



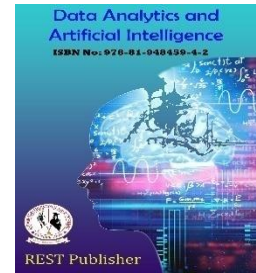
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Digital Assistant for Video KYC Framework in India

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Abstract. *The Know Your Customer (KYC) operations in India need to be done securely and efficiently due to the financial services industry's fast digitalization. The creation of a digital assistant that is customized for the Video KYC framework and prioritizes user experience over compliance requirements is suggested in this abstract. The digital assistant uses artificial intelligence and natural language processing to automate the KYC process and guarantee accuracy, dependability, and compliance with rules like those issued by the Reserve Bank of India (RBI). The assistant improves security protocols by utilizing advanced facial recognition, document verification, and biometric authentication, hence reducing the potential for identity fraud and data breaches.*

Keywords: *Digital Identity Verification; Regulatory Framework; Enhanced Customer Experience; Biometric Authentication; Real-time Verification; Fraud Prevention.*

1. INTRODUCTION

In the quickly changing Indian financial scene, video KYC (Know Your Customer) has become an indispensable tool for remote onboarding of new customers. The need to improve customer convenience and adhere to regulatory requirements is the main force behind this change. The Reserve Bank of India (RBI) has established regulations requiring safe and effective digital procedures, thus financial institutions must not only benefit from but also implement Video KYC. While guaranteeing regulatory compliance, a strong digital assistance framework for Video KYC incorporates cutting-edge technologies to expedite the onboarding procedure. Secure video communication systems, artificial intelligence (AI) and machine learning for liveness detection and facial identification, and optical character recognition (OCR) for document verification are some of the key technologies. By using these technologies, fraud risks can be reduced and the KYC process' accuracy can be increased. A key component of Video KYC's success is the user experience. The procedure is made to be inclusive and user-friendly with the help of accessibility features, multilingual support, and an easy interface. Operational efficiency is further improved by real-time support, automated scheduling systems, and easy interaction with current banking and CRM systems. In this framework, data security and privacy are of utmost importance. To protect consumer information, end-to-end encryption, safe data storage, and frequent security assessments are essential. The process's effectiveness and dependability are guaranteed by strict quality assurance procedures and ongoing training for staff members.

In the end, a thorough Video KYC framework not only satisfies legal requirements but also increases consumer convenience and trust, putting financial institutions in a better position to assist a varied and technologically literate populace.

