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A Comparative Study of AI Driven UX/UI Vs Traditional UX/UI in E-Commerce Websites and Platforms

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Abstract- This research conducts an inclusive comparative study between AI-driven and traditional UX/UI design approaches in e-commerce websites and platforms. It evaluates key performance indicators such as user efficiency, effectiveness, and overall satisfaction across various demographics, including gender, age, and geographic location. By examining real-world daily usage patterns, the study aims to highlight the strengths and weaknesses of each design approach. By analyzing user interactions, the research aims to determine which design approach—AI-driven or traditional—offers a more preferred/ better experience and to identify which method is more likely to enhance user experience. This research claims that a significant amount of youngsters prefer AI Driven UX/UI designs although very close in numbers, the number of people choosing Traditional UX/UI designs is also not low. The age group choosing Traditional UX/UI falls under the category of 31-60. Although preference has declared AI Driven UX/UI designs to be more likely to be chosen, the use of Traditional UX/UI designs still hold significance, especially among older age groups and female respondents, which highlights the importance of a balanced approach.

Keywords- UX/UI, User Experience, User Interface, Comparative Study, Website, Figma, AI tools, Designing

I. INTRODUCTION

In today's digital world, e-commerce has become an integral part of our daily lives. Whether we're browsing for clothes, ordering groceries, or booking services online, the way a website looks and feels can make or break our experience. This is where User Experience (UX) and User Interface (UI) design come into play. Traditional UX/UI design, which has long shaped how we interact with digital platforms, is now facing a new challenger: AI-driven design.

As AI becomes more integrated into our everyday technology, it raises an important question: Is AI-driven UX/ UI truly better at understanding and catering to users' needs compared to traditional design methods?

For years, traditional UX/UI design principles have guided the development of user-friendly interfaces, focusing on usability, aesthetics, and human behavior. However, we are now at the dawn of a new era where artificial intelligence (AI) is being incorporated into UX/UI design, promising to revolutionize the way we interact with e-commerce platforms. With AI, designers can tap into vast amounts of data to personalize and adapt interfaces to each user's unique preferences, behaviors, and needs. But is AI really the future of UX/UI, or does traditional design still hold its ground when it comes to delivering an optimal user experience?

This research aims to explore that very question by conducting a comparative study between AI-driven and traditional UX/UI design in the e-commerce landscape. Through an analysis of how these design approaches affect users from diverse demographics—including different age groups, genders, and geographic regions

Objective

This study aims to make an impact and improve the following factors leading to a successful user interaction phase:-

Analyze Demographic Variations: Investigate how different demographic factors—such as age, gender, and geographic location—affect user interactions with both AI- driven and traditional UX/UI designs. This will help identify any trends or preferences that may exist across various user groups.

To compare the efficiency of AI-driven UX/UI and traditional UX/UI design on e-commerce websites in terms of task completion time, ease of use, and user satisfaction.

Investigate Real-World Usage Patterns: Analyze real- world usage patterns through observational studies or analytics data to understand how users interact with e- commerce platforms employing AI-driven versus traditional UX/UI design.

To evaluate user preferences and impressions regarding AI-driven versus traditional UX/UI designs, focusing on the personalization and adaptability provided by AI-driven systems.

To identify the strengths and weaknesses of AI-driven UX/UI and traditional design approaches when applied to real-world e-commerce platforms.

II. LITERATURE REVIEW

This research paper introduced Heonsik Joo who has described in his paper "Study on Understanding of UI and UX, and Understanding of Design According to User Interface Change" about the various changes in the field of UX/UI designing. It emphasizes on the various changes made into this field and what we can learn to keep up with it[2].

Along with the reference paper [8] we understand the significance as well as the drawbacks of AI.The integration of artificial intelligence (AI) into user interface (UI) and user experience (UX) design has become a focal point in contemporary design practices. As AI technologies evolve, they not only automate various design processes but also enhance decision-making capabilities by providing insights based on user data. This literature review explores how AI is reshaping human roles within the UI/UX design industry, examining both the opportunities and challenges presented by these technologies.

