

**BLOCKCHAIN-BASED AUTONOMOUS NOTARIZATION SYSTEM USING
NATIONAL EID CARD**

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ABSTRACT:

Traditional notarization processes are often time-consuming, costly, and reliant on physical presence, hindering efficiency and accessibility. To address these limitations, this paper proposes a Blockchain-Based Autonomous Notarization System (BANS) utilizing National eID Cards to facilitate secure and efficient document notarization. BANS leverages blockchain technology to create an immutable and decentralized ledger of notarized documents, ensuring tamper-proof records and enhancing trust in the notarization process. National eID Cards, equipped with digital signatures and biometric authentication features, serve as the primary means of identity verification and authorization in BANS. The system operates autonomously, allowing users to upload documents for notarization directly through a secure web interface. Upon submission, BANS verifies the authenticity of the user's identity using the National eID Card's digital signatures and biometric data, ensuring compliance with legal requirements for notarization. Once verified, the document is encrypted and timestamped, and a unique hash of the document is recorded on the blockchain, providing irrefutable proof of its existence and integrity at the time of notarization. Users receive a digitally signed notarization certificate, further enhancing the document's credibility and legal validity. By eliminating the need for physical presence and streamlining the notarization process, BANS enhances accessibility, reduces costs, and accelerates document processing times. Moreover, the use of blockchain technology and National eID Cards enhances security, privacy, and trust, making BANS a reliable and efficient solution for document notarization in the digital age.

1.0 INTRODUCTION :

The traditional process of notarizing documents often involves significant time, effort, and resources, requiring individuals to physically visit a notary public's office for authentication and verification. However, with the advent of blockchain technology and the widespread adoption of National electronic ID (eID) cards, there is an opportunity to revolutionize the notarization process, making it more efficient, secure, and accessible. In this paper, we introduce a Blockchain-Based Autonomous Notarization System (BANS) that leverages National eID cards



to enable secure and autonomous document notarization. BANS aims to address the limitations of traditional notarization methods by harnessing the capabilities of blockchain technology and eID cards to create a streamlined, tamper-proof, and decentralized system for document authentication. The introduction of BANS marks a significant step towards modernizing the notarization process, offering individuals and organizations a convenient and reliable alternative to traditional notary services. By combining the security and immutability of blockchain technology with the authentication capabilities of National eID cards, BANS provides a robust solution for notarizing documents in the digital age. In the following sections, we will delve deeper into the design, implementation, and benefits of BANS, highlighting its key features, security mechanisms, and potential applications in various industries. We will also discuss the implications of integrating blockchain technology and eID cards into the notarization process and the opportunities they present for enhancing efficiency, transparency, and trust in document authentication. Overall, BANS represents a promising advancement in the field of notary services, paving the way for a more accessible, secure, and reliable notarization process in the modern digital landscape.

2.0 LITERATURE REVIEW:

1. **Blockchain Technology in Notarization:** Existing literature discusses the potential of blockchain technology in revolutionizing notarization processes by providing tamper-proof and transparent records of document transactions. Research by Swan et al. (2015) highlights the advantages of using blockchain for notary services, including enhanced security, efficiency, and accessibility.
2. **National eID Cards and Digital Identity:** Studies on the role of National eID cards in digital identity management emphasize their importance in enabling secure and convenient authentication for various online services. Research by Daghie and Koricic (2019) explores the benefits of eID cards in establishing trusted digital identities and facilitating electronic transactions.
3. **Decentralized Identity Management:** Literature on decentralized identity management systems discusses the potential of blockchain-based solutions to empower individuals with control over their digital identities. Research by Hardjono et al. (2018) explores decentralized identity frameworks and their implications for privacy, security, and interoperability.
4. **Smart Contracts for Notarization:** Smart contracts, programmable code executed on blockchain networks, offer automation and transparency in notarization processes. Studies by Buterin (2014) and Szabo (1997) present the concept of smart contracts and their applications in automating contractual agreements, including notarization tasks.



5. **Legal Implications of Blockchain Notarization:** Legal scholars have examined the legal implications of using blockchain technology for notarization and document authentication. Research by De Filippi and Wright (2018) discusses the legal validity of blockchain-based notarization and its recognition in different jurisdictions.
6. **Privacy and Security Concerns:** Concerns about privacy and security in blockchain-based notarization systems have been raised in the literature. Studies by Kshetri (2018) and Swan et al. (2019) discuss privacy risks, data protection measures, and security considerations associated with blockchain technology in various applications, including notarization.
7. **Adoption Challenges and Opportunities:** Literature also addresses the challenges and opportunities in the adoption of blockchain-based notarization systems. Research by Tasca et al. (2018) highlights regulatory hurdles, technological barriers, and interoperability issues while exploring the potential benefits of blockchain technology in enhancing trust and transparency in notary services.

Overall, the existing literature provides valuable insights into the potential of blockchain technology and National eID cards in transforming notarization processes. By leveraging blockchain's security and transparency features and eID cards' authentication capabilities, the proposed Blockchain-Based Autonomous Notarization System offers a promising solution for secure and efficient document authentication in the digital age.

