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Advancing System Authentication & Improving User Sign Up Process for Banking Applications

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***Abstract*—As technology is upgrading day by day, banks changed from paper-based solutions provider to the latest of the technologies like mobile application and web application. Due to the fact that there are more phones on the market than computers, mobile-banking has garnered increasing attention in the last few years .[1] But they still use the tedious method where the user has to fill in all the details. This study will attempt to improve the user sign up experience. Users will just have to scan their official government documents and the system will retrieve user details from it. System will authenticate the documents using the barcode or QR code present on them.**

Keywords— User experience, User Interface, User authenticity, Banking application

I. INTRODUCTION

The use and development of mobile applications is a relatively new and fast-growing sector. People and societies in underdeveloped countries are improving themselves with respect to mobile applications. Mobile apps run on a small hand-held mobile device that can be moved around, used easily, and accessed from any location. These apps not only have an impact on users, but they also play a critical role in business. Many businesses are generating revenue through smartphone applications.[2]

To overcome mobile consumers' concerns, mobile app developers must better understand security and privacy perceptions in order to design appropriate security and privacy solutions, enticing new users and retaining current ones. Because security and privacy are the primary reasons that mobile users continue to use apps, understanding these security perceptions and their relationship can help app developers provide composite security and privacy features rather than separate features, resulting in lower costs, time, and effort to develop secure mobile applications.[4]

The mobile application runs in a mobile environment, and its usability is influenced by a variety of circumstances, including screen resolution, hardware restrictions, connectivity challenges, and limited interaction options. Usability refers to a system's ease of use and suitability for a specific group of users. The ease of use has an impact on the user's performance and satisfaction, whereas acceptability decides whether or not the product is used. Planning a task, deciding on a method or process to employ for the assessment, and deciding what to evaluate are all part of usability evaluations. The mobile application must be designed in such a way that users will be able to interact with it effectively. One of the critical success factors of such an application is the ability to use in a small device effectively and with good interaction. Usability is defined as the extent to which a product can be used by specified users to achieve specified goals with minimal effort.[2][3][7]

Mobile banking, mobile commerce, and other systems have been regarded as innovations and self-service technologies by customers in recent years. According to research, banks emphasized the benefits of such new applications in an effort to increase customer satisfaction while lowering bank expenses. Mobile banking evolved when financial institutions began to offer their operations online.[1] It is an application of e-commerce that allows customers to use banking features at their convenience any time, any place irrespective of geographical location.[3] It has been seen as one of the most value-added application and vital mobile service available. Performance expectancy in mobile banking is defined as the degree to which users consider mobile banking apps to be useful. It reflects customers' impressions of the advantages of using a bank's mobile app to access financial services, such as transaction speed, convenience or ubiquity, and proximity.[13] Despite having varied lives, consumers' requirements may be identical. Many of the services provided by banks nowadays have an impact on consumers. As a result, banks must analyze consumer lives in order to understand how to provide services that meet their wants and, in turn, obtain a competitive advantage in this dynamic market.[13] Many banking apps, while convenient for customers, can be difficult to use. Even if a customer is able to use the application, the experience itself will be less delightful. It is therefore critical to investigate the factors because they directly contribute to the ease of use of these products, the quality of e-services, technological proficiency, and consumer attitudes, all of which affect customer satisfaction when using mobile banking services and applications.[1]

For creating a bank account, one has to go through a sign-up process. That may include registering for an account, creating a profile by filling in personal details like full name, phone number, email address, identification id and residential address., uploading the required documents followed by the KYC (know your customer) process. To reduce the steps the user needs to perform and to ease the sign-up process, this system will provide the user with an option to scan and upload their government issued documents with the phone camera to extract the data. User authentication and verification of the uploaded documents is the most crucial and a very important part while creating a bank account, any error in this will lead to fake accounts and affect the security and privacy of users.

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Customers must provide financial information to the website, which can be misused if not properly protected.[4]

II. LITERATURE REVIEW

A. *Authentication*

Mobile services offered anywhere in the world have been impacted by the constant expansion in the number of smart devices and the associated connectivity requirements. Authentication is the first step in keeping transmitted data secure in such a connected environment. Users identify themselves by transmitting data to the system, which verifies their identification by computing a function and comparing it to a previously stored value". Despite the fact that a basic password is no longer the only requirement for validating the user from an information technology standpoint, this definition has not altered considerably over time.

