Interior Designer Mobile App

Final report

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Figure 1: Interior Designer Mobile App Project, 2021.

ABSTRACT

The aim of this project was to develop a first prototype of a mobile application for the simple creation of sketches in the field of interior design. In the following, the development process from hand sketches up to prototypes created with the react-native framework is shown and problem situations and optimization options are discussed. With a strong focus on simplicity this project delivered a solid prototype of a user interface which, due to the complexity of the requirements in the area of interior design and the associated technologies still to be implemented, such as augmented reality, has to be evaluated again at a later stage.

KEYWORDS

interior, design, augmented reality, mobile application, react native

ACM Reference Format:
Asım Oğuz, Dominik Pegler, and Sophia Pum. . Interior Designer Mobile App: Final report. In *Proceedings of VU Human Computer Interaction 2021 (HCI '21).* ACM, New York, NY, USA, 6 pages.

1 MOTIVATION

1.1 Problem

Imagine you are moving out to a new place or you want to redesign a room of yours. What options do you have while designing? How well will the furnitures fit in your room? Will the style match your expectations? These are just some of the many questions that will pop out if you have a room designing process ahead of you. The typical solution for this would be just imagining it, making sketches by hand or just trying it out, but this would be too much expenditure and that is the reason why the interior designer app should be used.

1.2 Tasks of the app

The main purpose of the app is to minimize the effort to design a room and not just a room but specifically the room that you need to get designed, that is why the app allows you to scan rooms. This leads to you having the exact room you need and eases the transformation from design into reality. There is also the option to choose a pre-existing room just in case you want to try out new styles or want to experiment a little. Once a room is selected the user has the possibility to import furnituters and arrange them as they wish until the room has the desired design. And as soon as the room is finished it can be saved in the form of an exported image.

1.3 Users

The user spectrum for this app is actually pretty wide. Everyone who is able to handle mobile devices and has some interest in designing or redesigning is a potential user this also leads to that the app has to be designed in a way that it can be used by the whole spectrum. Our target group are people from the age of 18 – 40, as well as modern people who are interested in new solutions. The users we want to reach, are familiar with new technologies and open to try new things. They also should be interested in design and are willing to take their time to experiment around. Still the

target group is be practical and wants to find the most efficient but convenient solutions.

(Asım Oğuz)

2 RELATED WORK

There are already quite a few Interior Design Apps on the market, like we have already analyzed in the Konkurrenzanalyse in Milestone 1. Those include some really good systems with a lot of features. In order to stand out from these Applications we tried to make a simple and well-structured solution, which concentrates on the main features while keeping everything minimal. The main things we focused on was the room scanning and setting up rooms with furniture. We also put a big focus on a simple and straightforward design.

Simply scanning a room, saving the scan and adding furniture afterwards is how user can design their own room. We also discussed realizing the scanning process via Augmented Reality, so that the user can make quick and real-time changes to their room. However, we figured that this is not the best solution for us and the user, since it not good for planning long-term interior designs and hard to implement for us, who lack in front end programming experience.

We discussed some different solutions for our app during Milestone 2, the low-fi prototyping. All of us developed a unique idea of how we could realize our app. Some things we all had in common was a screen for room scanning, a screen for setting up a room and a home screen for navigation. As mentioned before those ended up being our main features. A functionality which we also talked about was a photo library of rooms and furniture for inspiration. Many existing apps, similar to ours include something like that, but we decided against it, since it is not necessary to have in our app.

All of us have hardly any to no experience with UI or App programming. Neither has anyone of us worked on something similar to our interior design app. All of us made our first frontend programming experiences during A2 of the Human-Computer-Interface VU, where we implemented a simple Application to search for musicians and display related information. Even though it is the only work which relates to our App, we could get some of use of it. For example the navigation via buttons on the home screen.

(Sophia Pum)

3 DESIGN

The main design aspect we have decided on from the beginning of the project, was to keep everything simple and clean. All of us agreed, that a minimalistic and abstract design would fit the best for our system, our target group and the whole concept of our app. We wanted to keep everything straightforward, from the functionalities and to the design. Furthermore, we also thought a clear design is important for our app, since there are already a few similar products on the market, so we needed an uncomplicated appearance in order to make users interested and stay with our app.