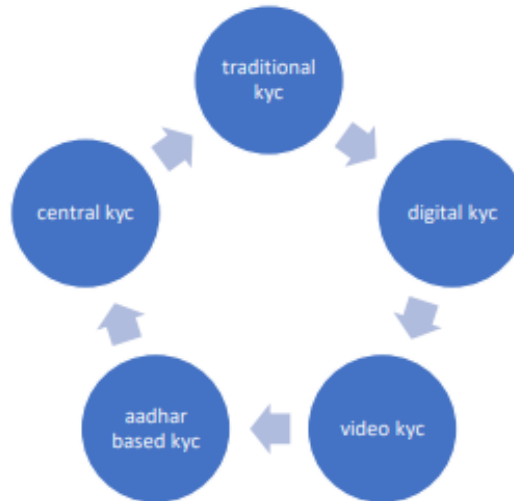


FIGURE 1. Types of KYC

2. LITERATURE SURVEY

[Article 1] *Enhancing Video KYC through Digital Assistants (2019)*: Investigates the integration of digital assistants to streamline Video KYC processes, reducing manual effort. Utilizes a combination of natural language processing (NLP) and computer vision for user interaction and document verification. NLP algorithms for voice commands, computer vision for document analysis. Improved efficiency and user experience reported; however, scalability challenges noted. [Article 2] *AI-driven Video KYC Framework with Digital Assistant Support (2020)*: Proposes an AI-driven framework for Video KYC, incorporating a digital assistant for real-time user guidance. Employs deep learning for facial recognition and OCR for document extraction during KYC. Deep learning models for facial recognition, OCR algorithms for document analysis. Demonstrates reduced KYC completion time and enhanced accuracy. [Article 3] *Securing Video KYC (2021): A Hybrid Approach with Digital Assistant*: Focuses on security aspects of Video KYC, introduces a hybrid approach blending biometrics and document verification, guided by a digital assistant. Integrates fingerprint recognition and block chain for enhanced security. Biometric algorithms for fingerprint recognition block chain for data immutability. Enhanced security features observed, with a slight increase in processing time. [Article 4] *Efficient Video KYC: Combining Digital Assistant and Machine learning (2022)*: Explores efficiency improvements in Video KYC through the combination of digital assistants and machine learning techniques. Utilizes machine learning for user behavior analysis, improving the digital assistant's contextual understanding. Machine learning algorithms for behavior analysis, NLP for enhanced conversation understanding. Notable reduction in false positives during KYC, contributing to a smoother onboarding process. [Article 5] *Next-gen Video KYC (2023): A Comprehensive Study on Digital Assistant Integration*: Conducts a comprehensive study on the evolution of Video KYC with a focus on the role and impact of digital assistants. Adopts a mixed-methods approach involving surveys, interviews, and system performance analysis various algorithms for user sentiment analysis, document verification continuous improvement of the digital assistant. Positive reception of digital assistant integration, with users expressing increased satisfaction and ease of KYC completion.

3. METHODOLOGY

This study uses a thorough methodology that includes several steps, such as research design, Digital Assistant for Video KYC development, deployment, assessment, and analysis. The methodology seeks to offer a methodical way to look at the security, compliance with regulations, and effectiveness of the suggested solution in the Indian financial setting. [1] *Research Design*: To collect data from a variety of sources, the research design combines qualitative and quantitative methodologies in a mixed-methods approach. The present condition of Video KYC practices in India is examined, and the viability and efficacy of the Digital Assistant solution are evaluated, using a case study technique. A pilot study is incorporated into the research design to assess the Digital Assistant's functionality in an actual environment. [2] *Creation of the Digital Assistant*: The Digital Assistant for Video KYC is created and developed based on information obtained from the literature analysis, interviews, and surveys.

Working with technology partners that specialize in video identification and authentication solutions is a part of the development process. The Digital Assistant's seamless integration with financial institutions' current KYC systems guarantees compatibility and simplicity of use. [3] *Evaluation Criteria*: A number of factors, such as user experience, security, efficiency, and regulatory compliance, are taken into consideration while evaluating the Digital Assistant. Ensuring adherence to RBI standards and other pertinent regulations that govern KYC processes in India constitutes regulatory compliance. User experience includes things like how responsive the Digital Assistant interface is, how simple it is to use, and how clear the instructions are. Efficiency compares how long it takes to finish Video KYC with the Digital Assistant to more conventional approaches. Data privacy regulations, encryption techniques, and security evaluation procedures are the main points of emphasis. [4] *Implementation*: Pilot institutions chosen for the project work together to install the Digital Assistant. During the deployment phase, bank staff members receive training on using the Digital Assistant, the solution is configured to meet the needs of the particular institution, and preliminary testing is carried out to guarantee functioning and dependability.[5] *Feedback and Iterative Improvements*: During the pilot program, bank employees and customers are surveyed about their interactions with the Digital Assistant. Iterative improvements to the solution are guided by the feedback received in order to pin point areas that require improvement. The Digital Assistant will adapt to consumers' changing needs and preferences thanks to ongoing communication with technology partners and pilot institutions.

