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CREATING A HAIR SALON MOBILE APPLICATION FOR ANDROID AND IOS

Diploma thesis

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Lihtlitsents lõputöö reprodutseerimiseks ja üldsusele kättesaadavaks tegemiseks

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Gevork Gevorkjan

10.05.2024

CONTENTS

CONTENTS.....	3
INTRODUCTION	5
The Problem.....	6
The Solution	6
The Aim.....	7
Tasks	7
1 RESEARCH.....	8
1.1 Design.....	8
1.1.1 Element arrangement on reading comprehension	8
1.1.2 Color palette	9
1.1.3 Color schemes.....	11
1.1.4 Typography and fonts	13
1.1.5 Functionality.....	15
1.2 Competitors	16
1.3 Tools and technologies.....	18
1.3.1 Flutter	18
1.3.2 Dart.....	19
1.3.3 Google Firebase.....	20
1.3.4 Android Studio	20
1.3.5 Android	21
1.3.6 iOS	22
1.3.7 Lottie	22
2 DEVELOPMENT.....	24

2.1	Functional requirements for the mobile application.....	24
2.2	Non-functional requirements for the mobile application.....	25
2.3	Application architecture	25
2.4	Components	26
2.5	Architecture Patterns.....	27
2.6	Screens.....	27
2.6.1	Login Screen	27
2.6.2	Sign Up Screen.....	29
2.6.3	Home Screen	32
2.6.4	Mehed Screen.....	35
2.6.5	Naised Screen.....	36
2.6.6	Service Details Screen	38
2.6.7	Hairdresser Screen	38
2.6.8	Booking Screen.....	39
2.6.9	Success Booked Screen	42
	CONCLUSION.....	43
	RESÜMEE	44
	REFERENCES.....	45

INTRODUCTION

In the modern world, digitization is steadily penetrating various spheres of life, transforming them forever. One such sphere is the beauty and healthcare industry, where technologies are actively applied to improve service quality and streamline processes. As noted in a study published on the National Center for Biotechnology Information website, “With the development of mobile technologies and the proliferation of smartphones, user experience becomes increasingly central in the design of mobile applications for various fields of activity” (NCBI, 2023). This underscores not only the significance of mobile technologies but also their influence on shaping new standards in customer service and business management. In a world where every minute counts, mobile applications have become an indispensable tool for satisfying our needs and desires.

In the context of hair salons, where both the high qualification of stylists and meeting customer needs are important, developing a mobile application becomes a key element in improving service. Such an application can provide customers with a convenient tool for booking services, accessing information about available services and stylists, as well as providing feedback on the quality of services rendered. For the salon, it will serve as a means of managing schedules and client databases, and increasing the efficiency of stylists.

Considering the above, conducting research and developing a mobile application for a hair salon on Android and iOS platforms becomes not only relevant but also a necessary step for modern businesses in this industry. By analyzing existing solutions, identifying user needs, and developing functionality that meets these needs, it is possible to create a tool that will not only meet modern service standards but also help the beauty salon increase its competitiveness and improve customer interaction.

This thesis aims to develop a mobile application for a hair salon called “Nana Juuksur” on the Android and iOS platforms, designed to facilitate online interaction with the salon. The “Nana Juuksur” application will provide customers with a convenient tool for booking services, obtaining information about available services and stylists, as well as providing feedback on the quality of services rendered.

The Problem

The owner of a chain of hair salons faced a lack of online interaction in his business and approached the author to develop a mobile application for the salon. He realized that the absence of online booking and customer interaction capabilities was leading to missed opportunities to attract new customers and retain existing ones. Without the ability to book online, clients were forced to turn to competitors who offered more convenient service conditions. Despite the high quality of services and professionalism of the stylists, the salon struggled to attract and retain clients due to the lack of a convenient online booking and interaction method. This situation hindered the expansion of the client base and revenue generation for the salon, limiting its potential for growth and development in the market. This issue is crucial for the salon's future success, as in the modern world, customers increasingly prefer online interaction and convenience in service usage. Developing a mobile application capable of addressing this service gap will be an important step in enhancing the salon's competitiveness and ensuring its long-term success in the market.

The Solution

To address the described problem, the development of a mobile application for the hair salon, named "Nana Juuksur" is proposed for both iOS and Android platforms. This application will provide customers with the convenience of easily and quickly booking appointments at the salon directly through their smartphones. Additionally, "Nana Juuksur" will offer comprehensive information about available services and stylists, as well as enable users to provide feedback on the quality of services.

The main feature of the application will be its simplicity and ease of use. Clients will be able to easily find their preferred stylist, choose a convenient appointment time, and receive instant booking confirmation. This will significantly save time and simplify the process of planning a visit to the hair salon.

Also, "Nana Juuksur" will provide the salon with the ability to manage stylists' schedules, analyze the client database, and track feedback from customers. This will enable efficient resource management, optimize workflow processes, and enhance the level of service.

The Aim

The aim of this project is to create a user-friendly mobile application for the “Nana Juuksur” hair salon. This application will streamline appointment booking for clients and provide the salon with basic tools to manage appointments and improve customer interaction.

Tasks

To achieve the set goal, the following steps are planned:

- Researching customer needs and market analysis.
- Developing the functionality of the “Nana Juuksur” mobile application.
- Creating a user interface that is intuitive and appealing to users.
- Testing the application on various devices and platforms.
- Launching and distributing the application among potential users.
- Training salon staff to use the application and providing user support during its use.
- Continuously updating and improving the application's functionality based on customer feedback and market changes.

1 RESEARCH

1.1 Design

Digital technologies and user expectations are constantly evolving. Designers are increasingly embracing user-centered design, prioritizing user needs over visual aspects. This shift compels them to create products that are not only beautiful but also useful and enjoyable to use.

Good design is not just about aesthetics; it is also functional. It should be intuitive and easy to use, considering the needs and limitations of users. Poor design can lead to confusion, disappointment, and errors. In a world where people are surrounded by a multitude of products and technologies, the importance of design is greater than ever. Design can simplify life, make it more enjoyable and efficient, helping us solve problems, communicate, and access information.

Designers have a great responsibility to create products that are not only beautiful but also functional. They must consider the needs and limitations of users, as well as the characteristics of human perception and behavior.

User-centered design is not just a trend, it is a necessity. It is a way of creating products that will truly be useful to people and make their lives better. (Norman, 1988).

The author, after reading numerous articles, research papers, and other sources, identified several key components of successful design.

1.1.1 Element arrangement on reading comprehension

Robert P. Dolan and Sonya Powers Pearson conducted a study titled "Effects of Text and Visual Element Integration Schemes on Online Reading Behaviors of Typical and Struggling Readers."

The study examines the impact of various schemes for integrating text and visual elements on online reading behavior among typical and struggling readers. It was conducted using data from sixty-three fourth and seventh-grade students who were analyzed while reading middle school science passages embedded with diagrams and photographs. (Robert P. Dolan; Sonya Powers, 2012).

The study found that different design schemes for integrating text and visual elements in multimedia learning materials impact students' reading behaviors. An eye-tracking study was

conducted to observe how students view passages with different visual element layouts (inline and sidelined) and different levels of visual cues (explicit and implicit).

The results showed that the placement of visual elements significantly affects the amount of time students spend viewing them. Inline visual elements were viewed significantly longer than sidelined elements, regardless of reading level.