3.0 EXISTING SYSTEM :

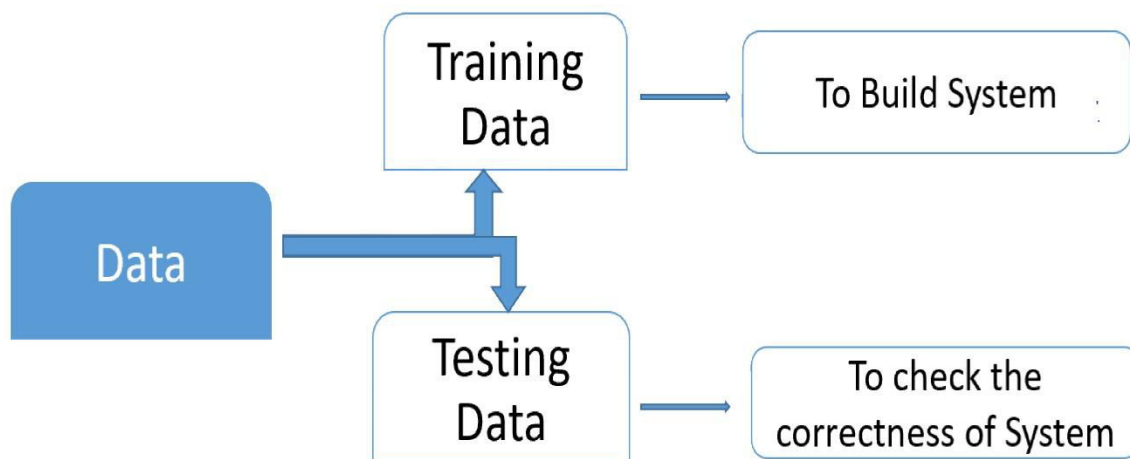
In the existing notarization system, individuals seeking authentication and verification of documents typically rely on traditional notary public services, which involve physical presence and manual verification processes. These traditional methods often result in time-consuming procedures, requiring individuals to schedule appointments, visit notary offices, and present physical copies of documents for authentication. Moreover, the reliance on paper-based documentation and manual verification processes can introduce vulnerabilities, such as human error, document tampering, and fraud. Additionally, the lack of interoperability and standardization across different jurisdictions can further complicate the notarization process, especially for cross-border transactions. Overall, the existing notarization system faces challenges related to accessibility, efficiency, and security, highlighting the need for a modernized approach to document authentication.

4.0 PROPOSED SYSTEM :

The proposed Blockchain-Based Autonomous Notarization System (BANS) aims to overcome the limitations of the existing notarization system by leveraging blockchain technology and National eID cards to create a secure, efficient, and accessible platform for document authentication. In BANS, users can initiate the notarization process remotely through a secure

web interface, eliminating the need for physical presence at notary public offices. Upon submission of a document for notarization, BANS utilizes the digital signatures and biometric authentication features of National eID cards to verify the identity of the user, ensuring compliance with legal requirements for notarization. Once authenticated, the document is encrypted, timestamped, and assigned a unique hash, which is recorded on a decentralized blockchain ledger. This process ensures the immutability and tamper-proof nature of notarized documents, enhancing trust and reliability in the authentication process. Additionally, BANS offers transparency and accessibility by providing users with real-time access to their notarization records on the blockchain. Users can independently verify the authenticity and integrity of their notarized documents, enhancing confidence in the system.

5.0 SYSTEM ARCHITECTURE:



6.0 IMPLEMENTATION:

To implement this project we have designed following modules

- 1) Verifier Login: verifier can login to system using username and password as 'admin and admin' and this will consider as government employee. After login verifier can collect eID card and pin no from user and then hash and generate signature and then SMART CONTRACT will verify whether hash and signature valid or not and if valid then verifier can view all details otherwise get 'Verification failed' error.
- 2) New User Sign up: new users can sign up with the application and all details will get saved in Blockchain
- 3) User Login: user can login with sign up details and after login user will perform below operations
- 4) Add Notary: user can create notary using pin no and eID file
- 5) Delete Notary: user can delete any existing notary details and keys
- 6) View Notary: using this module user can view notary on particular eID and pin no.

7.0 OUTPUT SCREENS

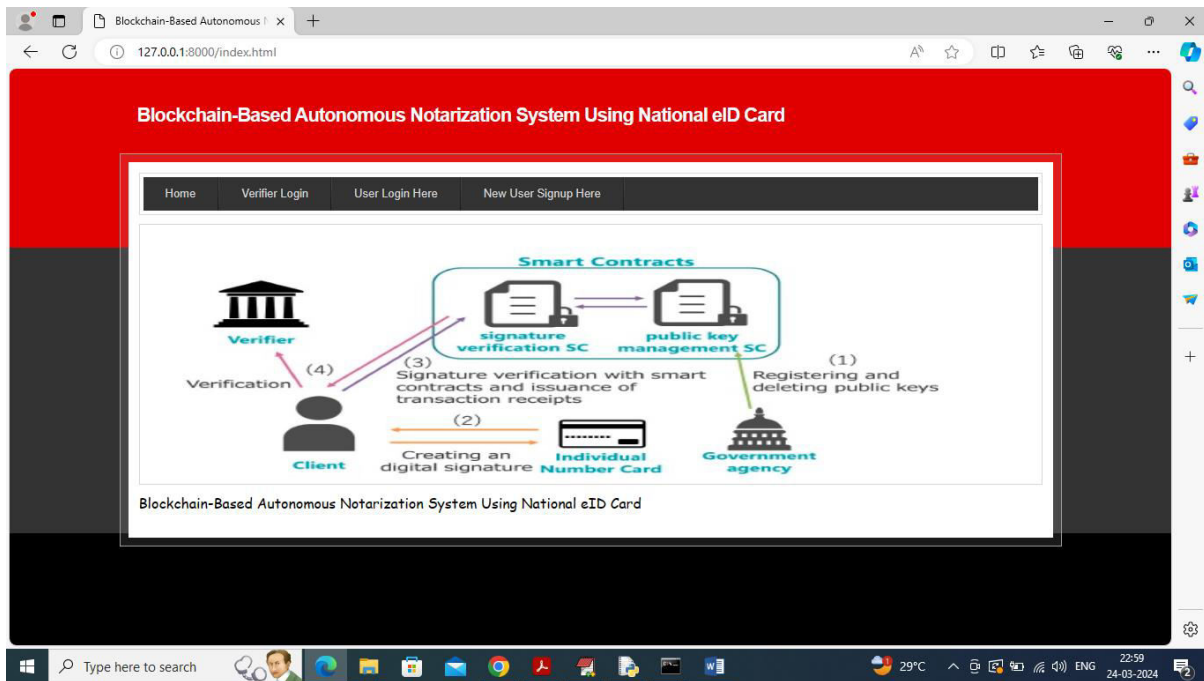
Double click on 'runServer.bat' file to start python server and get below page

```
C:\Windows\system32\cmd.exe
E:\takeoff\march24\Notarization>python manage.py runserver
Performing system checks...

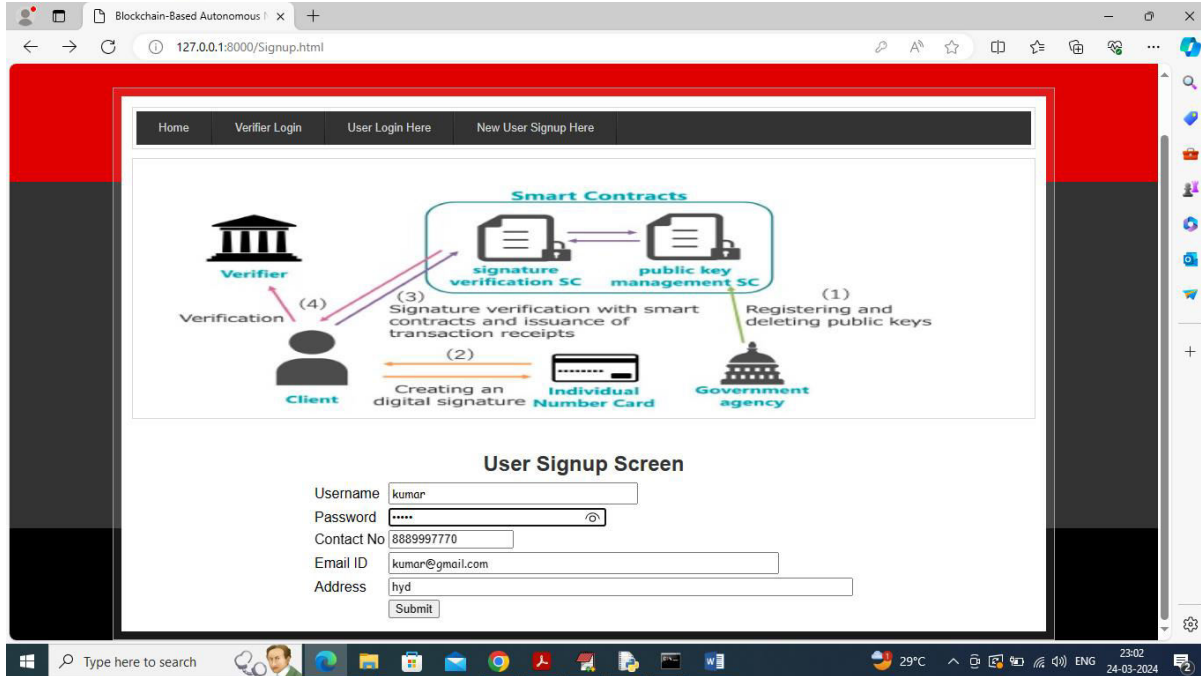
System check identified no issues (0 silenced).

You have 15 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin,
auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.
March 24, 2024 - 22:59:00
Django version 2.1.7, using settings 'Notary.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.
```