4. DATACOLLECTION METHODS

[A] *Review of Literature*: To comprehend the legal environment, emerging technologies, and industry best practices surrounding Video KYC in India and around the world, a comprehensive analysis of the body of existing research is carried out. Academic journals, legal rules, industrial reports, and pertinent publications are examples of this. [B] *Interviews*: Key stakeholders, such as representatives from financial institutions, regulatory agencies (including the RBI), technology companies, and specialists in the fields of KYC and digital identity verification, are interviewed in a semi-structured manner. The purpose of the interviews is to obtain information about the possibilities, requirements, and difficulties related to the implementation of video KYC. [C] *Surveys*: To get input on consumer's experiences with conventional KYC procedures and their opinions of Video KYC, surveys are given to a sample of bank employees and customers. Usability, security issues, and general satisfaction with the Digital Assistant solution are among the topics covered in the polls. [D] *Pilot Study*: To deploy and test the Digital Assistant for Video KYC in a controlled setting, a pilot study is carried out in association with a few financial institutions. A sample of consumers utilizing the Digital Assistant for Video KYC is part of the pilot project, and information about the solution's effectiveness, accuracy, and user experience is gathered. [E] *Data Analysis*: The data collected from the literature review, interviews, surveys, and pilot study is meticulously analysed to draw meaningful insights and conclusions. This involves quantitative analysis of survey responses, qualitative examination of interview transcripts, and comparison of findings with existing research in the field. Patterns, trends, and correlations are identified to inform the development and refinement of Video KYC protocols and practices. [F] *Regulatory Compliance Assessment*: A comprehensive assessment is conducted to ensure that the proposed Video KYC solution complies with the regulatory frameworks governing digital identity verification in India and other relevant jurisdictions. This involves scrutiny of laws, regulations, and guidelines issued by regulatory bodies such as the Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), and other pertinent authorities. Any discrepancies or areas of non-compliance are identified and addressed to mitigate legal risks. [G] *Technology Evaluation*: The technological infrastructure and capabilities required to support Video KYC are evaluated in detail. This includes assessing the reliability, scalability, and security of the underlying video conferencing platform, as well as the integration with existing KYC systems and databases. Consideration is also given to emerging technologies such as artificial intelligence and biometric authentication for enhancing the efficiency and accuracy of Video KYC processes..

