Evaluating Generative AI

Using ChatGPT to Support Mobile Design and Development Processes

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ABSTRACT

This research explores how ChatGPT can be a helpful tool in mobile design and development. It provides detailed insights into the entire process of designing and developing mobile applications, emphasizing the challenges at each stage. The study then thoroughly examines ChatGPT's capabilities, highlighting its effectiveness in giving support in different settings and situations in relation to design and development processes. By asking specific questions, the paper evaluates the model's ability to provide detailed and contextually relevant support. The goal of this research is to envision a future where ChatGPT becomes a valuable companion, improving the efficiency and creativity of mobile application creation.

1 INTRODUCTION

In an era dominated by mobile technology, the seamless integration of design and development processes is crucial for creating innovative and user-friendly mobile applications. This research investigates how ChatGPT can help in this. It carefully examines the details of both designing and developing mobile apps, giving a clear picture of the challenges in each step.

Following a detailed description of the mobile design and development landscapes, the paper focuses on ChatGPT, an advanced language model. It undertakes a comprehensive exploration into what ChatGPT can do, showing how the tool can generate different types of content, such as personas, code snippets, and setup descriptions. The research asks specific questions to see how well ChatGPT can give detailed and relevant support throughout the mobile design and development process.

The goal of this investigation is to figure out if ChatGPT can be a useful partner in creating mobile apps, providing useful help to both designers and developers. This fits into the ongoing connection between artificial intelligence and mobile technology, imagining a future where ChatGPT plays a key role in making mobile design and development more efficient and creative by giving useful support in each phase of the processes.

2 MOBILE DESIGN PROCESS

The first step of a design process for mobile devices is defining the structure of the solution and aligning it with the product. This process is called define phase [8]. It is crucial to do this before the actual design part can be started. During this phase the basis for the product is laid and the concept is getting created through high level brainstorming [1].

Once the concept is outlined, the research phase is kicked off. This happens through user research as well as market research. Doing research early in the process and changing design concepts according to the research results is important since it can help save a lot of time in the long run [2].

Next up is the analysis phase which uses the results from the previous phase and analyses why these results have emerged [1]. Specific details of the product are being analyzed, starting from terminology to visual differences and the navigation process [9]. The outcome of the analysis phase and certain previous assumptions will then be assessed and verified to ensure they are still valid [1].

After the concept phase, the research phase and the analysis phase are finished, the design phase is starting. The tasks in this stage range from information architecture to UI design [2]. As for the information architecture sitemaps and for the UI design wireframes are being created [8]. In order to have a successful design process it must fulfill two factors. Being highly collaborative as well as being iterative. Meaning that every team member must actively participate in the process and ensuring that the process cycles back upon itself to validate ideas [2].

The last part of a good design process is the validation phase. Usually, it is completed after the high-fidelity prototype of the product is finished and done with real end-users. During this process a series of user testing sessions is completed to validate the quality and user friendliness of the product [7].

3 MOBILE DEVELOPMENT PROCESS

The development process of a mobile application can differ according to each paradigm. For mobile applications there is a good amount of different ones. Fundamentally it is differentiated between native apps, web apps and hybrid apps [3]. The focus of this chapter will be directed to web apps.

The mobile development process of a web app starts with the requirement analysis phase. The phase of requirement analysis involves understanding and specifying the anticipated resources from the system, along with establishing limitations on the implementation and expansion [4]. In addition, this stage seeks to identify the requirements and anticipations of pertinent stakeholders. This stage is crucial in the development process, as any errors during this phase can inevitably result in later issues in the application's design and implementation [10]. In the course of the requirement analysis, ignoring web requirements and not addressing security concerns could lead to vulnerabilities in the app [4].

Next comes the implementation phase. During this phase the implementation of the web app takes place. During the implementation the goal is to create a web product fitting to the previous created design [10].

The last phase of this process is the deployment phase. During this phase the application usually gets deployed to a previously determined server and accounted to a fitting domain [4].

4 CHATGPT FUNCTIONALITIES

ChatGPT, as an intelligent conversational computer program, possesses the capability to offer detailed responses based on instructions provided in a prompt. As a part of AIGC (Artificial Intelligence Generated Content), ChatGPT has demonstrated impressive capabilities in diverse language understanding and generation tasks, including multilingual machine translation, code debugging, story creation, admitting mistakes, and even refusing inappropriate requests in alignment with the official statement. A distinctive feature of ChatGPT, setting it apart from earlier

conversational programmes, is its ability to retain information from earlier parts of the conversation, facilitating seamless and continuous dialogues [5, 11].

The Language Model has successfully navigated professional examinations in law, business, and medical licensing, stirring the imagination of many. On one side of the spectrum, optimists anticipate that the tool will amplify human creativity and productivity. Conversely, skeptics voice concerns regarding the potential influence of ChatGPT on the job market. This debate highlights the need to rethink the dynamics of collaboration between humans and artificial intelligence in our rapidly evolving society [6].

Artificial intelligence-generated content, which is at the forefront of technology, allows users to use AI to automatically create different types of content, including images, text and videos, tailored to their individual preferences. The continuous advancement of AI algorithms and network structures has led to considerable progress in the field of AIGC. Core technologies such as Generative Adversarial Network (GAN), Contrastive Language-Image Pre-training (CLIP), Diffusion Model and Multimodal Generation play central roles across various areas of AIGC, ensuring the automated generation of high-quality content [5].

ChatGPT is a combination of different technologies and has a variety of features, including deep learning, unsupervised learning, instruction fine-tuning, multi-task learning, context learning and reinforcement learning [5]. The tool has a variety of features which can be applied ranging from software development to daily life. As of now, ChatGPT has fundamentally shifted perceptions regarding the existing possibilities and potentials of AI tools in numerous communities [11].