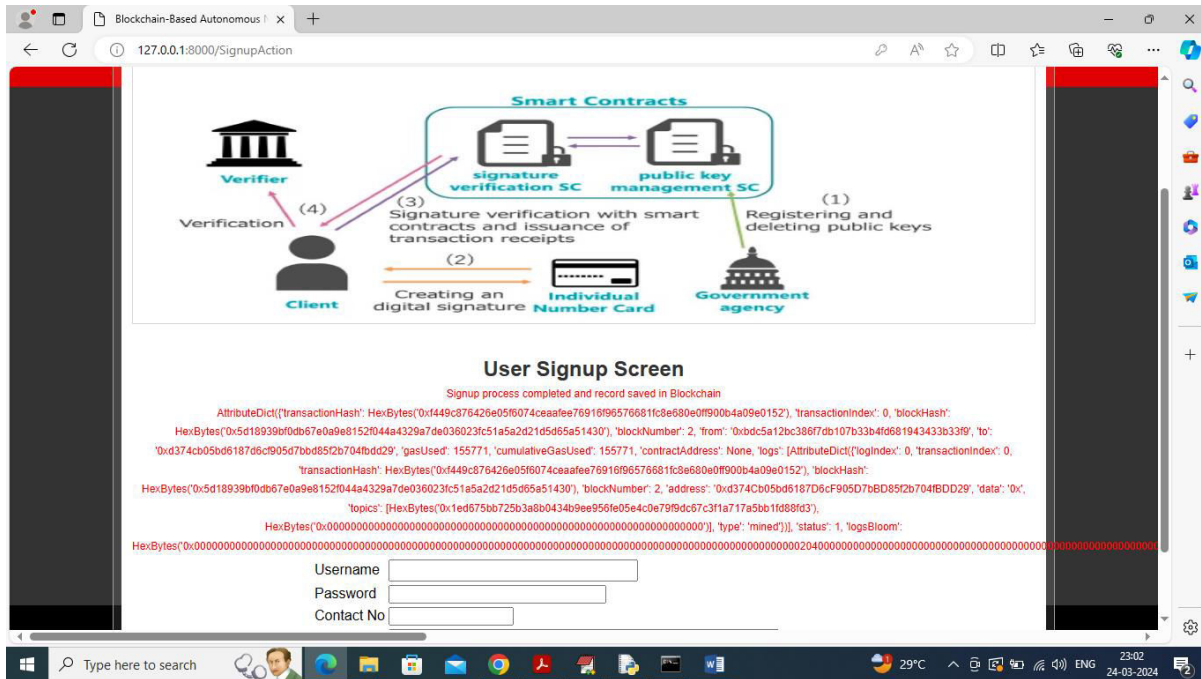
In above screen python server started and now open browser and enter URL as <http://127.0.0.1:8000/index.html> and press enter key to get below page



