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Lash Tech: A Web App-Based Lash Recommendation, Virtual Try-On, and Seamless Booking App Using Geo Location Powered by Artificial Intelligence

Abstract: - In the expanding field of the lash salon industry, this study tackles common challenges faced by clients through the development of a cutting-edge Web App-Based Lash Recommendation, Virtual Try-On, and Seamless Booking Application powered by AI and Geo Location technology. Clients frequently struggle to select appropriate eyelash styles, have issues with manual appointment booking, and lack methods to locate nearby salons that fulfill their tastes. The AI-driven Lash Recommendation feature analyzes facial features to suggest personalized lash styles, the Virtual Try-On functionality allows clients to virtually preview different styles, and the Seamless Booking feature enables effortless scheduling by locating nearby salons based on preferences and availability. Adhering to ISO 25010:2011 software quality standards, the system underwent rigorous testing and evaluation, resulting in an impressive overall mean satisfaction rating of 4.50 out of 5.00. This rating represents the platform's effectiveness, usefulness, and practicality, and it promises to improve client satisfaction and redefine industry norms.

Keywords: Facial Recognition, Geo Location, Lash Recommendation, Seamless Booking, Virtual Try-On

I. INTRODUCTION

In the world of beauty and aesthetics, eyelash extensions have emerged as a captivating trend, redefining the way individuals enhance their natural beauty and express their personal style. Eyelash extensions offer a transformative solution, granting enchanting, fluttering lashes that captivate attention and exude allure. Eyelash extensions are meticulously applied, individual synthetic lashes that adhere to natural lashes, offering length, volume, and curl. The process is skillfully performed by lash technicians who artfully customize the extensions to suit individual's eye shape and desired look. Whether seeking a subtle enhancement or a dramatic statement, eyelash extensions offer a range of possibilities, accentuating the eyes and framing the face with elegance.

The popularity of eyelash extensions has soared in recent years, transcending age, gender, and cultural boundaries. The appeal lies not only in the immediate aesthetic enhancement but also in the convenience they bring to daily beauty routines. Eyelash extensions eliminate the need for mascara and reduce the fuss of applying false lashes, granting a flawless and hassle-free appearance from the moment you wake up. The art of lash extensions has captured the hearts of individuals seeking to enhance their natural beauty and express their unique style. Lash salons have become go-to destinations for those desiring luscious and captivating lashes. However, the process of

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selecting the most suitable lash styles and visualizing the results, managing appointments, and seeking nearby salons with quality services can sometimes pose challenges for clients and salon professionals alike.

To address these challenges, the researchers will develop a mobile application with AI-powered lash recommendation and virtual lash try-on, seamless booking system, and nearby salon locator. The AI-powered lash recommendation will analyze users' facial features and eye shapes accurately. By interpreting this facial data, the system generates personalized lash recommendations that perfectly complement individual's unique looks. Moreover, the virtual lash try-on feature allows users to virtually visualize various lash lengths, curls, and volumes in real-time. The app integrates a user-friendly booking system that enables clients to schedule lash appointments directly through the platform. Finally, the app will have a nearby lash salon locator to improve user convenience by enabling easy access to local lash salons. To ensure clients stay on track with their lash maintenance, an appointment reminder feature sends timely notifications, making missed appointments a thing of the past.

1.1 Objectives

The general objective of the study is to develop a Web App with AI-powered lash recommendation, virtual lash try-on, and seamless booking system to elevate the lash salon experience. Specifically, the study aims to accomplish the following objectives:

1. To develop an AI-Powered Lash Recommendations system to analyze users' eye shapes for personalized lash style suggestions. Additionally, a virtual lash try-on platform will be created, enabling users to see how different lash styles look with their own eyes before purchasing.

2. To integrate a booking system for clients to schedule lash appointments directly through the app. The app sends appointment reminders to help clients stay on track with their lash maintenance. Digitalization of monitoring appointments will be efficient for the lash owners.

3. To create a nearby lash salon locator using geo location that enhances user convenience by providing quick access to nearby lash salons within the vicinity. The system will utilize machine learning to recommend a highly rated lash salon by analyzing client reviews.