3.1 Home Screen

The Home Screen (see fig. 2) is the first screen which users will see when they open the app. From our own experience we know, that people will not stay long if they get overwhelmed by text, pictures and icons. So we tried to avoid that by simply adding a clear and light-toned background picture, our minimal logo and a simple and uncomplicated navigation.

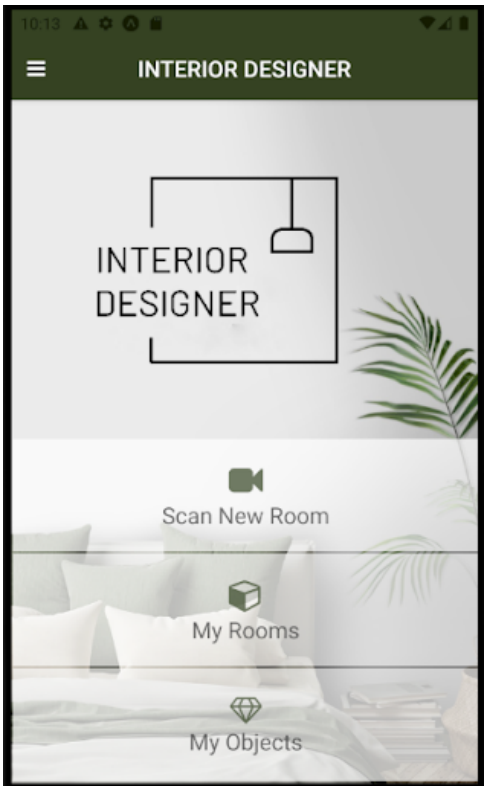

Figure 2: HomeScreen

3.2 Scan Screen

We wanted the Scan Screen to be pretty self-explanatory and designed it very simple by adding arrow icons, which should help guiding the user through the scan process. During earlier prototyping steps, we thought of including more specific text introductions, to explain the scanning to the user, but we decided against it. Firstly, because it is not a difficult step to do and secondly because our target group are rather young people, that we expect to have some knowledge of modern technologies. However after carrying out the interviews, the feedback included, that a short instruction would be nice, in order to avoid confusion and provide a simple overview. So we added a process bar, and a short statement, which tells the user to turn around in the room.

3.3 Room and Object Screen

The Object and the Room Select Screen (fig. 5) are designed pretty similar. The rooms and objects are simply listed with a picture and a title. The user can navigate through that list, via scrolling by simply swiping up and down. We chose this solution, because it is a very common feature in modern apps, so our target group should be familiar with it. The Room Screen (fig. 4) itself is designed very