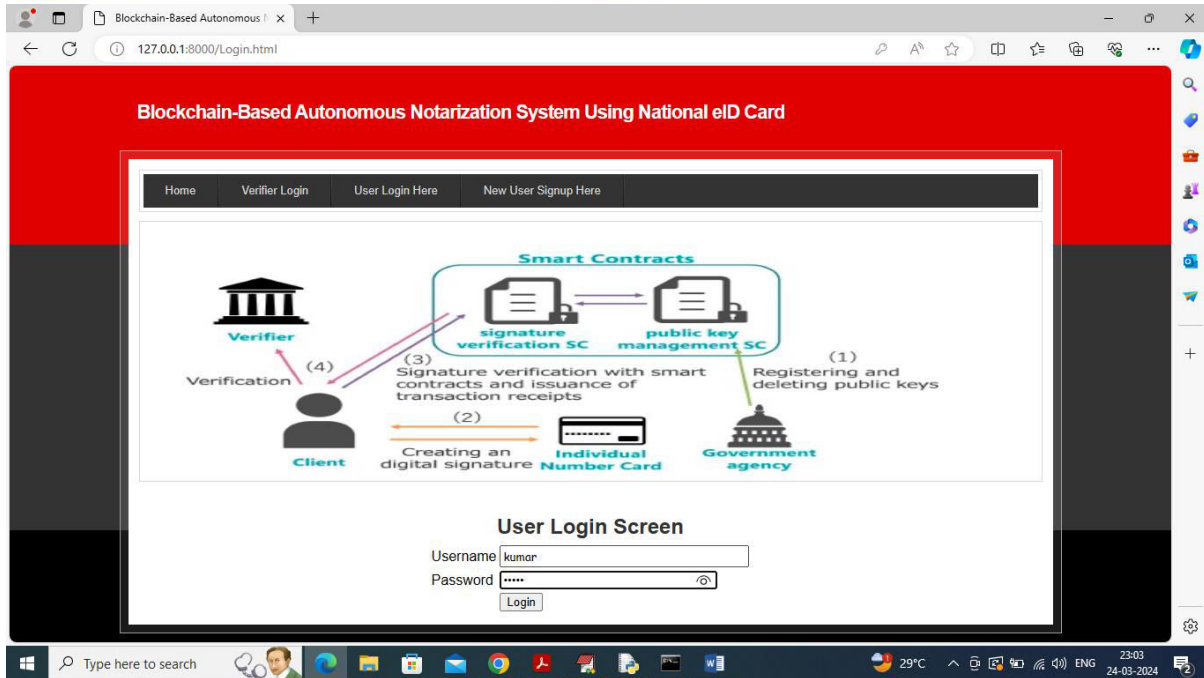
In above screen click on 'New User Sign up' link to get below page



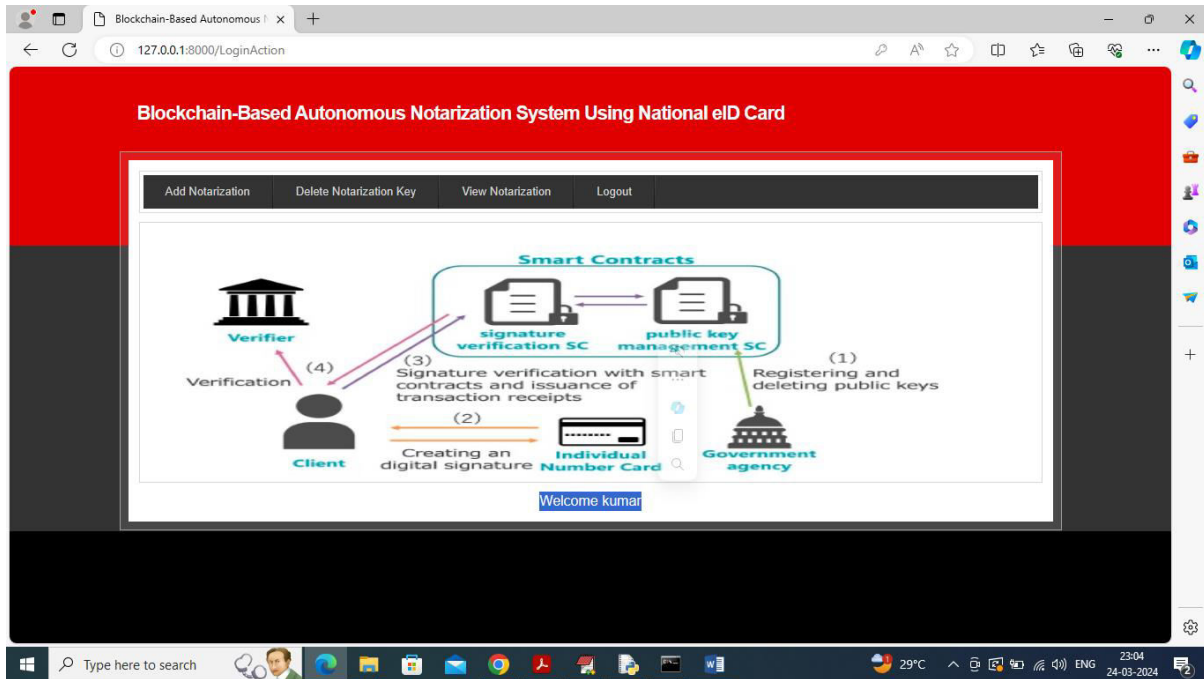
In above screen user is entering sign up details and then press button to get below output