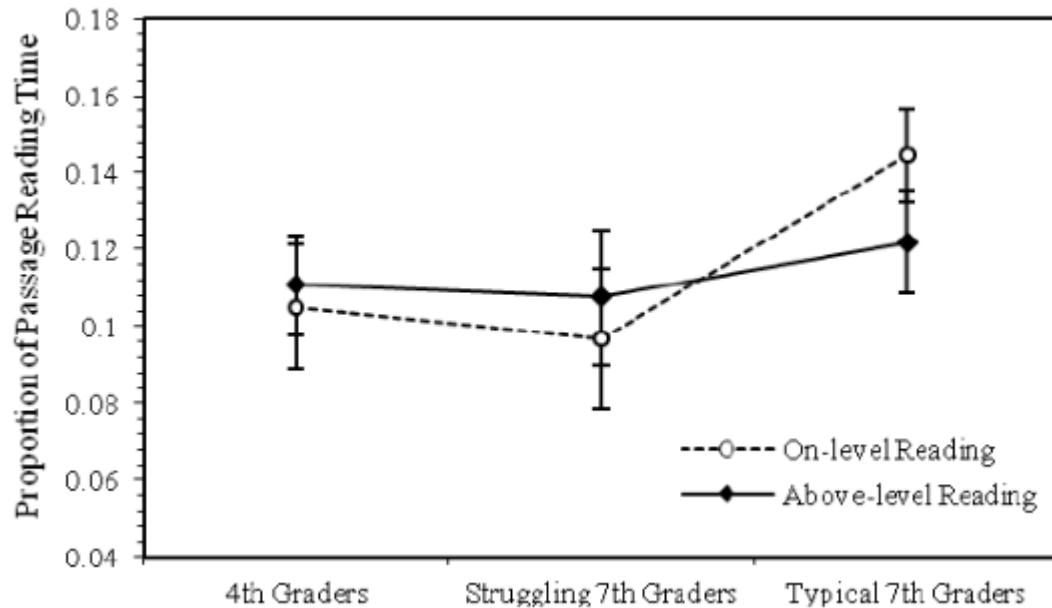


Figure 1 The proportion of total passage reading time that students spent viewing visual elements as a function of passage reading level. (Source: Robert P. Dolan; Sonya Powers, 2012).

This effect was most pronounced for struggling readers, who nearly doubled their viewing time of visual elements when they were presented in line with the text. Explicit cues to visual elements in the text also led to a small increase in viewing time compared to implicit cues, but this effect was not significant for struggling readers.

The study highlights the importance of considering the design of visual element integration in multimedia learning materials to optimize the use of visuals by students with varying reading abilities.

1.1.2 Color palette

Color palette is undoubtedly one of the most critical elements in web design, exerting a significant influence on user perception, mood, and behavior. The process of selecting a color palette involves choosing and combining hues to create a harmonious and aesthetically pleasing visual representation of a website. Numerous color schemes can be used for this purpose: triadic,

tetradic, complementary, and split-complementary systems, sequential system, among others. In each of these schemes, colors are combined based on specific principles such as the color wheel, relative positions of colors, and their relationships. For example, the complementary scheme uses colors that are opposite each other on the color wheel, creating strong contrast and an energetic visual effect. When choosing a color palette for a website, it is important to consider its purpose, audience, brand values, and expected emotional reactions from users. It is also essential to consider the psychological aspects of color and its impact on user perception and behavior.

In 2018, a study was conducted on the topic of "The role of color in Web-Design" by Reshetnev Siberian State University of Science and Technology (A. A. Gerasimchik, A. A. Groshkova, A. I. Makhova, M. A. Gvenetadze, S. P. Solomatin, 2018).

From this study, it can be emphasized the influence of different colors on user perception:

Red

Grabs attention, associated with importance, danger, and activity. Suitable for highlighting important elements, and warnings.

Blue

Calms, evokes trust, associated with safety. Suitable for creating a calm atmosphere, used on websites of financial and medical organizations.

Light blue

Cold, is associated with winter, cold, and snow. Suitable for websites dedicated to winter sports and recreation.

Green

Associated with nature, growth, stability, and health. Suitable for websites related to environmental topics, ecological products, and medicine.

Yellow

Evokes associations with the sun, joy, warmth, and energy. Suitable for websites that want to "awaken" the user and add energy.

Brown

Tranquil, is associated with stability, comfort, and coziness. Suitable for real estate websites, hotels, and cafes.

Orange

Energetic, warm, associated with activity, youth, and fun. Suitable for websites of youth organizations, and travel agencies.

Black

Associated with power, luxury, and elegance. Suitable for rock music websites, and branded clothing.

White

Associated with simplicity, purity, and freedom. Suitable for educational institutions, online stores, and news portals.

Gray

Neutral, can be combined with any other color. Associated with melancholy, fatigue, and gloom.

Purple

Associated with romance, mystery, and magic. Suitable for websites with mystical themes.

Pink

Associated with softness, fragility, and elegance. Suitable for women's forums, and online stores of cosmetic products.

1.1.3 Color schemes

A color scheme consists of a combination of colors used in a range of design projects, from fine art to interior design to graphic design. Each color scheme consists of one or more of the 12 colors present on the color wheel.

By pairing different colors with each other, you can create endless color palettes to use in any composition. Different color combinations can also evoke different moods or tones through clever use of color theory and color psychology. (Alex Clem, 2023).

The main types of color schemes are:

Monochromatic color scheme

A monochromatic color scheme uses various shades, tones, and saturations of a single color. This creates a calm and harmonious look that is easy on the eyes and often used for creating elegant and minimalist designs. Examples include variations of blue, ranging from light blue to dark blue.

Analogous color scheme

An analogous color scheme includes three colors that are adjacent to each other on the color wheel. This scheme creates a harmonious and pleasing effect, as these colors naturally go well together. Examples include combinations of blue, teal, and green, or red, orange, and yellow. Analogous schemes are often used to create a calm and comfortable design.

Complementary color scheme

A complementary color scheme consists of two colors that are opposite to each other on the color wheel. This creates a strong contrast and dynamic visual effect. Examples include combinations such as blue and orange, red and green, or yellow and purple. It is often used to attract attention and create visual interest.

Triadic color scheme

A triadic color scheme uses three colors that are evenly spaced around the color wheel. This scheme provides high contrast while maintaining harmony and visual balance. Examples include combinations such as red, yellow, and blue, or purple, green, and orange. Triadic schemes are often used to create vibrant and lively designs.

Split-Complementary color scheme

A split complementary color scheme involves one base color and two colors adjacent to its complementary color on the color wheel. This scheme offers high contrast while avoiding the tension of a direct complementary color scheme. It provides visual interest and is easier to balance than a traditional complementary scheme. For example, if the base color is blue, the split complementary colors would be yellow-orange and red-orange.

Tetradic color scheme

A tetradic color scheme, also known as a double complementary scheme, uses four colors

arranged into two complementary pairs. This rich and varied color scheme offers plenty of possibilities for creating interesting and vibrant designs. To maintain balance, one color is typically chosen as the dominant color, while the others are used as accents. For instance, a tetradic scheme might involve blue and orange paired with green and red.



Figure 2 Colors Schemes (Source: Diana Hathaway Timmons, 2023).