The system is constructed upon the foundational GPT (Generative Pre-trained Transformer) model, which has undergone iterative enhancements from GPT-1 to GPT-4. Initially developed in 2018, GPT-1 focused on training a generative language model based on the Transformer framework through unsupervised learning. The pretrained model was then fine-tuned for specific downstream tasks. In 2019, GPT-2 expanded on this approach by introducing the concept of multi-task learning. This expansion aimed to enable the pretrained generative language model to generalize to a wide range of supervised subtasks without the need for additional fine-tuning [5].

In the near future, individuals deciding to use generative AI tools will likely experience significantly enhanced efficiency compared to those who do not use such tools, given their potential as effective assistive technology. However, it is crucial to comprehensively explore the functionalities of ChatGPT to leverage them for advanced applications. Disregarding AI tools and their progress could impede a deeper understanding and hinder enhancements in work processes [11].

5 CASE USAGES OF GENERATIVE AI

ChatGPT has been tested according to the mobile design and development processes presented in chapters two and three. For both processes, questions and demands were formulated that the tool should answer successfully. A question is considered to have been answered successfully if the answers, provided by ChatGPT, can be classified as helpful for the respective process.

5.1 ChatGPT for Mobile Design

The following four questions or requests were created to support designers during a mobile design process for a recipe web app.

1. I want to create a web app regarding recipes. Can you help me expand the idea?

2. Create a design concept for a recipe app.

3. Describe five personas that would be part of the target group for a recipe app.

4. Create a wireflow for a recipe app.

Regarding the request for expanding ideas for a recipe app, the tool proposed 16 diverse suggestions, incorporating concepts such as "Social Integration" and "Shopping List Generator." Each idea was elaborated with one to two detailed bullet points, enhancing clarity. When prompted to "create a design concept for a recipe app," ChatGPT once again provided 16 distinct ideas, including elements such as "Visual Hierarchy" and "Color Coding." To ensure a thorough understanding, the tool accompanied each idea with additional bullet points.

Upon the inquiry to describe five personas suitable for the target audience of a recipe app, ChatGPT introduced five personas with connections to cooking. These personas, such as a professional cook, a family cook, or an individual who finds cooking challenging and seeks easy recipes, were accompanied by detailed descriptions. Furthermore, each persona was presented with a set of needs and goals that could be addressed by utilizing an appropriate recipe app.

ChatGPT was able to answer all four requests in a helpful matter to the mobile design process. Although some of the requests were made very openly and without much information, the tool was able to provide good support for all of them with very detailed answers.

5.2 ChatGPT for Mobile Development

Another four questions or requests with focus on supporting the mobile development process were created.

1. Which frameworks, front- and backend, would be useful to create a recipe web app?

2. How should the frontend framework be set up, assuming Angular is being used?

3. Provide Typescript code that helps with saving new recipes in a MySQL database.

4. How can a recipe web app be deployed successfully?

ChatGPT adeptly addressed the inquiry about the usage of frameworks by proposing various frontend and backend frameworks for a recipe web app. The tool went on to explain the suitability of each framework, even extending its response to include recommendations for databases and additional tools, despite no specific request for such information. Subsequently, when prompted to explain the setup of Angular, ChatGPT provided an extensive response. It outlined prerequisites, such as required npm-packages such as the Angular CLI, followed by a step-by-step guide on project setup and a detailed description of the Angular development workflow, all without a specific request for this level of detail.

In response to a rather broad request for Typescript code aiding in saving new recipes to a MySQL database, ChatGPT handled the question very well. It contained references to the backend framework and MySQL database to be used and then provided the required code in a complete Typescript file. The file was accompanied by a descriptive explanation of its content.

When asked about the successful deployment of the recipe web application, ChatGPT drew on information from a previous question about the use of Angular. It first outlined the process of building the Angular frontend for production.

Following this, the tool suggested various deployment considerations, including "Secure Sensitive Information," "Choose a Hosting Provider," and "Testing." Each suggestion was then thoroughly described with two to three bullet points, enhancing the overall clarity of the response.

Overall, ChatGPT was also able to answer the requests regarding a successful mobile development process in a helpful matter. During this round of questions, it was especially noticeable that the tool provided helpful additional information, though there was no specific request to do so. Furthermore, the tool utilized previously asked questions from the same chat to get further needed information, which makes the answers very detailed and fitting.

6 CONCLUSION

In summary, the assessment of ChatGPT in the context of mobile design and development has shown positive outcomes. When applied to the design of a recipe web app, ChatGPT proved to be remarkably versatile. It not only expanded on initial app ideas but also generated detailed design concepts, personas, and wireflows, demonstrating its ability to enhance the brainstorming and planning stages.

Moving on to development-related queries, ChatGPT continued to perform well. It provided suggestions for suitable frameworks and offered detailed insights into setting up Angular, showcasing its proficiency in giving thorough guidance. Additionally, its effective handling of a comprehensive code request for Typescript, along with explanations of backend and database choices, highlighted its capability to assist developers in tackling complex coding challenges.

An important observation was ChatGPT's inclination to provide additional relevant information, showing a keen understanding of contextual dependencies. By using previous responses to improve subsequent answers, the tool demonstrated an ability to offer consistent and detailed support throughout both the design and development processes. This assessment positions ChatGPT as a valuable asset in the landscape of mobile application creation, capable of making meaningful contributions to various aspects of a design and development journey.

For additional research, it is recommended to create more intricate demands for the tool for each stage of a design or development process. Moreover, specific criteria can be established to assess the tool's performance in handling questions, particularly beneficial for more complex inquiries.

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