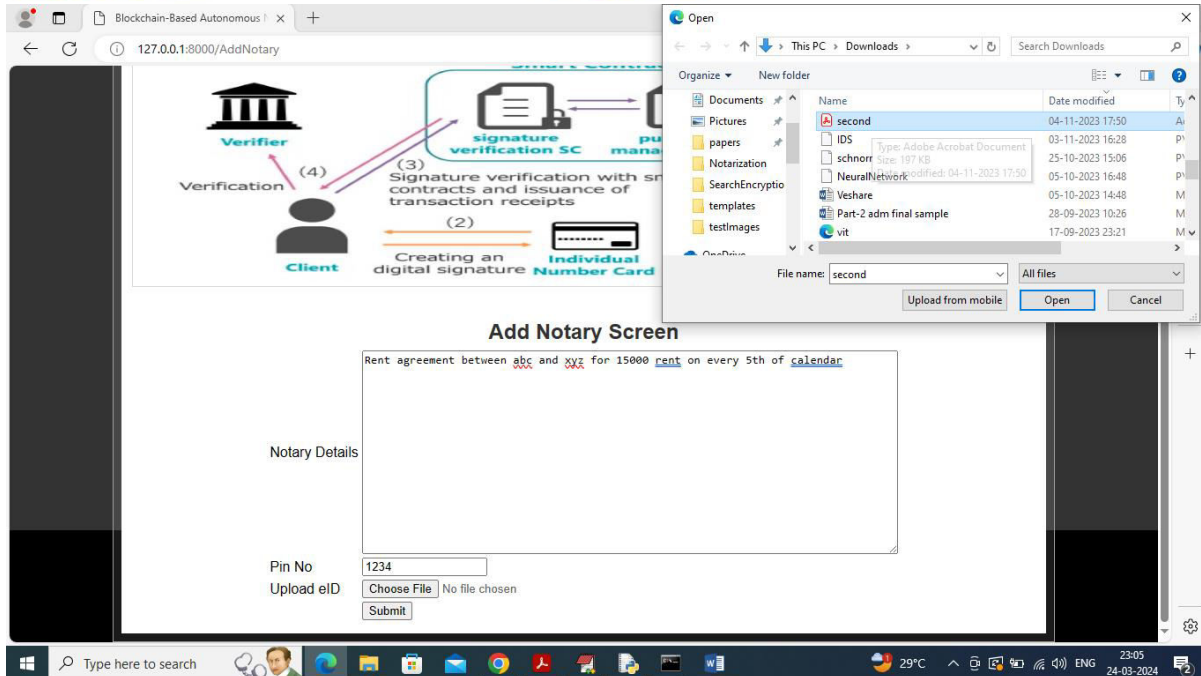
In above screen in red colour text we got transaction receipt from Ethereum and for your understanding purpose we are displaying entire details instead of displaying transaction hash code. In above output we can see block no, transaction hash and many other details. Now click on "User Login" link to get below page



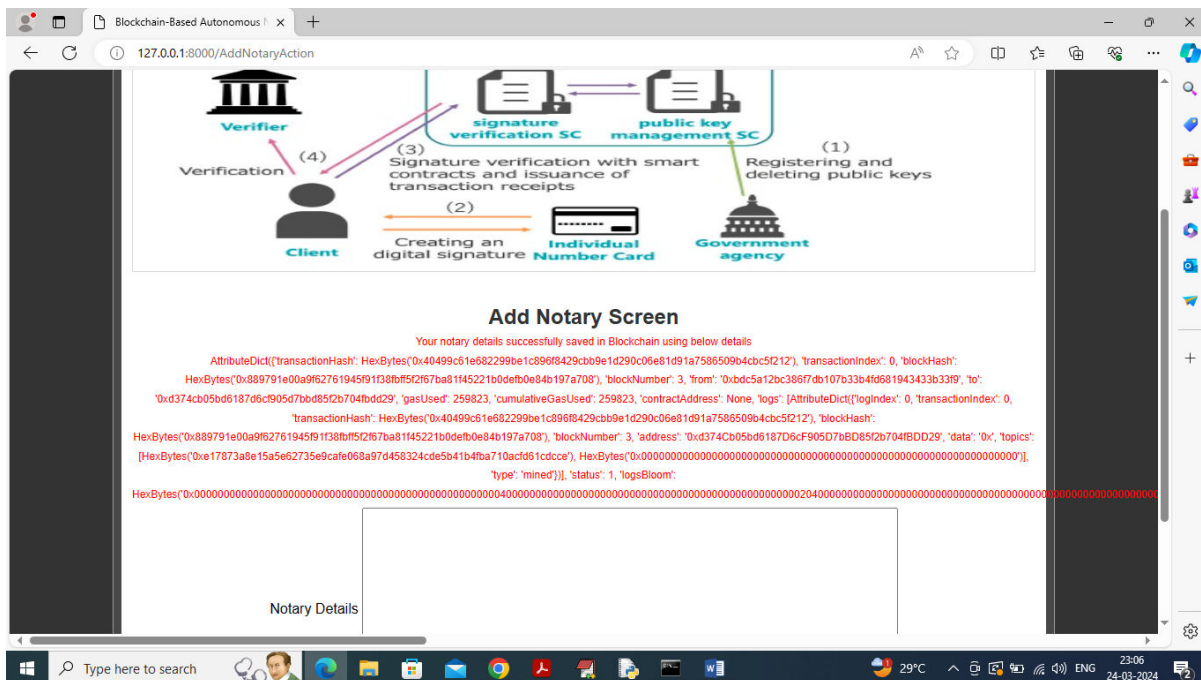
In above screen user is login and after login will get below page



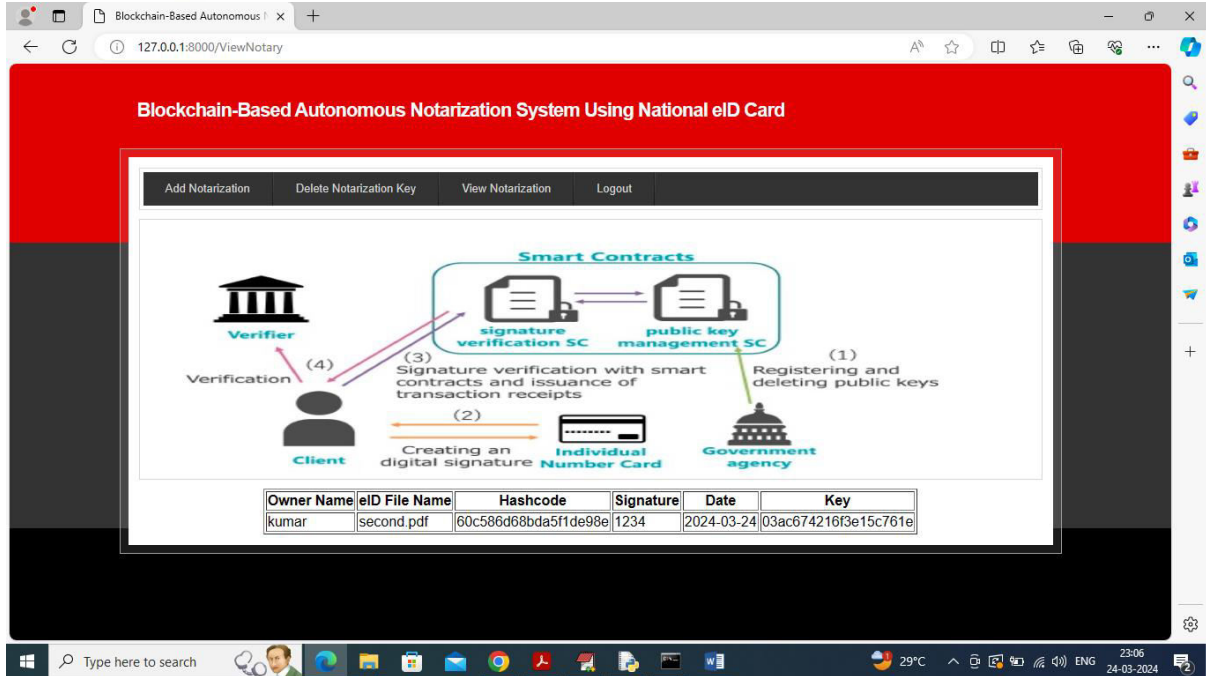
In above screen user can click on 'Add Notarization' link to create notary and will get below screen