1.1.4 Typography and fonts

In 2022, a study titled “The effect of inter-letter spacing on reading performance and eye movements in typically reading and dyslexic children” was conducted. (Marta Wójcik, Katarzyna Jednoróg, 2022).

The authors of this study analyzed the potential benefits of modifying letter spacing in texts to mitigate the effects of visual crowding and improve reading outcomes. Previous research has shown that both children and adults with dyslexia struggle with letter and word recognition when surrounded by similar stimuli. Additionally, dyslexic individuals may require wider letter spacing for accurate identification of embedded letters compared to typical readers. This underscores the critical need for personalized typographic interventions tailored to the specific challenges of visual processing associated with dyslexia.

Through a series of experiments, the study examines the impact of modified letter spacing on various aspects of reading performance, including reading accuracy, comprehension, reading speed, and eye movements. Hypotheses are formulated based on existing literature, anticipating differentiated effects of letter spacing modifications between typical readers and dyslexic individuals. Furthermore, the study explores the influence of reading mode (oral versus silent) on reading performance, shedding light on potential differences in comprehension and reading strategies between the two modes.

The findings of this study contribute valuable insights to optimizing reading experiences through typography and font modifications.

The impact of typography on readability

Font size: Increasing font size enhances readability, particularly for individuals with weakened vision.

Letter and line spacing: Optimal spacing between letters and lines improves readability and reduces eye strain.

Font selection: Serif fonts may be more readable for longer texts, while sans-serif fonts are better suited for short texts and headings.

Text-foreground contrast: Adequate contrast between text and background enhances readability and reduces eye strain.

The impact of typography on text perception

Font selection: Different fonts can evoke different associations and emotions. For example, serif fonts may be perceived as more classical and formal, while sans-serif fonts may appear more modern and informal.

Text structuring: Using subheadings, lists, and quotes enhances readability and facilitates text perception.

Use of visual elements: Illustrations, tables, and diagrams make the text more engaging and comprehensible.

The impact of typography on text understanding

Information hierarchy: Using different font sizes and styles to highlight important elements enhances text understanding.

Logical text structure: Employing indentation, tabulation, and spacing reinforces the logical structure of the text and facilitates its understanding.

Language and style: The text should be written in clear and concise language, using simple words and sentences.

Typography and font selection are key design elements that significantly influence readability, perception, and understanding of text.

1.1.5 Functionality

Based on the identified principles of user-centered design and the importance of catering to user needs, the author has highlighted the following key features for the mobile app development:

Design

An attractive and intuitive design that aligns with the salon's brand and provides a pleasant user experience.

Navigation

Simple and convenient app navigation allows users to easily find the information they need.

Services

Detailed descriptions of the services offered, including styling options, terms, and timelines.

Prices

Transparent and understandable information about the salon's service prices.

Contacts

Easy access to the salon's contact information, including address, phone number, and email.

Feedback

The ability to leave reviews and ask questions through the app.

Information about stylists

Profiles of stylists with their qualifications, experience, and portfolio of work.

Photos

A gallery of images showcasing the work of stylists and the salon's interior.

Online booking system

A convenient and fast system for booking services through the mobile app.

These features form the foundation for a successful hair salon mobile application that prioritizes user needs and delivers a convenient and engaging experience. By adhering to the principles of user-centered design and incorporating these essential components, the app will effectively address the needs of its target audience and contribute to the salon's success.

1.2 Competitors

For the development of a successful mobile application, conducting a comprehensive competitive analysis is crucial. This analysis provides valuable insights into existing solutions, identifies potential gaps and opportunities, and ultimately informs the creation of a mobile app that surpasses the competition and delivers a superior user experience.

For comparison, the author selected these websites:

- Fahle Ilusalong
- Beautiq Ilusalong
- Hairlook Salong
- Avancia Ilusalong
- Truman Barbershop
- Casablanca Beauty
- Nokturn Ilusalong
- Paula Juuksestudio
- Tropical Beauty Salong

By meticulously examining the functionalities of existing websites, the author has compiled a table highlighting key performance indicators (KPIs) that directly impact user experience and

booking efficiency. These KPIs include:

1. Number of steps from selecting a service to completing the booking.

This criterion directly assesses the booking process's efficiency and user-friendliness. A streamlined booking process with minimal steps minimizes user effort and frustration, ultimately leading to higher conversion rates.

In the table, it's labeled as "**Steps**".

2. Page loading speed in seconds.

Website loading speed significantly impacts user experience. Slow loading times can lead to user abandonment, particularly in a mobile context. Analyzing competitors' speeds helps ensure the application optimizes loading speed for a seamless user experience.

In the table, it's labeled as "**Speed**" (in seconds).

3. Navigation and information accessibility.

This metric evaluates the website's overall navigation and information accessibility. A website requiring minimal clicks to reach desired information demonstrates intuitive design and a focus on user convenience.

In the table, it's labeled as "**Clicks**".

Table 1 Comparative table based on KPIs (Source: author).

Website	Steps	Speed	Clicks
Fahle Ilusalong	4	3.2	2
Beautiq Ilusalong	5	2.8	4
Hairlook Salong	4	2.5	3
Avancia Ilusalong	6	4.1	4
Truman Barbershop	5	3.6	4

Casablanca Beauty	4	3.4	2
Nokturn Ilusalong	7	4.8	5
Paula Juuksestudio	4	2.9	3
Tropical Beauty Salong	5	3.5	4

By analyzing the data in the table, several key observations and insights can be gleaned:

1. **Number of steps from selecting a service to completing the booking:** Hairlook Salong and Paula Juuksestudio stand out with the most streamlined booking process, requiring only 4 steps from service selection to completion. This indicates a user-friendly and efficient booking experience.
2. **Page loading speed:** Beautiq Ilusalong and Paula Juuksestudio boast the fastest loading speeds, highlighting their focus on optimizing user experience and minimizing wait times.
3. **Navigation and information accessibility:** Fahle Ilusalong and Casablanca Beauty excel with the least number of clicks required to find specific information, demonstrating intuitive website design and a focus on user convenience.

These observations provide valuable insights into the strengths and weaknesses of existing solutions. By understanding these aspects, the development of the mobile application can be tailored to surpass the competition by offering a more streamlined booking process, faster loading times, and intuitive navigation that prioritizes user convenience.

1.3 Tools and technologies

In this section, the author describes the tools and technologies they use in the development process of mobile applications. Each of them is chosen based on its functionality, flexibility, and integration capabilities to ensure the best outcome in the final product.

1.3.1 Flutter

Flutter is an open-source UI software development kit created by Google. It can be used to develop cross-platform applications from a single codebase for the web, Fuchsia, Android, iOS, Linux, macOS, and Windows. Flutter is an innovative tool developed by Google for building

mobile, web, and desktop applications using a single codebase. It's an open-source toolkit that enables developers to create beautiful and high-performance apps that run on various platforms including Android, iOS, web, Windows, macOS, and Linux. (Tuhin, 2024).

One of the key advantages of Flutter is its ability to create cross-platform apps using the same codebase. This significantly reduces development time and simplifies app maintenance as developers can write code once and run it on different platforms without the need for platform-specific adaptations.

Flutter ensures high-performance thanks to its rendering engine called the Flutter Engine. This engine allows for smooth and responsive user interfaces with high frame rates even on devices with limited resources.