Fundamentals of UX/UI Design

Color Theory

- It is a fundamental aspect of design, in UX/UI, and involves the use of color to create visually appealing, meaningful, and functional designs. Color impacts how users feel, interpret, and interact with interfaces, so understanding color theory can help designers create intuitive and aesthetically pleasing user experiences.
- A neutral color palette is been chosen for a smoother flow of design and to not over complicate the process..
- For this research, the same color palettes were used to differentiate which of the designs perform better and which design is more visually appealing for the user. This is done to avoid any partial behavior and maintain a balance to not make one of the designs exceedingly better than the other

Usability

- The interface should be easy to navigate, and users should be able to perform tasks without frustration. A well-designed product should feel intuitive, even to a first-time user..
- Users should quickly learn how to interact with the system without needing extensive guidance.
- Use a zero before decimal points: "0.25", not ".25". Use "cm3", not "cc". (bullet list)

Visual Hierarchy

- Visual hierarchy ensures that users can easily identify the most important elements on the page, such as calls-to-action, navigation links, or key information. Users should quickly learn how to interact with the system without needing extensive guidance.
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Layout

- Layout in UX/UI design refers to the arrangement and organization of visual elements on a page or screen, including text, images, buttons, and navigation components.
- A well-thought-out layout helps guide users through a website or app, making content easy to read and interact with, while improving overall user experience.

Typography

- It refers to the art and technique of arranging type, making written language legible, readable, and visually appealing when displayed.
- Ensure that the fonts work together harmoniously. Avoid using fonts that clash in style or mood
- Aligns text to both the left and right margins, creating a clean, straight-edged block of text. However, it can lead to uneven spacing between words, affecting readability.

III. METHODOLOGY

After applying the required principles and fundamentals into each design, a google form survey was generated to ask users about the aesthetic, visual satisfaction and the overall experience. The questions and the description about the survey is given below in detail.

The methodology of this research is composed of comparing the visual satisfaction, color theory, usability, visual hierarchy, layout and typography of each design.

1. Research Design

The study will employ the approach of qualitative data. This will allow for a thorough comparison of AI-driven UX/ UI versus traditional UX/UI by capturing objectives and user perceptions.

- **Qualitative:** Gather user feedback and preferences through surveys, interviews, or focus groups.
- In this case Google forms are used.

2. Comparative Analysis

- The core design is a comparative study where two versions of e-commerce platforms will be evaluated: one utilizing traditional UX/UI and the other using AI-driven UX/UI.
- In this case we have taken the example of an e-commerce shopping website for clothing.
- In each design i.e the traditional and AI driven, all the design principles have been incorporated in both designs.

3. Data Collection Methods

- The type of data that is being used is primary data
- and the data is collected through google forms
- I have fixed and established the data set limit at 50.

The following generic questions were asked :-

- What is your name?
- What is your age?
- Where do you live?
- What is your gender?
- Do shop online?

These questions are enquired in order to further categorize the data.

The following specific questions were asked in the survey comparing both the designs:-

- Which one of these designs do you like more(the traditional or the AI driven)?
- According to you which website page will encourage you to buy?
- Whose color do you like the most and which pictures text is more clear?
- To summarize this survey which one of the Pages was the better option for you?

The research is based on these following questions

Creation of Pages for Comparison

For the traditional design page, Figma designing tool is used to create multiple landing pages for the e-commerce shopping website.