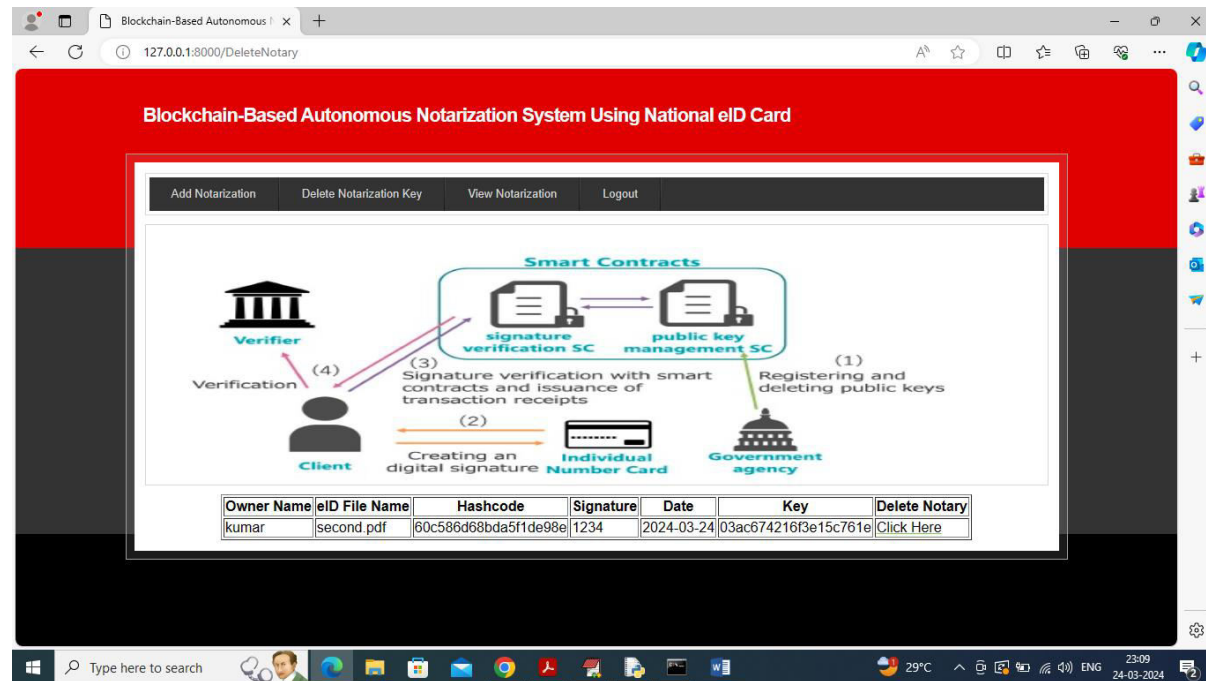
In above screen enter some notary text and then enter pin no and then select some eID document and then click on 'Open' and 'Submit' button to hash document and save all notary details to Blockchain and will get below output



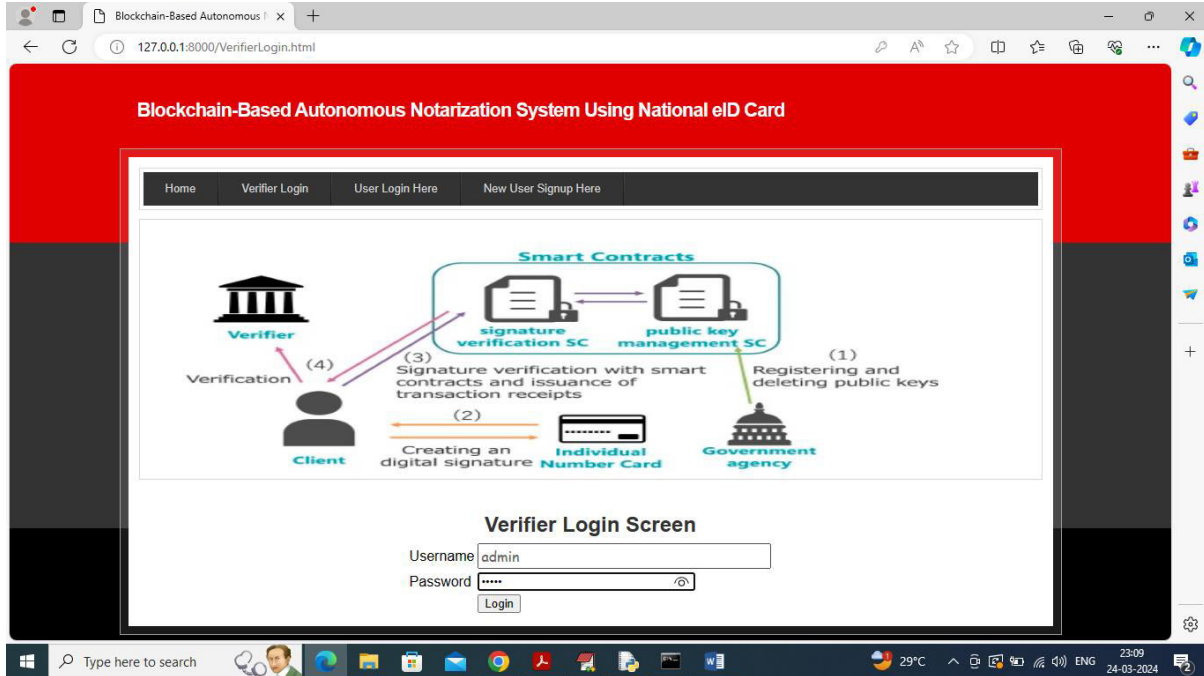
In above screen notary details saved in Blockchain and can see all transaction receipt and now click on 'View Notary' link to view all existing created notary details