Moreover, Flutter offers a rich library of widgets that can be easily customized and adapted to meet the specific needs of an app. This makes the development process more flexible and efficient, allowing for the creation of user interfaces of any complexity and creativity.

Flutter was chosen for this project because it aligns with the author's goal of creating a mobile application for both Android and iOS platforms. Its cross-platform nature allows for the development of applications that seamlessly run on both operating systems, ensuring a broader reach and user accessibility.

1.3.2 Dart

Dart is a client-optimized language for developing fast apps on any platform. Its goal is to offer the most productive programming language for multi-platform development, paired with a flexible execution runtime platform for app frameworks. Notably, Dart boasts a strong typing system, crucial for error detection during development and ensuring code reliability. It supports both just-in-time (JIT) and ahead-of-time (AOT) compilation, enabling swift development cycles and optimized production builds.

With a syntax familiar to developers acquainted with languages like Java or JavaScript, Dart is easily adaptable for those with prior programming experience. Modern features such as asynchronous programming support through `async/await` syntax contribute to building responsive and interactive applications.

In essence, Dart plays a pivotal role in the Flutter ecosystem, offering developers a potent and

efficient language for crafting cross-platform applications. Its blend of performance, reliability, and user-friendliness positions it as a preferred choice for mobile, web, and desktop app development. (Dart, 2024).

1.3.3 Google Firebase

Google Firebase is a mobile and web application development platform. Firebase is made up of complementary features that developers can mix-and-match to fit their needs. Firebase provides services like real-time database, authentication, cloud messaging, hosting, analytics, and more, all as a unified platform. (Firebase, 2024).

The author opted for Firebase Authentication to handle user authentication within the application. This service not only ensured the security and protection of user data but also offered a seamless login mechanism for users. Integrating Firebase Authentication with Flutter facilitated swift implementation, accelerating development, and ensuring a dependable user authentication process. Firestore served as the primary database solution for managing application data. Its flexible and scalable nature made it suitable for storing various types of data, including user information, app content, and user interactions. The real-time data synchronization feature of Firestore enabled instant updates across different devices and platforms, making it ideal for features requiring real-time data updates such as chats and news feeds.

Moreover, Firestore's offline synchronization capability ensured uninterrupted app functionality even in the absence of an internet connection or during network issues. This feature allowed users to interact with the app and access cached data seamlessly, enhancing the overall user experience.

Additionally, Firestore offered robust security rules and authentication mechanisms, ensuring secure storage and access to sensitive user data. By leveraging Firebase Authentication alongside Firestore, the author could maintain data security and restrict access to authorized users only. Compared to other database solutions like SQL or NoSQL, Firestore stood out for its real-time synchronization, offline functionality, and robust security features. These attributes made Firestore an attractive choice for building a reliable, scalable, and secure application.

1.3.4 Android Studio

Android Studio is the official Integrated Development Environment (IDE) for Android app

development. Based on the powerful code editor and developer tools from IntelliJ IDEA, Android Studio offers even more features that enhance your productivity when building Android apps. These include a flexible Gradle-based build system, a fast and feature-rich emulator, and a unified environment where you can develop for all Android devices.

Additionally, Android Studio provides Live Edit functionality, allowing you to update composables in emulators and physical devices in real-time. It also offers code templates and GitHub integration to assist in building common app features and importing sample code. Extensive testing tools and frameworks, as well as Lint tools to catch performance, usability, version compatibility, and other problems, are also included. Android Studio supports C++ and NDK, along with built-in support for Google Cloud Platform, making it easy to integrate Google Cloud Messaging and App Engine. These attributes make Android Studio a comprehensive tool for Android app development. (Android Studio, 2024).

Android Studio was used by the author of this project for testing the application on the Android platform. As the official Integrated Development Environment (IDE) for Android app development, Android Studio provided the necessary tools and features for building, debugging, and testing Android applications. This included a flexible Gradle-based build system, a fast and feature-rich emulator for testing, extensive testing tools and frameworks, as well as support for various Android devices. With Android Studio, the author was able to ensure the functionality, performance, and compatibility of the application specifically for the Android platform.

1.3.5 Android

Android is a mobile operating system developed by Google. It is based on the Linux kernel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android has a large user base and is the most widely used operating system globally. (Wikipedia, 2024).

The Android platform serves as one of the primary pillars of the application, providing a reliable foundation for its operation and functionality. Being a widely adopted mobile operating system, Android offers extensive compatibility with a wide range of devices, from smartphones and tablets to wearables and other Internet of Things devices. Leveraging the capabilities of the Android platform allows the application to reach a broad audience of users across various devices and form factors.

Additionally, Android provides a rich ecosystem of development tools, libraries, and platforms

that facilitate the creation of feature-rich and visually appealing applications. The author leveraged the capabilities of Android Studio, the official Integrated Development Environment (IDE) for Android app development, along with a comprehensive set of APIs and resources provided by the Android SDK. This enabled the author to create engaging user interfaces and utilize device hardware features.

1.3.6 iOS

iOS is a mobile operating system developed by Apple Inc. It is the operating system that powers Apple's iPhone, iPad and iPod Touch devices. Known for its user-friendly interface and seamless integration with Apple's ecosystem, iOS is widely regarded as one of the most polished and secure mobile platforms available.

The iOS platform serves as another key foundation for the application, offering a stable and consistent environment for its functionality. With its emphasis on user experience and performance, iOS provides a seamless experience across Apple's range of devices, ensuring a high level of quality and reliability. (Wikipedia, 2024).

Like Android, iOS also provides a robust set of development tools, libraries, and frameworks to assist developers in creating powerful and visually appealing applications. The author utilized tools such as Xcode, Apple's official IDE for iOS app development, and a comprehensive suite of APIs and resources available in the iOS SDK. This enabled the author to design intuitive user interfaces and leverage the advanced features of iOS devices effectively.

1.3.7 Lottie

Lottie is a JSON-based animation format that improves the interaction, and the quality of designs. It's interactive and responds to user input. Also, the vector structure of Lottie allows users to scale animations without losing the quality of the picture, and without increasing file size.

Lottie is multi-platform and plays everywhere: web, IOS, Android, React Native, you name it. Also, you don't need any modifications for different platforms or screen sizes. You just create one file, and it'll play on every platform, saving tons of time for designers and accelerating the process. (Movsisyan, 2021).

In this project, Lottie was utilized to enhance the user interface and overall aesthetic appeal of the application. The interactive and responsive nature of Lottie animations allowed for creating

engaging visual feedback for user interactions, guiding users through different app functionalities, and providing a more dynamic and enjoyable user experience.