1.2 Motivation

As we worked on developing the LashTech web application, our motivation started from a determined commitment to address and overcome significant challenges related to the eyelash beauty industry. Clients struggle to choose appropriate eyelash styles without a visual aid, which impedes their decision-making process. The manual appointment booking causes inefficiencies and missed appointments, which negatively impacts the overall client experience. The lack of a dedicated geolocation application makes it difficult for clients to locate nearby quality lash salons. LashTech intends to address these issues by offering a user-friendly virtual try-on feature, an automated booking system, and geolocation services, thereby revolutionizing the eyelash beauty experience for clients and salon owners.

1.3 Significance of the Study

The study is beneficial to the following:

1. To the beauty and fashion communities by introducing a tech-forward approach to lash extensions. It fosters conversations and interest in the latest advancements in beauty technology and how AI can enhance the overall beauty experience.

2. To the clients visiting the lash salon. The AI-Powered Lash Recommendations and virtual try-on features provide personalized lash style suggestions and the ability to visualize different lash options in real-time. This enhances the clients' confidence in selecting the perfect lash styles that best complement their facial features and eye shapes, leading to a more satisfactory lash extension experience.

3. To the efficiency of lash appointments. The integrated booking system streamlines appointment scheduling, reducing the need for manual bookings and potential scheduling conflicts. Additionally, the virtual try-on feature can facilitate better communication between lash artists and clients, ensuring that both parties have a clear understanding of the desired lash look before the lash extension process begins.

4. To the manufacturers of lash products and extensions from increased exposure of their lash styles through the virtual try-on feature. Clients can virtually try on various lash products, leading to higher engagement and potentially increased sales for featured lash styles.

5. To the researchers as it allows them to enhance their skills and broaden their understanding of AI-powered Lash Recommendations, Virtual Try-On, and Seamless Booking App. Additionally, it serves as a valuable resource for gathering information pertaining to their future studies.

1.4 Scope and Delimitation

The scope of the study encompasses the development of a comprehensive web application that incorporates AI-powered lash recommendations, a virtual try-on platform, and a seamless booking system for lash appointments. The app will analyze users' facial features and eye shapes to provide personalized lash style suggestions, allowing users to visualize how different lash styles would look on their own eyes before making a purchase. Additionally, the app will include a geo location-based feature to help users locate nearby lash salons and recommend highly rated salons based on client reviews, thereby enhancing user convenience. The primary target audience for this web application is small business owners in the lash industry. The app aims to provide these small business owners with an efficient and technologically advanced platform to attract more clients, streamline their booking process, and offer personalized lash recommendations based on each client's unique facial features.

The limitations of the web application include the accuracy of lash recommendations, which is influenced by the quality of facial feature analysis and training data. Although the virtual try-on provides an approximation of lash styles, it may not fully represent the actual lash extensions' results due to factors like lighting conditions and application technique.

II. METHODOLOGY

2.1 Data Collection

Data collection is a critical component of the study since it is used to train the algorithm to efficiently select lash styles depending on user preferences. The study will use standardized scales and questionnaires to evaluate user involvement and satisfaction using a combination of quantitative and qualitative methodologies. Before using the system, these tools will methodically collect information on consumers' personal preferences and experiences. Focus group talks will also be held with lash professionals, potential users, and beauty industry experts to gain varied viewpoints on the system's use, benefits, and limits, as well as its broader impact on the beauty business. Participant confidentiality will be scrupulously safeguarded to uphold ethical standards through informed consent and anonymized data. The integrity and privacy of the obtained data will be ensured if study methods are followed when conducting focus group interviews and documenting observations, as well as secure data management practices. The collected data will then be fed into the AI model, which will be critical in making the system project fully operational.

2.2 Development

Agile methodology was chosen as the primary approach for the system's development due to its inherent flexibility and adaptability to changes. This approach enables cross-functional teams to respond quickly to changing requirements, ensuring that the final product meets user expectations. The development process is guided by the Agile software methodology and unfolds in a systematic progression of six pivotal phases: planning, designing, developing, testing, releasing, and gathering feedback.