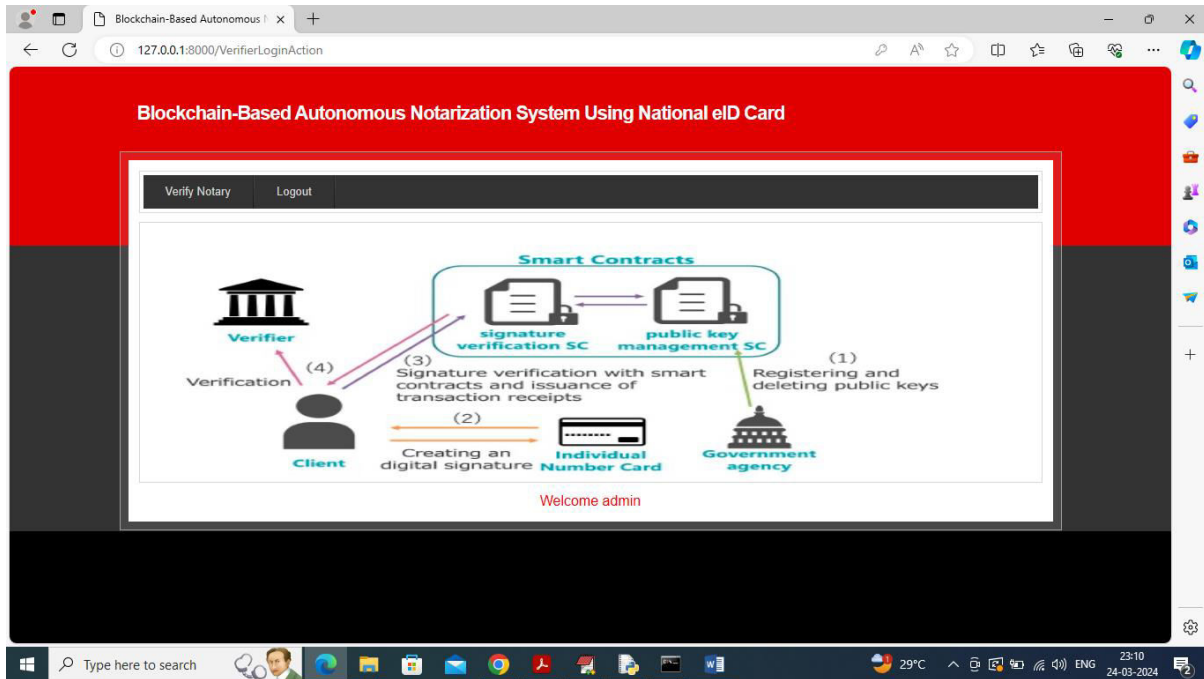
In above screen user can view all notary details along with signature, key hash code and created fixed date. To delete notary and its key then click on 'Delete Notarization key' link to get below output



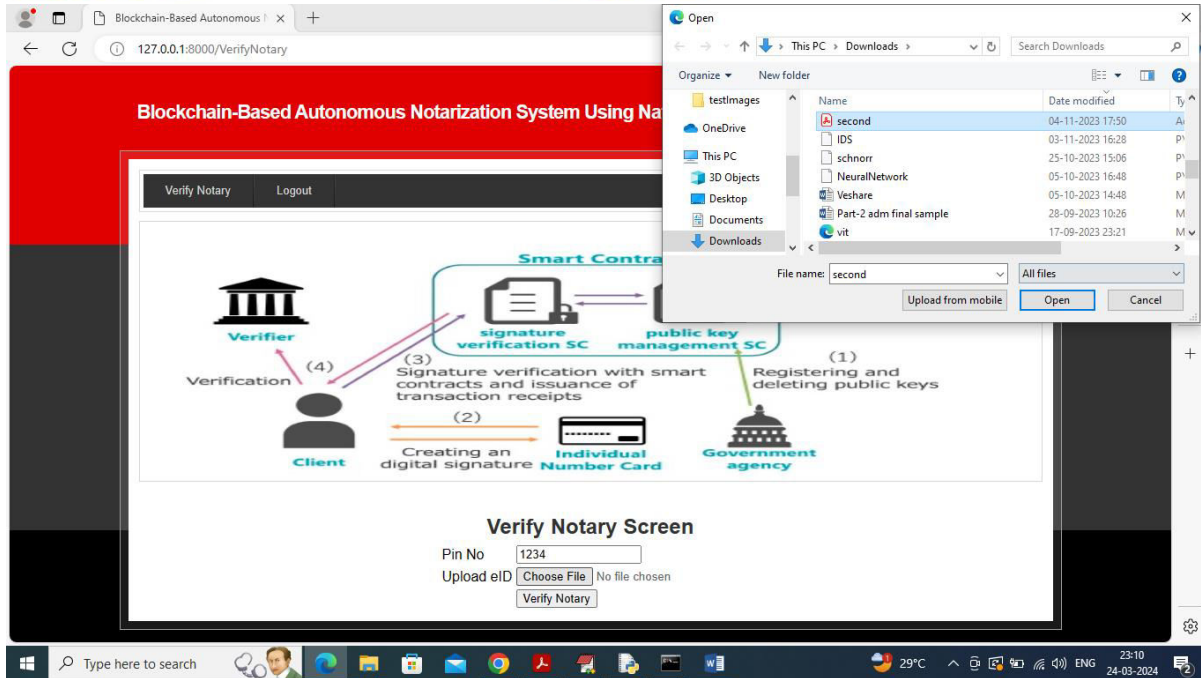
In above screen user can view all notary details and can click on 'Click Here' link to delete notary and now logout and login as 'Verifier' to verify notary