2 DEVELOPMENT

2.1 Functional requirements for the mobile application

1. Authentication and authorization: The application must provide user authentication functionality. Users can create accounts, log in, and manage their data.
2. User account management: The application must have functionality for password recovery or changing users' personal information.
3. Displaying salon catalog and services: The application should display a catalog of services offered by the salon. Users can view available services, their descriptions, prices, and available time slots for booking. The catalog should be conveniently structured and easy to navigate so that users can quickly find the services they are interested in.
4. Displaying a list of hairdressers: The application displays a list of hairdressers with their names, photographs, work experience, and specialization. Users can view information about each hairdresser and choose from the list.
5. Booking services: Users can choose a hairdresser and book a service with them. After selecting a hairdresser, users can choose a convenient date and time for the appointment. Users can send a booking request and receive confirmation.
6. Cancellation of booking: Users have the ability to cancel a service booking. After canceling the booking, the time becomes available for other users.
7. Management of hairdresser records: Administrators can add, delete, or edit hairdresser profiles. Administrators can also manage work schedules and availability for booking.
8. Error Handling and Exception Management: The application must adequately handle errors, such as lack of internet connection, incorrect data, etc. Users should receive informative error messages and instructions on how to resolve them.
9. Support for multiple devices and platforms: The application should be developed in a way that it is available on various devices and platforms, such as mobile devices iOS and Android.
10. Automatic data updates: The application should automatically update information about the availability of time slots and services in real-time, ensuring users always see up-to-date information.
11. Support for interactive features: The application should include interactive elements such

as animations, graphics, or various mechanics to enhance user experience and attract attention to the salon's services.

12. Compatibility with different screen resolutions: The application should be adapted to work on devices with different screen resolutions to ensure optimal display of the user interface.
13. Feedback feature: The application should provide users with the ability to provide feedback on their usage experience, suggestions for improving functionality, or addressing any issues they have encountered.

2.2 Non-functional requirements for the mobile application

1. Performance: The application must load quickly and respond promptly to user actions.
2. Reliability: The application must handle errors related to network requests and database operations correctly. User data must be securely stored and protected.
3. Usability: The application interface should be intuitive and appealing to users. The process of booking a service should be simple and understandable for users of all ages.
4. Scalability: The application should be capable of scaling to accommodate a large number of users and data volume without sacrificing performance.
5. Maintenance and Support: There should be a mechanism for updating and maintaining the application after its release, including bug fixes and the addition of new features.
6. Efficient resource usage: The application should efficiently utilize device resources such as CPU, memory, and battery to ensure long battery life and minimal energy consumption.
7. Compliance with standards and regulations: The application must comply with legislative requirements and regulatory acts concerning user data protection, confidentiality of information, and other norms in the field of IT and technology.

2.3 Application architecture

Application architecture is the high-level structure of software applications, outlining how components interact and are organized to achieve functionality and performance goals. It encompasses the frameworks and methodologies used in the development process, including the choice of programming languages, data storage solutions, and the interaction between the application's various parts, such as user interfaces, business logic, and data access layers. This architecture is designed to meet specific requirements, such as scalability, security, and

maintainability, ensuring the application can grow and adapt over time.

Application architecture is a crucial element of software development, helping to streamline the development process and enhance the quality of the product. A well-defined application architecture brings several benefits, including:

- **Scalability:** The ability of the application to handle increasing user loads and data volumes without sacrificing performance.
- **Maintainability:** The ease with which the application can be modified, updated, and debugged.
- **Security:** The application's ability to protect user data and system resources from unauthorized access and attacks.
- **Testability:** The ease with which the application can be thoroughly tested to ensure it functions as expected.
- **Reusability:** The ability to reuse components of the architecture in other applications.
- **Flexibility and adaptability:** The ability of the application to adapt to changing requirements and technologies.

Choosing the right application architecture involves a careful evaluation of several factors, including the application's specific requirements, scalability needs, team expertise, and the technology landscape. Consider the complexity of the application, expected load and performance criteria, security concerns, and how quickly the application needs to adapt to changes in technology or business requirements. The architecture should align with the business goals, support agile development practices, and allow for efficient maintenance and future growth. (Spasojevic, 2024).

The choice of application architecture is based on the Model-View-Controller (MVC) pattern, considering the application's specific features such as user authentication, management of hairdresser records, service booking, and user account management.

2.4 Components

Presentation Layer

Screens: Displays the user interface and interacts with the user.

Widgets: Represents small interface components used to build screens.

Business Logic Layer

Models: Defines the data structure used in the application, such as information about hairdressers and service booking.

Services: Contains business logic and handles operations like user authentication, booking management, and hairdresser record management.

Data Access Layer

Firestore: Used to store data about users, hairdresser records, and service booking.

Local Storage: Serves to cache data and provide offline access to it.

Integration with External Services

Firebase Auth: Provides mechanisms for user authentication and authorization.

Firebase Cloud Functions: Executes server-side business logic, such as updating data about bookings and hairdressers.

2.5 Architecture Patterns

Model-View-Controller (MVC)

Divides the application into three main components: Model, View, and Controller.

The Model is responsible for data and business logic, the View displays the interface, and the Controller manages the interaction between them.

Repository Pattern

Abstracts the data access layer from the rest of the application, providing a unified interface for working with data.

Facilitates testing and maintenance, as well as ensuring separation of concerns.

2.6 Screens

2.6.1 Login Screen

The Login Screen is the first thing users see when they open the application. It serves as the

authentication gateway, where users input their credentials to access the app's features. The screen features a casual photograph illustrating someone interacting with their phone, creating a welcoming atmosphere.

Below the image, users encounter two input fields for email and password, essential for user authentication. Users enter their email in the "Email" field and their password in the "Password" field. Upon entering their credentials, users press the "Login" button, highlighted in blue. If the entered information is correct, users are directed to the Main Screen of the app. In case of incorrect login or password, users are presented with an error message on the screen, informing them of the issue. This feedback mechanism helps users troubleshoot and correct their input.

Below the "Login" button, users find the inscription "Loo konto". Clicking this text redirects users to the Sign Up screen, where they can easily create an account if they don't have one already. This inclusive approach ensures all users can join the app's community and access its features.



Figure 3 Login Screen appearance (Source: author)



Figure 4 Application login error due to incorrect user data (Source: author)

2.6.2 Sign Up Screen

The “Sign Up” screen is accessed by clicking the “Create account” button on the Login Screen. Here, users can create a new account if needed. Users are required to enter their email, password, and confirm the password. The screen includes validation checks to ensure the email address is valid; otherwise, an appropriate error message is displayed. Similarly, password conditions are enforced, and if the user fails to meet them, an error message appears. Additionally, if the user enters mismatched passwords, a corresponding error message is shown.

Upon successful registration, a confirmation message is sent to the user's email address, prompting them to verify their registration. Users can only access their account after confirming their email address.

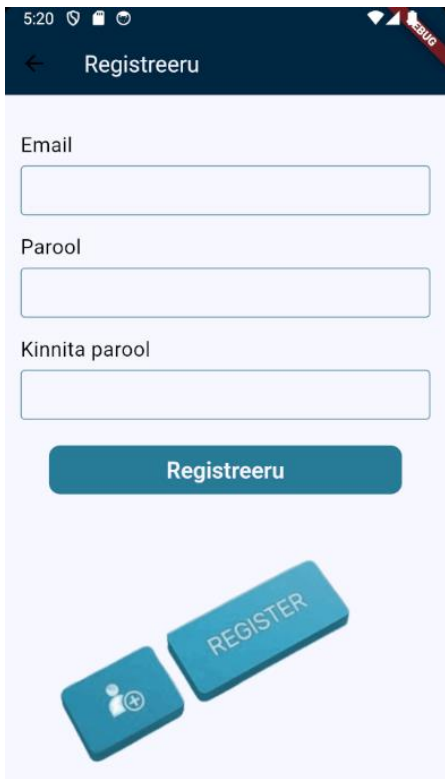


Figure 5 Sign Up screen appearance (Source: author)