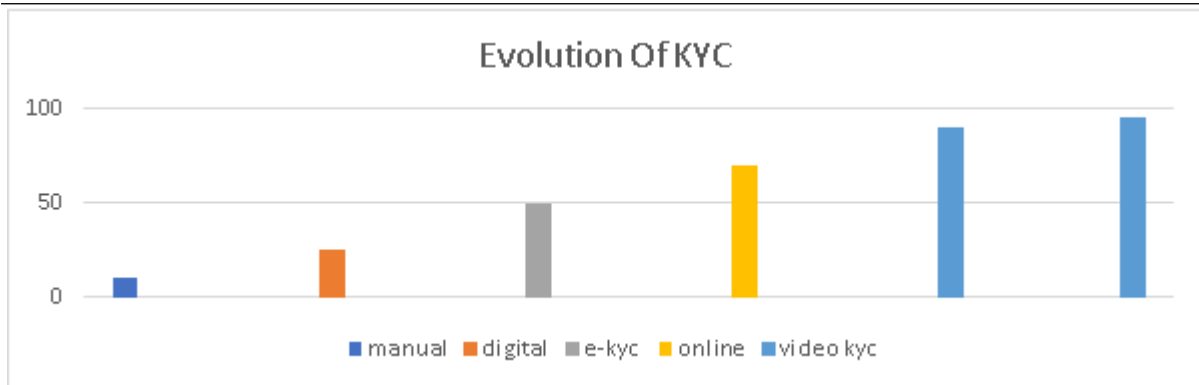


FIGURE 2. Evolution process of KYC

5. ALGORITHM

Several processes are involved in designing an algorithm for the creation of a Digital Assistant for Video KYC, with the goals of guaranteeing user experience, security, efficiency, and regulatory compliance. The main steps and procedures involved are outlined in the high-level methodology below: [1] **Input Data Collection:** [a]. Compile regulatory guidelines: Get details from the Reserve Bank of India (RBI) and other regulatory agencies regarding the regulations pertaining to Video KYC. [b]. Perform market research: To understand market trends, user preferences, and technology advancements in Video KYC systems, gather information from industry reports, the body of current literature, and stakeholder interviews. [c]. Get user feedback: Interview or survey clients and bank staff to learn about their perceptions of traditional KYC procedures and what they would want to see from a digital KYC system. [2] **Algorithm Design:** [a]. Specify system requirements: List all of the functional and non-functional needs for the Digital Assistant, such as user interface design, security protocols, regulatory compliance, and integration with current KYC systems. [b]. Plan the flow of user interaction: Make a flowchart that details the exact steps customers must follow to accomplish Video KYC with the Digital Assistant, taking into account features like biometric authentication, document verification, and facial recognition. [c]. Create a rationale for decisions: Define algorithms that leverage input data from government-issued identification documents, facial biometrics, undescribed algorithms that validate the identity of users based on input data, including government-issued identification documents, facial biometrics, and liveness detection methods. [3] **Execution:** [a]. Create the app for the digital assistant: Using the proper programming languages and frameworks, create the frontend and backend parts of the Digital Assistant, making sure they function with mobile and web browsers. [b]. Connect to external services: Use the APIs or SDKs that technology partners have supplied for biometric authentication, face recognition, and document verification. [c]. Put security measures into action: Include data storage techniques that comply with data privacy requirements (e.g., GDPR, Indian Data Protection Bill), encryption systems, and secure data transport protocols (e.g., HTTPS). [4] **Testing:** [a]. Perform unit testing: Examine each part of the Digital Assistant program to make sure it works as it should and can gracefully manage unexpected situations. [b]. Carry out integration testing: To ensure data consistency and interoperability, test how the Digital Assistant integrates with current KYC systems and third-party services.

6. PROPOSED SYSTEM

With the use of artificial intelligence (AI) and video technology, the proposed system seeks to address the shortcomings of conventional KYC procedures by developing a Digital Assistant specifically designed for Video KYC in the Indian financial industry. This technology simplifies the KYC process for financial institutions as well as clients while providing an effective, safe, and user-friendly solution that improves regulatory compliance. [1] **User Interface and Experience:** The web and mobile platforms offer an easy-to-use user interface for the Digital Assistant. Through an easy-to-use, guided interface, customers can start the Video KYC process by providing the required identification documents and giving their approval for video verification. [2] **Video Verification:** When the procedure starts, clients are put in a live video chat with a qualified person who does the verification. The Digital Assistant makes use of artificial intelligence (AI) algorithms to instantly confirm the legitimacy of identity documents, guaranteeing adherence to legal requirements. [3] **Facial Recognition Technology:** During the video session, the system uses facial recognition technology to verify the identity of the customers. In order to verify a match between the given identity documents and face features analyzed by AI algorithms, an additional degree of

security is added to the KYC procedure. [4] *Verification of Documents*: The Digital Assistant not only uses facial recognition technology but also authenticates identifying documents that clients present.

Names, addresses, and identification numbers are extracted from the documents using advanced optical character recognition (OCR) technology, and these details are subsequently cross-checked against official databases for verification. [5] *Security and Compliance Measures*: The Reserve Bank of India (RBI) and other pertinent authorities have developed regulatory criteria that the system is built to abide by. To protect sensitive information transmitted during the Video KYC process, data encryption protocols are used. This ensures compliance with data privacy laws and protects client data from unauthorized access