Fig. 1 Agile Methodology in System Development (Simsek, 2020)

2.2.1Plan

The LashTech development planning phase establishes a solid foundation for the project. First, the team identifies and thoroughly defines system requirements. Priorities are set, and the scope of work for a specific timeframe is defined. A comprehensive plan is developed, outlining activities, calculating effort, and organizing the next iteration.

2.2.2Design

During this stage, the team establishes the LashTech system's foundational elements, such as its architecture, user interface, and security measures. Technology, algorithm, and overall system architecture decisions are made following the objectives developed during the planning phase. Wireframes and prototypes are created to serve as a blueprint for the development of the system. This phase includes critical technology, user experience, and security decisions.

2.2.3Develop

The development phase begins with the development of the LashTech system, which includes both front-end and back-end components. Developers collaborate to build and integrate code, ensuring the system functions cohesively according to the defined strategy, using HTML and CSS for the front end and Django for the back end. This detailed relationship of technologies not only ensures a visually appealing user interface but also sets the foundation for the system's functionality, bringing the envisioned features to life with precision and reliability.

2.2.3.1 System Architecture

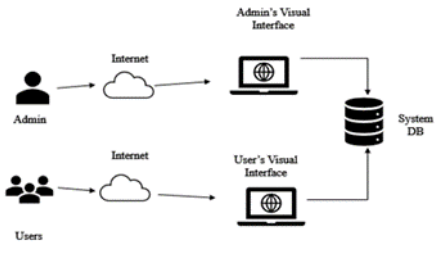

Fig. 2 LashTech's System Architecture

Figure 2 shows the system architecture of LashTech. The system consists of two main components: the user interface and the admin interface. These components are designed to provide different functionalities and cater to the needs of the admin and the users, respectively. The user interface is designed for clients who want to interact with our system. The user can sign up for an account and use various features in the system, such as AI lash recommendation, virtual try-on, and booking an appointment. However, the admin interface serves as a control panel for managing and monitoring bookings by the user. The system has a centralized database where all collected data is stored to ensure seamless data management. The database stores user profiles, appointment details, and other relevant data.

2.2.4Test

The testing phase, which is dedicated to validating the LashTech system's functionality, performance, and user experience, includes comprehensive unit testing for individual components to ensure intended functionality. Integration testing ensures performance and functional efficiency by thoroughly testing interactions between front-end and back-end components.

2.2.5Release

The release phase involves preparing the LashTech system for deployment, which may begin with the distribution of a beta version to a select group of users for additional testing. Feedback, bug reports, and error reports are actively collected during this stage, allowing for continuous improvements and refinements based on user experiences.

2.2.6Feedback

During this phase, user reviews and feedback are gathered to continuously improve the features and overall functionality of the LashTech system in the production environment.

2.3 Sampling Techniques

The proponents will use purposive sampling as the chosen sampling technique. Purposive sampling enables the selection of individuals with specified features or knowledge relevant to the research purpose. Individuals interested in lash enhancement treatments and potential users of the LashTech web app will make up the sample. The researchers seek to recruit people from various age groups, gender identities, and geographic areas to ensure a varied user base and thorough insights into the app's functionality. The research intends to capture a range of user preferences and experiences connected to lash recommendations, virtual try-on features, and smooth booking supported by AI and geolocation technology by exploiting the convenience of enrolling individuals who are readily available and interested. While convenience sampling may add bias due to its non-random nature, it allows researchers to efficiently acquire feedback and measure user impressions of the LashTech app's usability, effectiveness, and overall utility. This strategy will allow for the collection of vital feedback that will influence the refining and enhancement of the app's features, assuring its relevance and appeal to a broad user base.

2.4 Evaluation

To accurately assess the alignment of the completed project with the defined criteria, an evaluation will be conducted following the ISO 25010:2011 standard. This well-known evaluation technique will be used to assess the project's quality, dependability, and security. The project was rigorously tested before it was made accessible to everyone, ensuring that it met quality standards. The use of the ISO 25010:2011 model was critical to a thorough evaluation of the project, which confirmed its overall excellence.