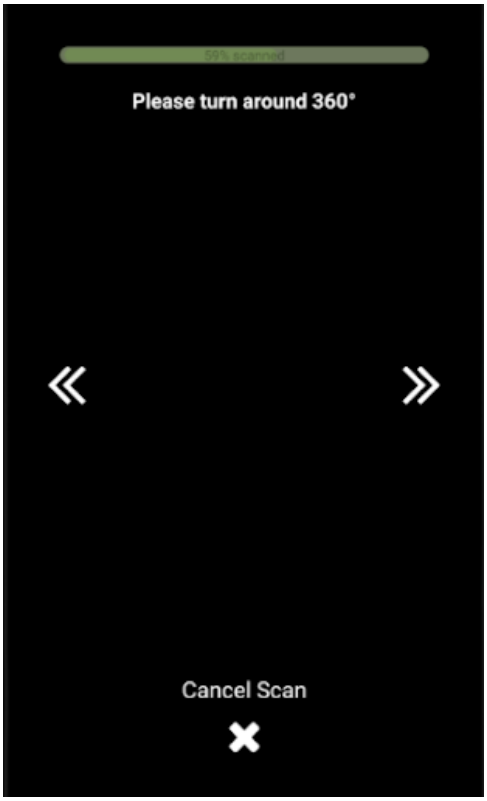

Figure 3: ScanScreen

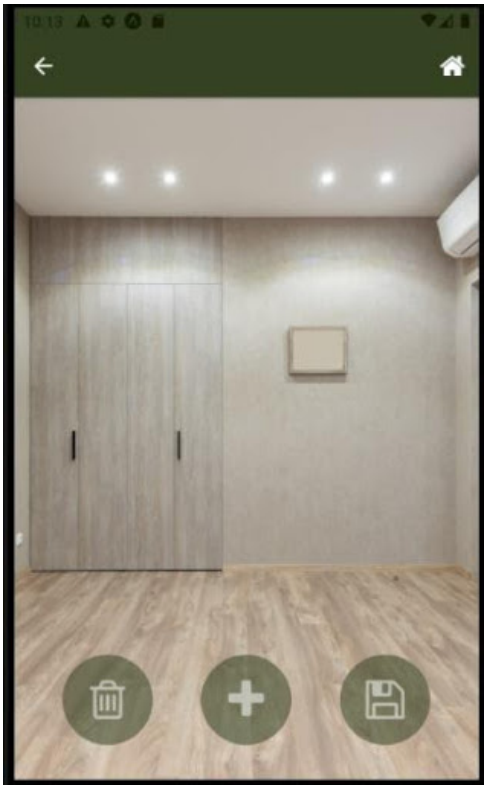

Figure 4: RoomScreen

abstract, with no text, just the icons. This might get the user confused in the first place, but they will quickly be able to understand everything, by clicking around a bit. We also decided on simple icons, without any fancy details, so the user should easily identify the symbols and have an idea of what will happen.

3.4 Overall

All in all keeping the design simple and consistent was not always easy, even though it might sound like that. During early prototyping steps we soon realized that everyone has a different interpretation of a minimal design and that it is important to precisely analyze what aspects are essential for a smooth user experience and what we could skip on. *(Sophia Pum)*

4 IMPLEMENTATION

The app was developed in react-native which is an open-source JavaScript library that is used for building mobile user interfaces. While implementing the app we have not used any templates and the only toolkit used was expo-camera. This was necessary to be able to get access to the camera of the device and be able to implement the ScanScreen. React-native allows for development for both android and IOS at the same time so the interior designer app is available for both of these platforms. The main problem of ours was the missing knowledge about developing in react-native or ReactJS. None of us had ever used this framework before so it was not easy to adapt to the new required developing style needed by react-native, this led to us needing to do a lot of research. An example for this would be when to use absolute and when to use relative positions for the react elements. Using the wrong style led to unexpected results which took quite some time to resolve. Our main problem solving method was research and there is a lot of content about react-native online so we were almost always able to find a solution. We also had a really great communication in the team. This was maybe the result of us just being a three person team, but thanks to communication we did not have to deal with the problems by ourselves and could help eachother out. *(Asım Oğuz)*

5 EVALUATION

There were eight participants who were included in the study varying in age, profession and gender. Because of our wide spectrum of possible users we had the goal to choose the participants from different groups to be able to represent all of our target group. The participants were provided with the app and were requested to answer a total of 23 questions doing 5 different tasks. While choosing the tasks we tried to cover the whole app. The following section shows these tasks: Scanne einen Raum ein und bestätige den Scan. Wähle einen Raum Gestalte den Raum Wähle ein Objekt aus Ändere die Einstellungen

And finally after all these tasks were completed we asked for a general review of the app.