Offline or online, authentication remains a crucial precaution against unauthorized access to a device or any other sensitive application. Transactions were confirmed by physical presence, such as placing a wax seal, back in the olden days. Recently, as our society has advanced, we've come to realize that validation based on sender identification alone is not necessarily sufficient on a worldwide scale. Regardless of the authentication mechanism used, the authentication scheme must provide a consistent user experience.[12]

B. *Design Thinking*

Design thinking is a human-centered approach to innovation that focuses on understanding customer demands, prototyping quickly, and coming up with innovative ideas that will change the way you produce goods, services, processes, and organizations. Instead, then relying solely on historical data or making hazardous bets based on instinct rather than facts, design thinking allows you to make decisions based on what customers truly desire.

The accuracy and appropriateness of the data collected will influence not only the designers' judgement on the needs of the users, but also the outcome of design thinking. The methodology of the entire idea and design is known as design thinking. It entails looking for alternative solutions to various design themes and thinking in new ways. Designers can use design thinking in document design to innovate and reconstruct their documents. It is necessary to explore the core needs of users from a large amount of research data during the design thinking process.[6]

C. *User Experience*

As human–computer interaction (HCI) and interactive systems design have developed a sense of people living with and through technologies, our concerns have broadened from usability to include wider qualities of people's experiences with technology. User experience has become a focal interest in leading HCI. The internal and subjective feeling a person has when using a product or encountering a service is referred to as user experience. It is a comprehensive process that differs from person to person. User Experience Design (UXD) has emerged as a critical component of product success. One of the critical issues in UXD is determining how to evaluate user experience. It is unavoidable that affective factors will play a significant role in the decision-making process. The most popular computational models, on the other hand, are cognition-based models, which analyze and simulate human perception based on user experience.[5][11]

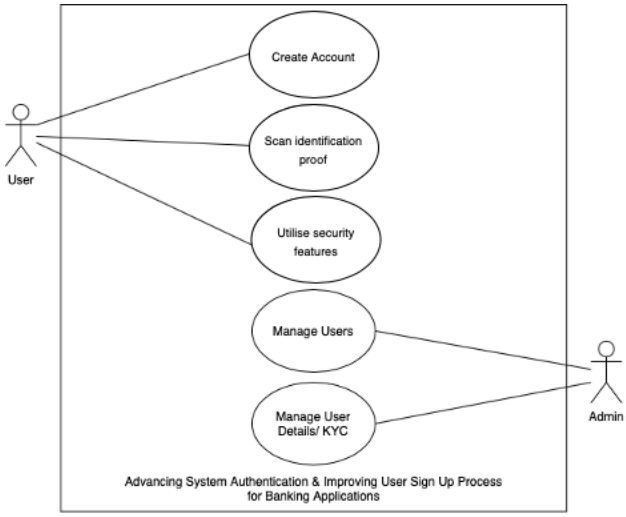
D. *Security*

As the mobile Internet evolves, intelligent terminals and applications with Android and iOS systems mature into mature products from emerging technology; however, malicious applications emerge at the same time. Growing with each passing day Detection and protection are the two most common methods of ensuring mobile security.[9]

Users and information regulators are paying more attention to the security of mobile applications: application security is linked not only to developers' economic interests, but also to users' information and financial security, as well as the healthy development of the Internet ecology and the security of key national information infrastructure. Mobile applications come in a wide range of platforms and types, as well as a wide range of security challenges. [8]

III. PROPOSED WORK

The work flow of the system goes as follows:



The proposed system is described as:

A. *Front-end Module*
B. *Improving User Sign up Experience*
C. *Advancing System Authentication*
D. *Back-end Module*

Here is the brief description about each of them.

A. *Front-end Module*

The front-end module defines an application's user interface and builds a strong user experience to improve the client-side interaction. It is important to empathize with the user to apply design thinking and improve the UX of each stage of a particular application. The front-end for a Banking Application must ensure clarity to the design by building an attractive user interface and a robust user experience.

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Let's have a deeper look:

User Interface: The user interface (UI) is the point at which human users interact with a computer, website or application. Consistent choice of colors, graphics and branding would help users associate with the developer. It avoids problems, increases user involvement, perfects functionality and creates a strong link between the visitor and your application.