ISO 25010:2011 is a recognized standard for evaluating software quality characteristics, categorizing the functionalities of an application, and listing all aspects that must be verified before it can be released. This study specifically seeks to evaluate the system in terms of the following categories: Functional Suitability, Performance Efficiency, Usability, Portability, and Security.

The evaluation result was conducted and interpreted using a numerical rating scale, as shown in Table 1.

Table 1. Rating Scale for Interpreting the Evaluation Result

Numerical Rating	Range	Interpretation
5	4.21 - 5.00	Excellent
4	3.21 – 4.20	Very Satisfactory
3	2.61 – 3.40	Good
2	1.81 – 2.60	Fair
1	1 – 1.80	Poor

III. RESULTS AND DISCUSSIONS

The proponents delve into the outcomes of this study and the insights garnered from a comprehensive survey conducted among a diverse group of at least 30 respondents. This will present an in-depth analysis and discussion of the results obtained through the survey, shedding light into the habits, experiences, and perspectives of individuals regarding LashTech web app.

Listed below are some examples of questions that are used in the survey form.

A. General Questions and Results

Question 1. What is your Age?

In this inquiry, reveals that the age group with the highest percentage of participants was 21–24, making up 7 people (23.3%) of the sample represent age of 21, 5 people (16.7%) of the sample represent age of 22, and 6 people (20%) of the sample represent age of 23, respectively. This implies that a considerable proportion of our participants belong to the young adult population. The second-largest age group was that of people aged 25 to 29. This suggests that a sizable portion of the population is in their late 20s and early 30s. Furthermore, one respondent (3.3%) was older than 17.

Question 2. What is your gender?

In this inquiry, shows the majority, comprising 2 individuals (6.7%) of the sample, identified as male. This indicates a significant representation of males among the Lash Salon customer in our study. Additionally, 23 respondents (76.7%) of the sample, identified as females. Moreover, 3 respondents (10%) identified as non-binary and 2 respondents (6.7%) prefer not to say their gender, highlighting the importance of acknowledging and including individuals with diverse gender identities in our research.

Question 3. Do you frequently use eyelash extensions?

In this inquiry, shows majority, compromising 22 individual (73.3%) of the sample, this indicates that a large portion of the participants frequently utilize this use of eyelash extension. Comparatively, a meager 1 (3.3%) of respondents said they never use eyelash extensions. Furthermore, 7 (23.3%) of respondents admitted to using eyelash extensions occasionally, suggesting a moderate usage tendency within this cohort. This information provides a brief overview of the prevalence of using eyelash extensions among the population that was polled, emphasizing the enormous popularity of this beauty improvement treatment among most respondents.

Question 4. Are you familiar with virtual try-on technology for eyelash extension?

In this inquiry, reveals the majority, compromising 22 (73.3%) of the sample, indicating that they are familiar with virtual try-on technology. This majority shows that a sizeable percentage of the participants are aware of the virtual try-on tools created for digital experimentation with various eyelash extension types. In contrast, a smaller but still significant percentage of respondents 8 (26.7%) said they were unfamiliar with this technology. The information, which is graphically represented in the pie chart, offers important insights into the use of virtual try-on solutions in the context of eyelash extensions.

Question 5. Would you be interested in using a web app like LashTech that offers AI lash recommendations and a virtual try-on feature?

In this inquiry, shows majority, compromising 29 (96.7%) of the sample, indicating the willingness among the respondents to learn more about the virtual try-on feature provided by LashTech, suggesting a high likelihood of this technology's acceptance and adoption. Additionally, a relatively tiny percentage of respondents, 1 (3.3%) of the sample, indicated that they were not interested in the service. Surprisingly, none of the respondents indicated any ambiguity, with none choosing "Not sure."

Question 6. How often do you face challenges in finding the right eyelash style that suits your preferences?