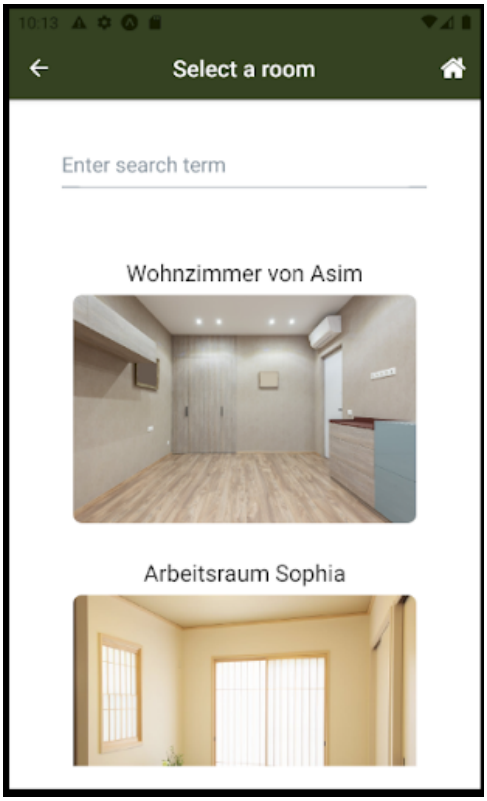

Figure 5: RoomSelectScreen

5.1 The result

The feedback we got from almost all of our participants was that the app was designed in a clean and easy to use way. This was a purpose of ours so it can be said that we have reached a goal regarding design. Most of the negative feedback was regarding the scanscreen which is understandable because this is a unique feature of our app and the users are not used to a task like this but in the end they all succeeded in using it so it can be said that they needed some time and adaptation to this. A detailed result about improvement ideas is shown in an external table. *(Asım Oğuz)*

(Lösungsvorschläge zu Feedbacks)

6 REFLECTION

The most important lessons we have learned were not regarding programming but they were about planning and designing of the app. We have learned that design is an iterative process so this means no matter how well you think about everything in the end there will be points that have to be optimized. Another important point we learned was the significance of letting the users test the app. Since we were involved in the development process from the beginning every screen and every function was clear and understandable for us but this was not the case for the users. Thanks to the interviews we were able see the odd things in the app and adjust them. So for future works we will have in mind to include users in the design process from the beginnig. *(Asım Oğuz)*

The work separation is shown in an additional spreadsheet file ("Arbeitsaufteilung M4").

7 CONCLUSIONS AND FUTURE WORK

Due to the goal of creating an application for use in the area of interior design and the complexity and variety of necessary technologies that come with it, especially in the backend, it could not be assumed from the start that we would create much more than a highly simulation-heavy user interface which would serve as the basis for further work. We think we reached our goals for the most part. The current immplementation is already well prepared for the expected increase in complexity in the further course, in that the interface is based on a design that is as simple as possible and already equipped with familiar style elements. So we expect that at least from the interface side, the amount of possible problems for users in dealing with the application can be kept low. Negative criticism from the user study suggested minor adjustments rather than major concept changes, which will also be included in the next releases. In the following sections we want to discuss possible further work.

7.1 Simplicity doesn't just have advantages

Certain functions have not been considered because of the strong focus on simplicity. This applies, for example, to the storage of rooms or objects. The app currently only offers the option of saving a room in the last configuration and overwriting the original room. Here we should provide more flexibility and enable users to duplicate rooms, rename them and save them in multiple configurations (i.e. with different objects and arrangement options). The concept of "rooms" and "objects" should therefore be expanded to include a concept of "projects", which contain all these different configurations. The concept of rooms, like that of objects, would then be limited in its definition to simple 3D models.

7.2 Cross-device and cross-platform development

Another essential aspect that needs to be dealt with immediately on the user interface is converting the layout into a cross-device and cross-platform-compatible layout. In the current implementation, some elements are still "hard-coded" for the sake of faster implementation and are not completely reliable in being able to adapt flexibly to all possible conditions such as screen sizes.

7.3 Research on available technologies

In future work, however, we no longer want to devote ourselves completely to the UI, but instead do more research to explore which technologies (such as augmented or virtual reality) would be suitable for the purpose. Since these determine the functionality of the app and thus define its feasibility and usefulness, the focus should be placed here in order not to invest in a project that cannot be implemented with the currently available technologies.

7.4 Purpose of the application

Another focus will be on working out the distinguishing features to existing interior design solutions. This includes, for example, an

"open" approach in the sense of a free and open exchange of digital objects, which, in addition to a mobile app, could lead to a separate platform for object exchange. We want to enable users to decide on the best possible and therefore most sustainable configuration for their living environment. We want the right pieces of furniture to find their way to the right people and not end up on second-hand platforms or in the garbage dump in a short time.

(Dominik Pegler)