saturated yellow in contrast to the dark background and white-toned elements. The vibrant yellow naturally draws a lot of the users' visual attention, standing out from the surrounding elements. By applying this colour to certain elements such as buttons, icons, and phrases I give them a sense of priority and importance. Strategically placing an element higher on the visual hierarchy ensures that the users' attention is directed where it's needed most. This deliberate use of colour enhances the user journey by reinforcing key actions and information.

The glass-morphism technique is used to make elements have a frosted/opaque glass effect on the elements behind them. Glass-morphism creates subtle visual interest compared to the vibrant yellow which demands attention. This UI choice gives the website a sense of dimension with certain elements appearing in front or behind others with an added layer of playful interest.

Data Visualizations

In order to make each planet distinct I gave them each a specific colour that remained the same throughout the data visualizations. This gives each planet a colour that the user can identify by a general glance.

The first data visualization shows each planets distance from the sun (semi-major axis) to scale as well as the radius of each planet. I wanted the data visualization to look aesthetically comprehensive to the website without it immediately giving the user the impression that data has to be big numbers on intimidating graphs. By presenting the radius and semi-major axis of each planet in a text-book-like fashion, makes the data visualisation less intimidating to approach. This mends with the playful approach I took with the design.

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Interactivity

I leveraged off the main actions that users do when interacting with the web to make the website interactive. This includes using the cursor to navigate the GUI and the scroll action to move the web page up or down. A common interactive element I have in the website is tilting cards. These cards tilt when a user hovers over them and makes the element fun to engage with whilst browsing the page. This interactive feature allows users to remain engaged with the website by making the elements responsive to their actions.

In order to make the data visualizations more engaging, I made it so that overing over a planet in the first data visualization displays its name. I also gave users full agency as to what planets they would like to compare. They can click on a planet and add it to a list that gets compared in the bubble and sider chart. This user agency allows users to

wilfully engage and interact with the data visualization, allowing more room for them to interpret the data as they please. This interactive feature leverages off the users habit of clicking and hovering over web elements as they scroll through a website.

I integrated the scroll action as an interactive element by coding animations triggered as users scroll. This is particularly notable in the first data visualization, where planets pivot around the sun as users scroll down, eventually aligning in a line. Once aligned, the visualization zooms in on each planet individually, revealing more detailed information. These scroll-triggered animations immerse users in a dynamic data journey, presenting specific data representations at key points to create a cohesive narrative. This structured narrative allows users to digest information in a way that's both engaging and easy to understand. A more subtle integration of scroll animations is the blurring of elements that are not in the centre of the screen. This blur is a subtle way to direct the users focus on what is and the centre of the screen by diluting the details of elements that are not the main subject of focus, similar to how vision works.

A section I ensured was more interactive and fun was the design section. As the design section is usually overlooked by casual users, I made the sections detailing the different aspects of the style sheet a lot more interactive and fun to engage with. The colour section initially has blurry blobs of colour until the user hovers over them with the cursor, revealing a coloured element displaying the HEX value. Users can then click to copy the HEX code for personal use. The font section allows the user to preview different font styles used throughout the website by typing their own phrase, offering a hands on way to explore different font options. Additionally, I created a miniature solar system animation that mimics the main data visualization's pivot effect but responds to mouse movement instead of scroll. Each of these interactive elements transforms the design section into a playful, engaging experience that encourages users to explore the design philosophy behind each choice.

Challenges

One of the primary challenges I faced was implementing data visualizations with the D3.js library. The vision I had for the behaviours and interactions of certain visualizations proved difficult to implement, especially as it was my first complete project using D3.js. While I referenced the online documentation, I found the language ambiguous, which limited my success. Eventually, I turned to ChatGPT to help debug and adjust my code. With the code ChatGPT provided, I would then research the new methods, functions and syntax that I do not know of to gain a deeper understanding of how the code runs.

Another hurdle was the sheer scope of the project, which led to a monolithic code structure that was difficult to debug and manage. To improve this, I refactored parts of

the code into specific functions that performed specific tasks, following the Separation of Concerns (SoC) principle. This helped organise the logic but, without proper documentation, managing the project remained somewhat stressful.

On the design side, I struggled with responsiveness due to my initial approach of designing solely for desktop. Adding mobile and tablet compatibility later proved tedious and became a trial-and-error process, as the initial code wasn't written with responsiveness in mind. This experience taught me the importance of planning for responsive design from the outset to avoid technical debt later in development.

Professional Practices

Throughout the project, I adhered to professional practices by implementing meta tags to boost the website's Search Engine Optimisation (SEO), increasing the likelihood that it appears in relevant search results. I also prioritised semantic markup to improve accessibility, ensuring that screen readers and bots are able to browse the site efficiently.

The development process was iterative, incorporating feedback from user testing to refine the UI and UX. For user testing, I either provided the user with a list of tasks to complete on the site and observing how they navigated the site in order to complete them or just observed their natural interactions while browsing the site. This approach gave me critical insight as to what features needed to be polished in order to create a user friendly experience that aligns with the users' needs and expectations.

Conclusion

In conclusion, developing this website was a valuable learning experience that expanded my understanding of both the technical and design aspects of web development. Familiarizing myself with the D3.js library and experimenting with other web technologies allowed me to create a site that merges interactivity with a minimalist aesthetic. I was challenged to think critically about each design choice to ensure the website remained visually appealing and user-centred. Through iterative user testing, I gained insights that will continue to shape my approach in future projects, reinforcing the importance of user feedback in refining UI and UX. Additionally, overcoming the challenges of managing and abstracting complex code taught me strategies for organizing logic and structuring code more effectively. I now recognize the importance of designing with responsiveness in mind from the outset to avoid the difficulties I encountered in this project. Overall, this project not only honed my technical skills but also strengthened my appreciation for the impact of thoughtful design and interactivity in creating meaningful, user-centred websites.