In this inquiry, shows majority, 14 (46.7%) of the sample, expressed frequently encountering such difficulties. This implies that a sizable portion of individuals frequently struggle to locate eyelash designs that suit their preferences. Additionally, 13 (43.3%) of the respondents said they occasionally faced these difficulties, showing that this problem is not uncommon and occasionally affects a sizable number of people. However, a lesser percentage of 2 (6.7%) of the respondents said they only occasionally had similar problems, indicating infrequent trouble choosing the proper eyelash style. Surprisingly, only 1 (3.3%) of respondents said they had never had obstacles in this regard, indicating that a very tiny percentage of people find it simple to select eyelash designs that suit their preferences.

Question 7. Do you prefer Lash Salon that are located close to your current location?

In this inquiry, shows majority, 27 (90%) of the sample, reported a definite preference for lash salon that were close to where they were at the time. This overwhelming majority reveals a high preference for convenience and accessibility among the participants, who favor services that are easily accessible, either due to time restrictions or practical reasons. Surprisingly, 0% of respondents expressed a negative preference for neighboring services. The location of lash salon doesn't matter to a lesser but significant 3 (10%) of the participants, showing a more accommodating attitude.

Question 8. Would you find it convenient to book eyelash services (e.g., lash extensions, beauty appointments) seamlessly through a web app based on your current location?

In this inquiry, shows majority, 28 (93.3%) of the sample, indicate a strong preference for this book services easily through a web application. This overwhelmingly high percentage emphasizes the need for nimble, location-based digital systems, underscoring the desire for simplicity and effectiveness in the reservation process. Additionally, a negligible 1 (3.3%) of respondents expressed disinterest regarding this service. In contrast, 1 (3.3%) of respondents of the sample, indicate that they are uncertain. These comments imply that while the vast majority is looking forward to the ease of location-based online bookings, there is a tiny group that could require more information or convincing to adopt this technological breakthrough.

B. Evaluation Results

Using the 5-Likert scale (see Table I), the respondents were able to answer the following evaluation questions:

Functionality Suitability

The functional suitability of the system as evaluated by all 30 respondents received overall rating for the functional suitability category received a 4.49 mean score indicating an ‘Excellent’ remark. This remark indicates that the system has provided necessary functions that work properly as needed by the user.

Performance Efficiency

The performance efficiency of the system as evaluated by all 30 respondents received overall rating for the performance efficiency category received a 4.47 mean score indicating an ‘Excellent’ remark. This remark indicates that the system operates efficiently and effectively.

Reliability

The reliability of the system as evaluated by all 30 respondents received an overall rating for the reliability category and received a 4.54 mean score indicating an ‘Excellent’ remark. This remark indicates that the system is stable, consistent, and reliable.

Security

The security of the system as evaluated by all 30 respondents received a mean score of 4.7 indicating an ‘Excellent’ remark. This remark indicates that the system ensures the privacy and security of data.

Usability

The usability of the system as evaluated by all 30 respondents received an overall rating for the reliability category and received a 4.48 mean score indicating an ‘Excellent’ remark. This remark indicates that the system’s user interface and overall design is pleasing, intuitive, and usable for all users as intended.

Compatibility

The compatibility of the system as evaluated by all 30 respondents received a mean score of 4.47 indicating an ‘Excellent’ remark. This remark indicates that the system can operate properly in another environment.

Maintainability

The maintainability of the system as evaluated by all 30 respondents received a mean score of 4.53 indicating an ‘Excellent’ remark. This remark indicates that the system provides ease of maintenance.

Portability

The portability of the system as evaluated by all 30 respondents received a mean score of 4.33 indicating an ‘Excellent’ remark. This remark indicates that the system is portable and can be transferred to other platforms.

IV. CONCLUSION

The development and evaluation of LashTech, successfully achieves its primary objective of blending technology and beauty services, contributing to an elevated beauty and wellness experience. LashTech consistently receives an Excellent rating for functionality, performance efficiency, reliability, security, and usability while adhering to ISO 25010 standards. It delivers personalized lash recommendations using cutting-edge AI algorithms, and the virtual try-on feature increases user engagement. The user-friendly interface adds to its appeal by making lash selection and booking easier. Maintaining these standards requires ongoing development, ensuring LashTech's continued success in the continually evolving landscape of beauty and wellness.

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