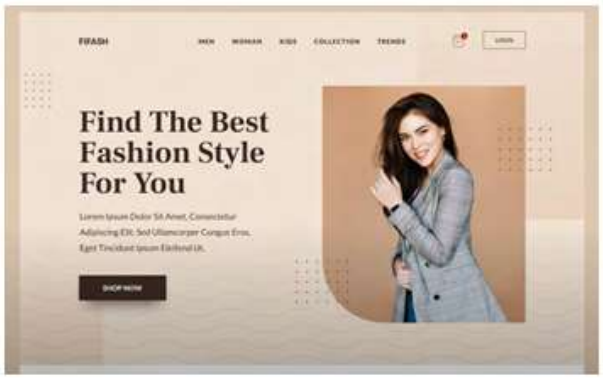

Figure 1: Traditional Home Page

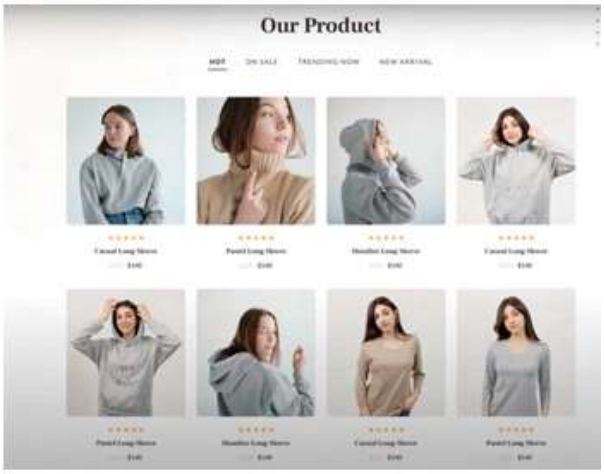

Figure 2: Traditional Product Page

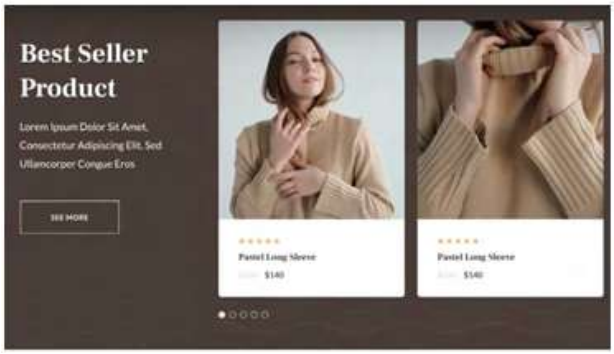

Figure 3: Traditional Product Page

For the AI Driven design page, ChatGPT was trained with all the basic principles and fundamentals of UX/UI design and was was told to generate the multiple pages for the e- commerce shopping website.

Figure 4: AI Driven Home Page

Figure 5: AI Driven Product Page

Figure 6: AI Driven Product Page

Testing

In the testing phase, a data set of 56 has been acknowledged and results have been generated based on these primary data.

A Few Data Survey Entries are Given Below

Serial No.	What They Prefer			
	Name	Age	State	Traditional Or AI Driven
1.	Mohammad Azam Aga	21-30	Maharashtra	Traditional
2	Salman Ahmed	21-30	Maharashtra	Traditional
3	Vinayak	21-30	Maharashtra	Traditional
4.	Shraddha Tiwari	21-30	Maharashtra	AI Driven
5.	Vishaka Kotian	21-30	Maharashtra	AI Driven
6.	Shahan	21-30	UP	Traditional
7.	Arshdeep Singh	21-30	Maharashtra	AI Driven
8.	Hasnaat Ansari	31-40	Maharashtra	AI Driven
9.	Mohammad Waqas	31-40	UP	Traditional
10.	Madiha	21-30	Maharashtra	AI Driven