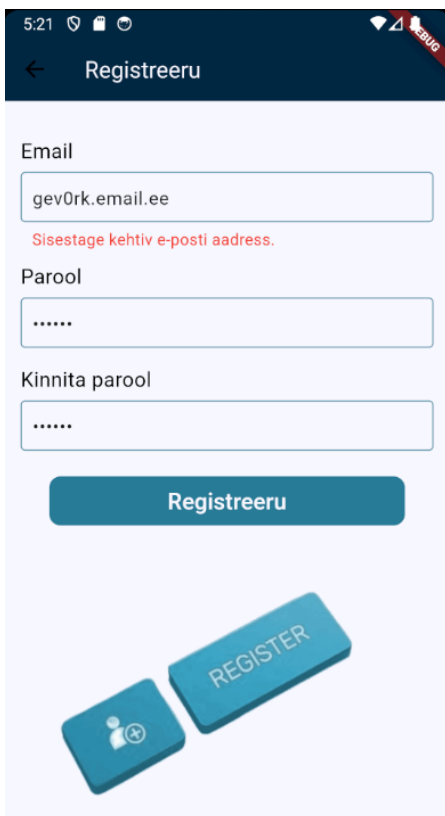


Figure 6 Error when entering an invalid email address (Source: author)

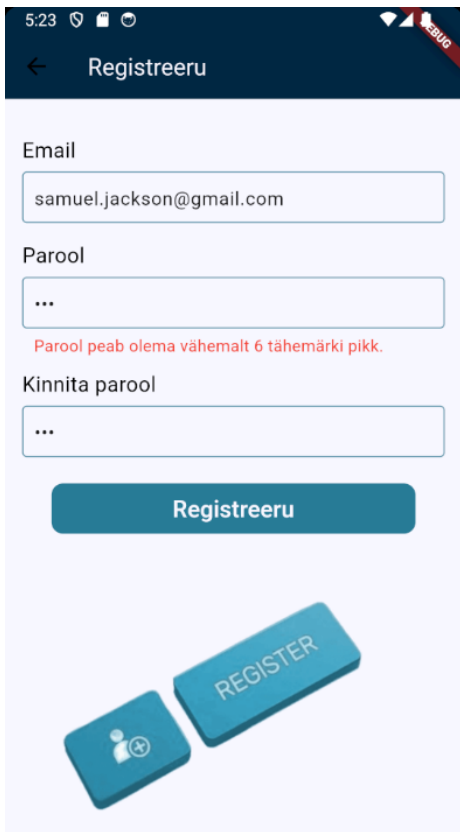


Figure 7 Error when password conditions are not met (Source: author)

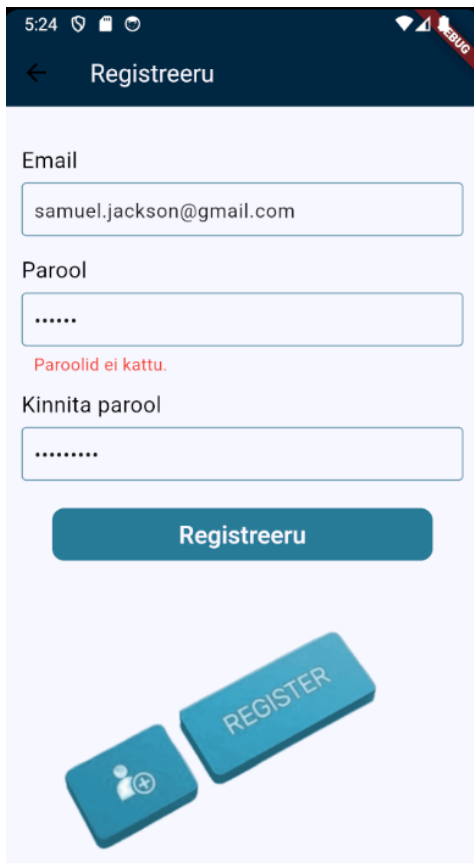


Figure 8 Error when passwords do not match (Source: author)

2.6.3 Home Screen

The Home screen is the initial screen that the user sees after successfully authenticating in the application. At the top of the screen, there is the name of the hair salon, its contact phone number, and a map showing the salon's location. This allows the user to easily determine the salon's location and plan a route if necessary.

Below is the "Broneering" card, which displays the user's current booking for a session. Initially, the card is empty, but once the user makes a booking, information about the date and time of the session automatically appears on the card. The card also features a "Tühistama" button, allowing the user to cancel the booking if needed. When the "Cancel" button is pressed, a pop-up window appears, where the user must confirm their intention to cancel the booking. This prevents accidental cancellations of bookings. Below the booking card is the "Logi välja" button, which allows the user to log out of their account. After clicking this button, the user is automatically redirected to the login screen. This is convenient for users who want to log out of their account and then, possibly, log in again with another or the same account.

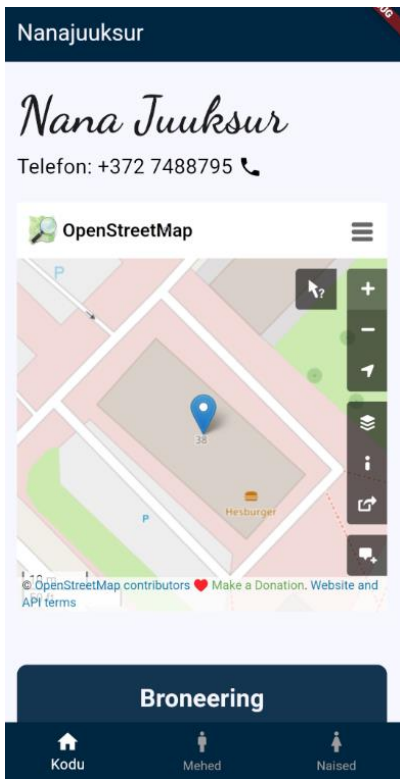


Figure 9 Home Screen appearance (Source: author)

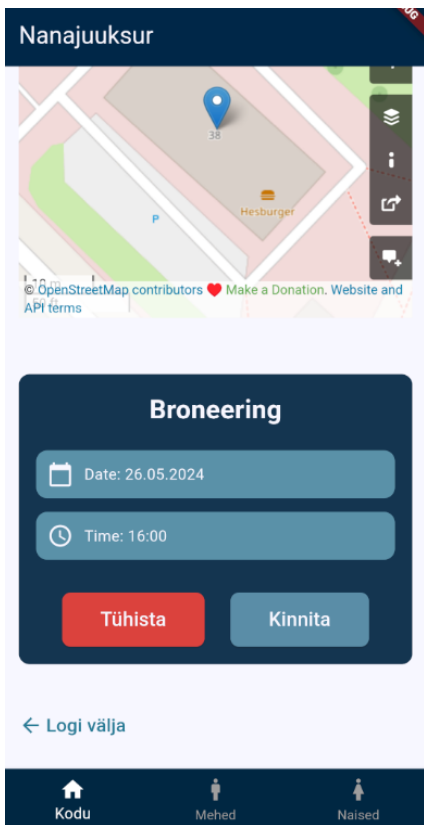


Figure 10 Home Screen appearance (Source: author)