7. ARCHITECTURE DIAGRAM

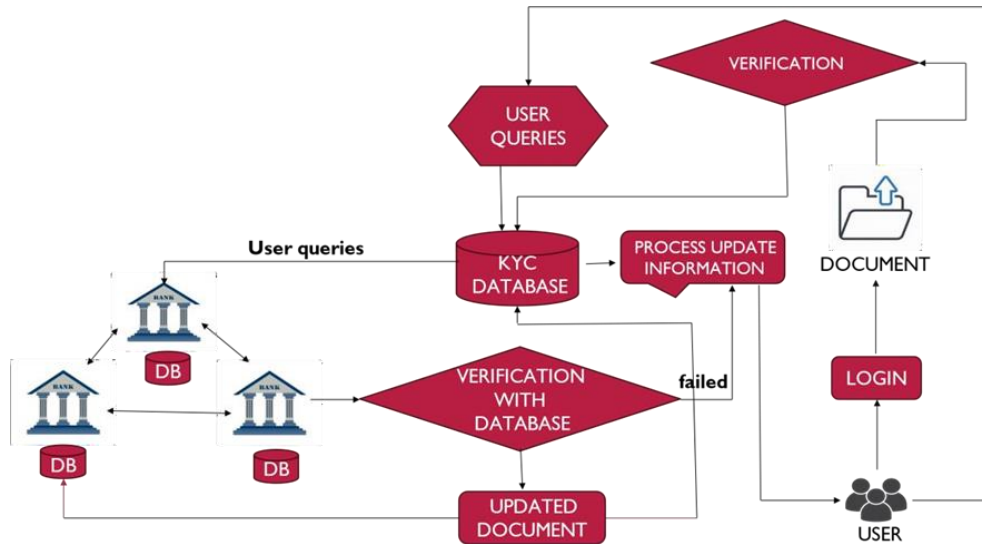


Figure 3. Architecture diagram

8. OUTPUT

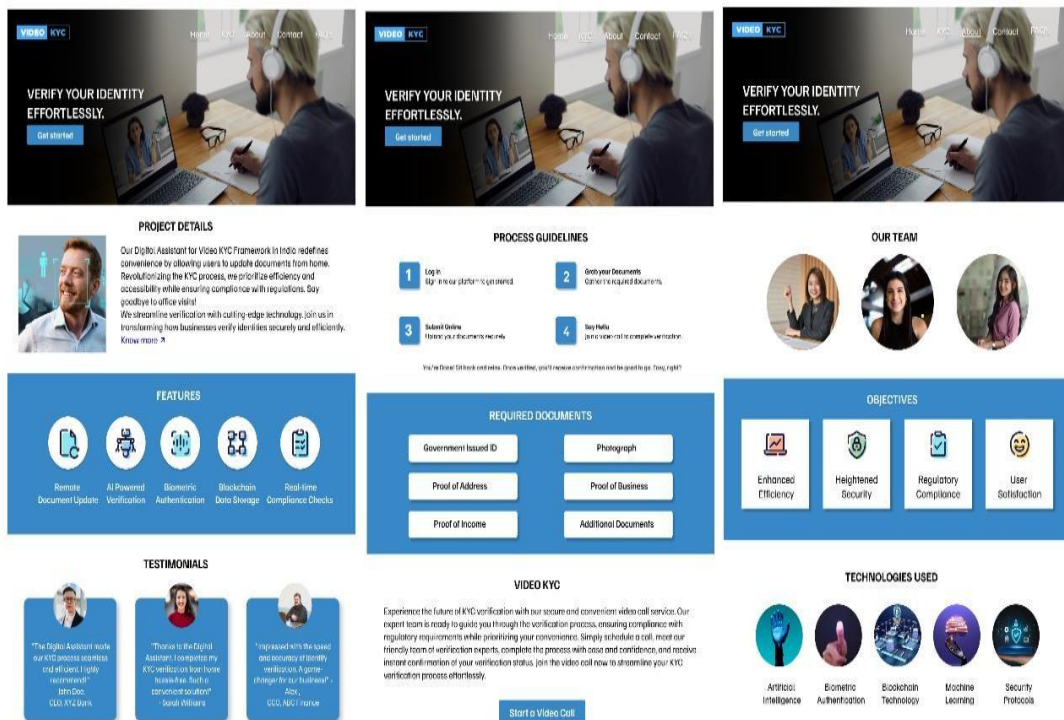


Figure 4. website page

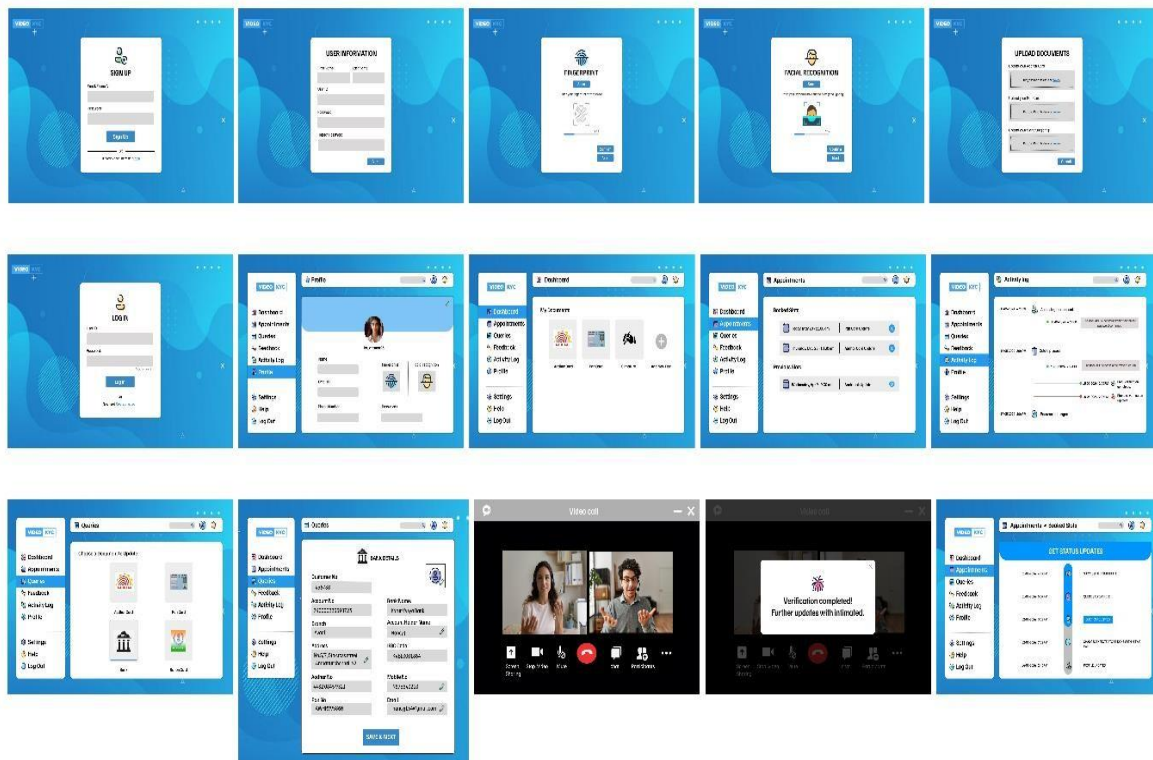


Figure 5. Modules

9. CONCLUSION

In conclusion, a viable way to improve and expedite the verification process is to include a digital assistant into India's video KYC framework. The digital assistant can help users and agents connect more smoothly by utilizing cutting-edge technology like artificial intelligence, machine learning, and natural language processing. This will increase efficiency and accuracy. This invention might greatly shorten processing times, cut down on mistakes, and improve the whole customer experience. Moreover, the use of strong security protocols guarantees adherence to regulatory guidelines and protects confidential data. However, aspects like accessibility, data protection, and user interface design need to be carefully considered in order to guarantee the success of this digital assistant. Continuous observation and upgrades are also necessary to adjust to changing legal requirements and technology breakthroughs. All things considered, the addition of a digital assistant to the video KYC framework is a big step in the right direction towards modernizing identity verification procedures in India and promoting increased consumer and corporate confidence, convenience, and security.

10. FUTURE SCOPE

A digital assistant has a wide and bright future ahead of it in India's video KYC framework. First of all, as AI and machine learning continue to progress, the digital assistant will be able to become progressively more intelligent, adaptable, and capable of managing intricate client inquiries and interactions on its own. Furthermore, integrating biometric authentication technologies like voice and facial recognition could improve security and expedite the verification procedure. Furthermore, adding support for regional languages to the digital assistant's language capabilities would provide accessibility and inclusivity for a larger spectrum of users nationwide. In addition, as the digital ecosystem develops, there may be opportunities for integration with other digital services and platforms, like financial transactions and e-commerce, to produce a smooth and cohesive user experience. Digital assistants in India's video KYC framework have a bright future ahead of them thanks to increased client satisfaction, efficiency, and creativity.

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