IV. RESULT & DISCUSSION

The representation of data based on age

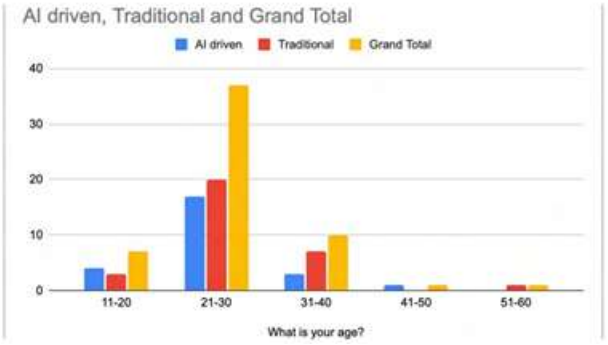

Figure 7: Based on age

The representation of data based on gender

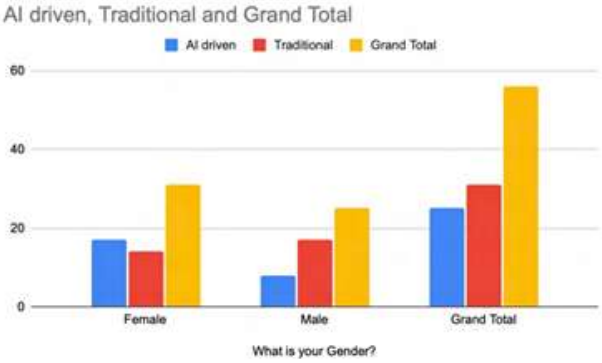

Figure 8: Based on gender

The representation of data based on locality

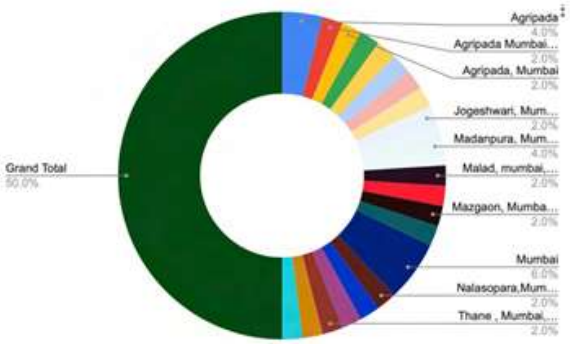

Figure 9: Based on locality

- Based on the comprehensive analysis conducted in this study, it becomes clear that both AI-driven and traditional UX/UI designs have unique strengths and limitations, with their effectiveness varying based on user demographics, engagement goals, and platform-specific needs.
- Through observational studies and survey data, this research assessed user satisfaction and engagement with both types of UX/UI design on e-commerce platforms.
- Findings indicate that while AI-driven designs often lead to enhanced task completion and engagement rates, traditional designs provide a more straightforward, accessible interface.
- Given the variability in AI implementation quality across platforms, as noted in the study's limitations, some AI- driven interfaces may not meet user expectations consistently, underscoring the need for balanced integration.

Limitations

Limited Sample Size

One of the primary limitations of this study is the relatively small sample size of participants(which is 50). A small sample size restricts the ability to generalize the findings to a broader population. While the study captures valuable insights into user preferences and experiences with AI-driven and traditional UX/UI designs, the sample may not represent all user demographics, behaviors, or cultural backgrounds.

Time Constraints

Another limitation of this study is the time constraint imposed during the research process. The duration of user interactions with AI-driven and traditional UX/UI designs was relatively short, which may not have provided enough time for users to fully explore and experience the platforms.

Geographical and Demographic Constraints

A notable limitation of this study is the geographic and demographic scope of the participants. The data collected may be influenced by the specific region or population group from which the participants were drawn, which can affect the generalizability of the results. Users from different regions may have distinct preferences, cultural values, and levels of technological access, all of which can influence how they interact with AI-driven or traditional UX/UI designs.

AI Technology Variability

A significant limitation of this study is the variability in AI technology across different e-commerce platforms. Not all AI-driven UX/UI implementations are created equal. The sophistication, functionality, and effectiveness of AI tools can vary greatly depending on the platform and the underlying technology being used. Bertao and Joo (2021) investigate the integration of artificial intelligence in UX/UI design, identifying current trends and future implications, such as increased personalization and automation in user interactions within e-commerce [7]. Pratama and Cahyadi's (2020) study, referenced here again, underscores that user interface elements significantly affect consumer decisions, a notion further strengthened by advances in AI-driven designs [6].

User Familiarity and Bias

One of the limitations of this study is the potential for user familiarity and bias to influence the results. Users may have prior experience with either AI-driven or traditional UX/UI designs, which can shape their perceptions and preferences.It analyzes the influence of UX on user-centered e-commerce platforms, reinforcing the idea that a well-designed user experience leads to higher user satisfaction and potentially increased customer loyalty [5].

Future Scope

The findings from this comparative study open several avenues for future research in the domain of UX/UI design, particularly concerning the integration of AI technologies in e-commerce platforms. It emphasizes the importance of user experience (UX) design in improving customer satisfaction in e-commerce, highlighting the critical role of UX elements in retaining customers and driving engagement in online platforms [1]. One promising area for exploration is conducting longitudinal studies that track user interactions with both AI-driven and traditional designs over extended periods. Such studies could reveal long-term user satisfaction, learning curves, and evolving preferences that might not be captured in short-term assessments. Understanding how user experiences change over time would provide valuable insights for designers aiming to create more effective and enduring interfaces.

Another vital aspect to consider is the expansion of demographic research. Future studies could include a more diverse participant pool that encompasses various demographics, geographic locations, and cultural backgrounds.

V. CONCLUSION

The analysis shows a clear trend favoring AI-driven UX/UI designs, particularly among younger respondents aged 21-30. This demographic's strong preference suggests that as the user base skews younger, businesses focusing on e-

commerce and digital platforms may benefit from investing in AI- driven UX/UI solutions to meet the evolving expectations of their audience. Roth (2017) discusses the principles of UI/UX design in Geographic Information Systems (GIS), offering insights that can also apply to e-commerce. His work suggests that accessible, intuitive design enhances user interactions across platforms [4].

Meanwhile, traditional methods still hold significance, especially among older age groups and female respondents, which highlights the importance of a balanced approach that caters to diverse preferences. Companies should consider user demographics when designing interfaces to ensure they resonate with their target audience, potentially combining elements from both AI-driven and traditional designs to maximize user satisfaction and engagement. Pratama and Cahyadi (2020) explore the effects of UI and UX on application sales, showing that thoughtful design can positively impact consumer purchasing behavior, aligning with the benefits noted in AI-driven e-commerce platforms [3].

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