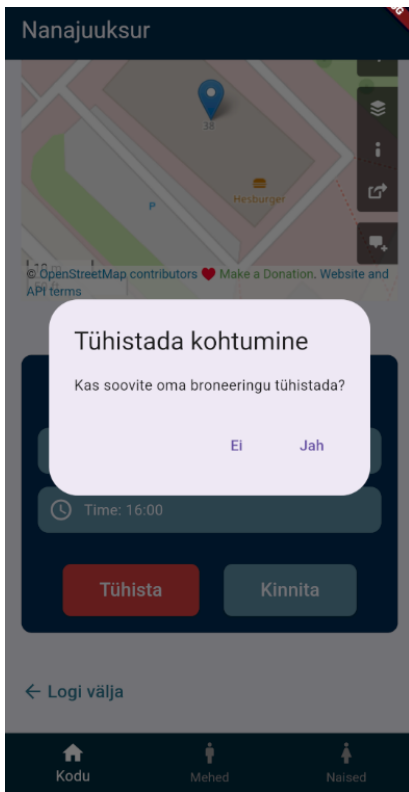


Figure 11 Appointment cancellation (Source: author)

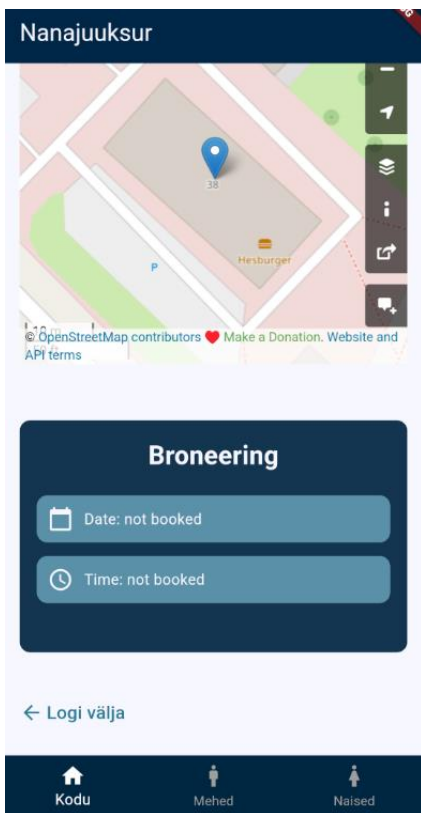


Figure 12 Booking card if appointment does not exist (Source: author)

2.6.4 Mehed Screen

Mehed Screen is dedicated to the men's section of the hair salon services. It showcases all available services for men, including their names, descriptions, and prices. Users can scroll through the screen to view the entire assortment of services. Additionally, there is a search feature that allows users to input keywords, and the screen displays relevant options accordingly.



Figure 13 Mehed screen appearance (Source: author)

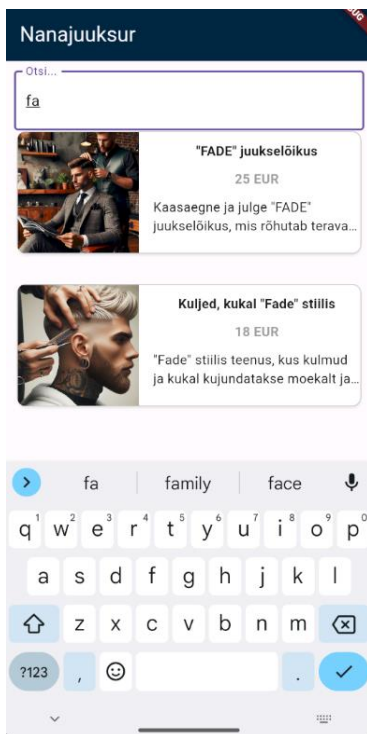


Figure 14 Search by services in the Mehed screen (Source: author)

2.6.5 Naised Screen

Naised Screen is similar to the "Mehed Screen". It offers the same functionality but features services tailored for women. Users can find a complete range of women's services with names, descriptions, and prices. Like the "Mehed Screen," users can scroll through the offerings and use the search function to find specific services by entering keywords.

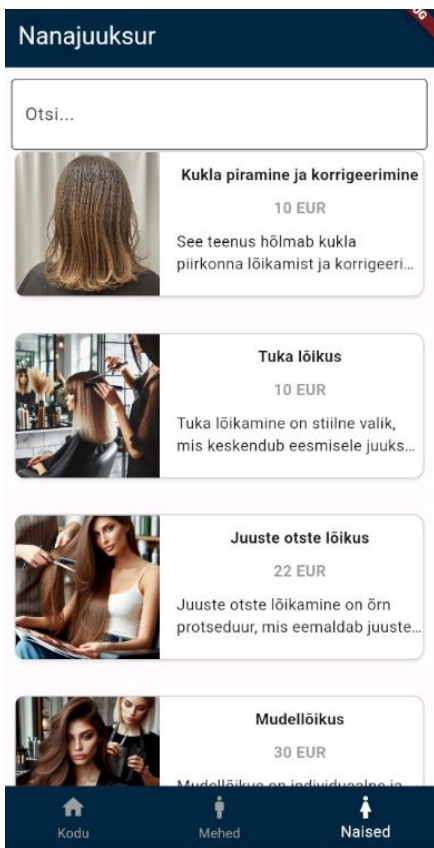


Figure 15 Naised screen appearance (Source: author)



Figure 16 Naised screen appearance (Source: author)

2.6.6 Service Details Screen

Service Details Screen appears when the user selects a specific service from either the male or female catalog screens. It displays comprehensive information about the service, including its name, detailed description, and price. At the bottom of the screen, there is a "Broneeri aeg" button for users who are interested in this service and wish to schedule an appointment.



Figure 17 Example of chosen service by customer on the Service Details screen (Source: author)

2.6.7 Hairdresser Screen

Hairdresser screen appears after the user presses the "Broneeri aeg" button on a specific service in either the male or female catalog of services. The screen presents a list of hairdressers, each accompanied by their name, experience in the salon, and a photograph. Users can select their preferred hairdresser, and upon selection, they are automatically redirected to the Booking Screen.

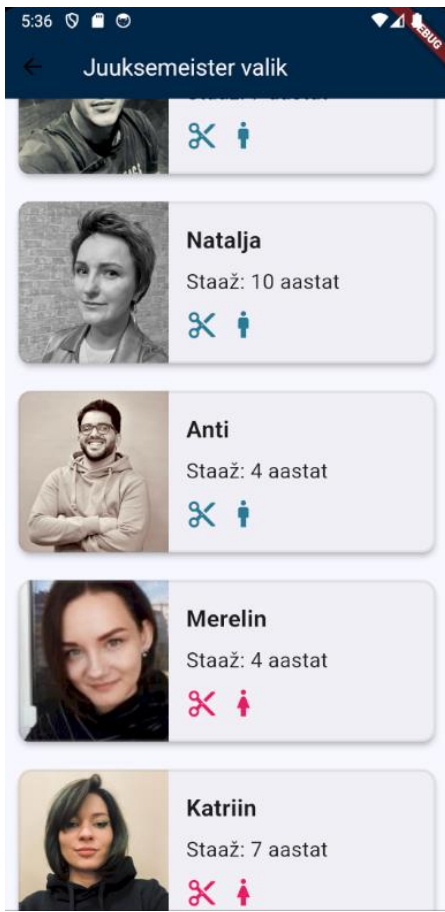


Figure 18 Hairdresser screen appearance (Source: author)

2.6.8 Booking Screen

On the "Booking Screen," the user-selected hairdresser is displayed, along with the "Valige kuupäev" button. Upon pressing it, a calendar opens. This calendar is updated weekly by the salon management in accordance with the hairdressers' schedules. Users can choose a specific date and time for their appointment with the hairdresser. After selecting the date and time, the user confirms the booking by pressing the "Kinnitage broneering" button, leading them to the "Success Booked" screen. Only available appointments with the hairdresser are shown for selection; if no available appointments are found, a message informs the user that there are no appointments currently available.