User Experience: The user experience (UX or UE) is how a user interacts with and experiences a product, system or service. It includes the user's perceptions of utility, ease of use, and efficiency. User Experience will put a lasting impact on your users' mind. User experience is important because it tries to accomplishment the user's needs. It aims to provide positive experiences that keep a user devoted to the product or brand.

B. *Improving User Sign up Experience*

This procedure begins with a fixed dot approach replacing the fixed "navbar" approach. The developer or the designer are greeted with some options to place a navigation dot. A navigation dot is a small circle enclosing an arrow icon representing an expansion in that particular direction.

C. *Advancing System Authentication*

Post the scan of the identification card, the system would verify the details of the same with the barcode or QR code on the card to authenticate the information. The 2-factor verification would ensure the authenticity of the data. Furthermore, the data could be cross referenced through the government database. This method can restrict users from creating accounts with bogus information.

1. *Aadhar Card*

2. *Pan Card*

D. *Back-end Module*

The back-end module would act as a software-based OCR to collect information present on the card. The information collected would be segregated according to data types to create the potential database for the user to confirm. The 2nd factor verification would simply use a software based QR scanner or barcode scanner respectively to verify the data to authenticate it. The data could be stored in mySQL for further banking requirements.

Step-by-step procedure for proposed model:

1. User would launch the banking application for the first time and sign up.
2. User simply places the phone camera to scan their identification card.
3. The OCR extracts the card information.
4. User would be prompted to confirm the details.
5. The scanner confirms the data from the QR code or barcode.
6. The sign-up process completion.

IV. IMPLEMENTATION AND ANALYSIS

With this implementation we are able to implement following features in our proposed system. The features are:

- *Faster process*: The proposed model successfully speeds up the process of creating a new account and the KYC process.
- *Secure process*: This method would ensure data authenticity for every user limiting the possibility of fraud.
- *2-factor verification*: The user would verify data once. The second confirmation would occur with cross-checking the data with the government database.

V. RESULTS AND DISCUSSION

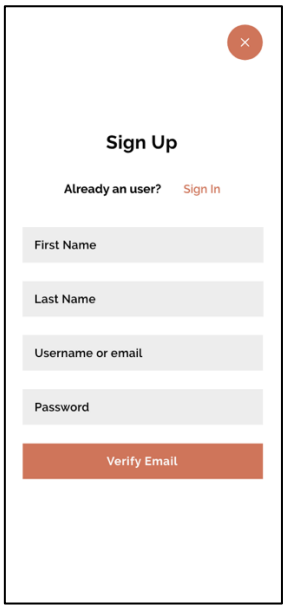

Fig. 1. Regular Sign-up process

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Fig. 2. Regular OTP Verification

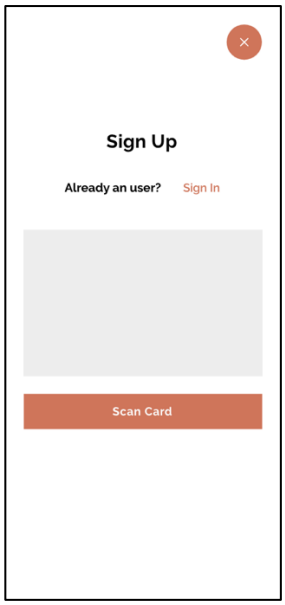

Fig. 3. Proposed Sign-up Experience

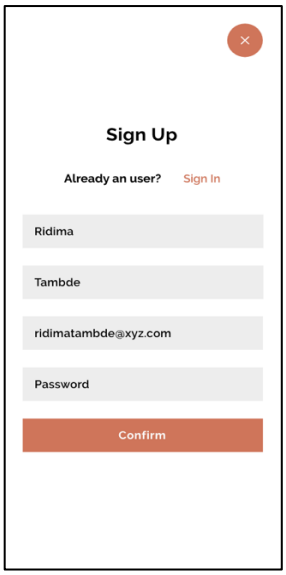

Fig.4. Proposed user validation

With the above implementation, the comparison between existing system and proposed system can be given as:

Parameters	*Existing System*	*Modified System*
Process Time	Quick	Dependent on User
Data Authenticity	Ensured	Dependent on User
Verification	2 Factor Verification	KYC

VI. CONCLUSION

Thus, with this implementation we are not just proposing a banking system but we are also advancing security and improving user sign up process.

FUTURE SCOPE

The proposed work can be implemented for to ensure profile authenticity for other applications as well.

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