The "Booking Screen" also includes a check to prevent users from registering for two appointments simultaneously. If a user is already registered for an appointment, attempting to book another appointment will result in an error message, notifying the user that it is not possible to register for two appointments simultaneously.

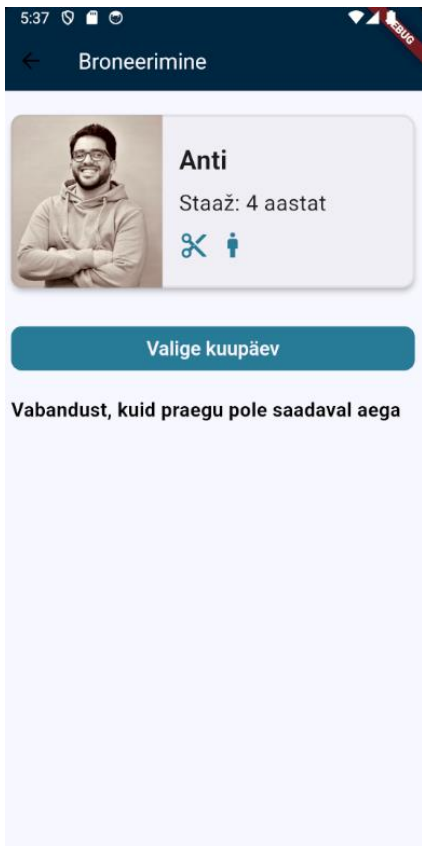


Figure 19 Booking Screen appearance (Source: author)

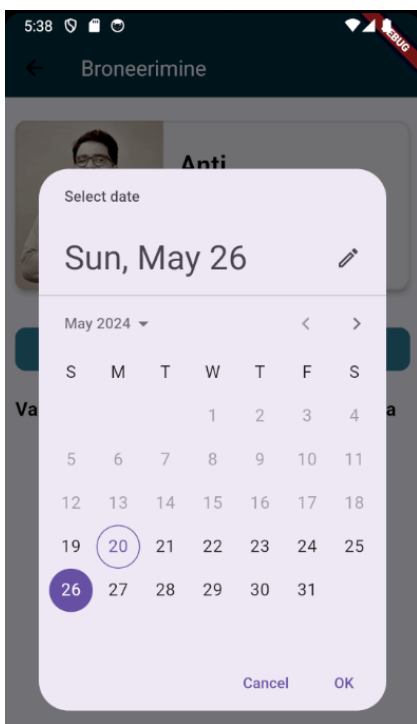


Figure 20 Choosing the date in the calendar on the Booking Screen (Source: author)



Figure 21 Choosing time on a specific day on the Booking Screen (Source: author)



Figure 22 Error message if the user tries to book appointment twice (Source: author)

2.6.9 Success Booked Screen

The "Success Booked Screen" features a Lottie animation of a check mark, symbolizing the successful booking made by the user, following the selection of date and time. At the bottom of the screen, there is a "Tagasi koju" button, which, when pressed, takes the user back to the Main Screen.

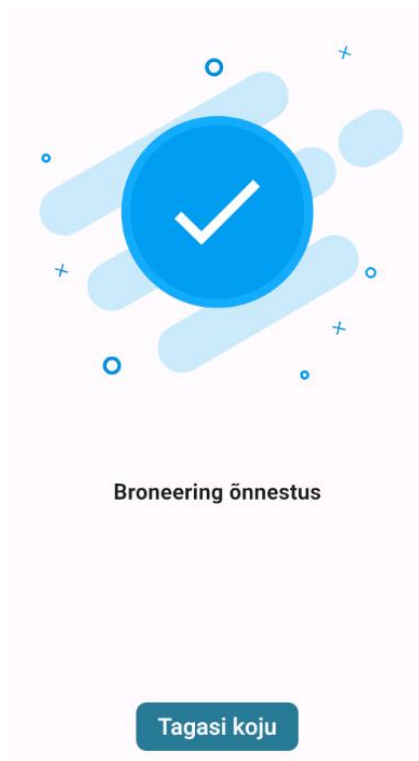


Figure 23 Success Booked Screen appearance (Source: author)

CONCLUSION

This diploma project aimed to develop a mobile application specifically tailored for a hair salon. The main objective was to enhance the interaction between clients and the salon by providing convenient tools for booking services, organizing specialists' schedules, and selecting optimal services and payment methods.

The project began with a thorough examination of the issues based on the presumed market needs. The conducted analysis enabled the selection of the most suitable technologies and services for the development of the mobile application. Subsequently, a market analysis was carried out to determine the competitive advantages of the developed product.

During the development process, the main functionality of the application was implemented, which was detailed and presented in section 2 of the diploma project. Special attention was paid to creating a user-friendly and intuitive interface that would ensure a smooth and efficient interaction process between the user and the application.

Plans include further improvement of the application by enhancing its interface to increase user convenience and strengthening its visual appeal for an effective marketing strategy. Additionally, it is envisaged to expand the application's functionality based on user feedback and emerging trends in the beauty and health industry.

RESÜMEE

See diplomiprojekt oli suunatud mobiilirakenduse arendamisele, mis oli spetsiaalselt kohandatud juuksurisalongile. Peamine eesmärk oli suurendada klientide ja salongi vahelist suhtlust, pakkudes mugavaid tööriistu teenuste broneerimiseks, spetsialistide graafikute korraldamiseks ning optimaalsete teenuste ja makseviiside valimiseks.

Projekt algas põhjaliku uurimisega lähtuvalt eeldatavatest turuvajadustest. Tehtud analüüs võimaldas valida kõige sobivamad tehnoloogiad ja teenused mobiilirakenduse arendamiseks. Seejärel viidi läbi turuanalüüs, et määratleda välja töötatud toote konkurentsieelised.

Arendusprotsessi käigus rakendati rakenduse põhifunktsionaalsust, mis oli detailideni kirjeldatud ja esitletud diplomiprojekti teises jaotises. Erilist tähelepanu pöörati kasutajasõbraliku ja intuitiivse liidese loomisele, mis tagaks sujuva ja tõhusa suhtluse protsessi kasutaja ja rakenduse vahel.

Tulevikuplaanidesse kuulub rakenduse edasine täiustamine, suurendades selle liidese kasutajamugavust ja visuaalset atraktiivsust efektiivse turundusstrateegia tagamiseks. Lisaks on kavas rakenduse funktsionaalsuse laiendamine kasutajate tagasiside ja ilu- ning tervishoiutööstuse uute suundumuste põhjal.

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Nokturn Ilusalong - <https://nokturn.ee/>

Paula Juuksestudio - <https://juuksestudio.eu/>

Tropical Beauty Salong - <https://www.tropicalbeauty.ee/>

GitHub link to the source code - <https://github.com/Gevorkg/nanajuuksur>