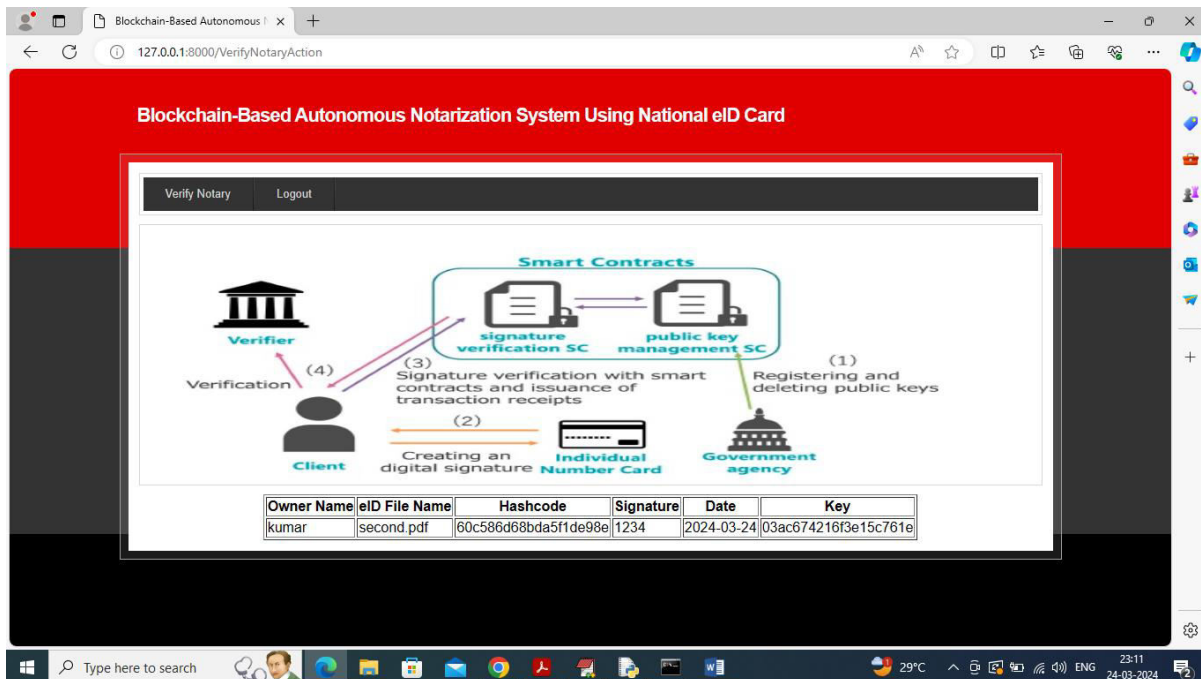
In above screen verifier is login and after login will get below page



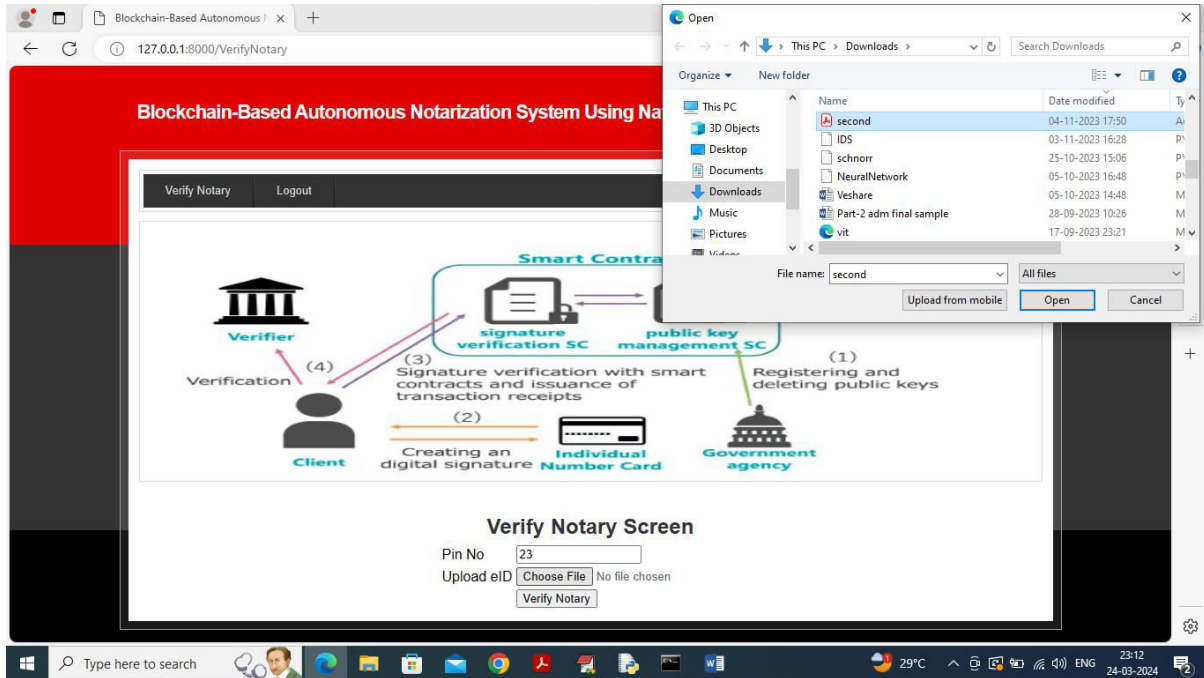
In above screen verifier can click on 'Verify Notary' link to get below page



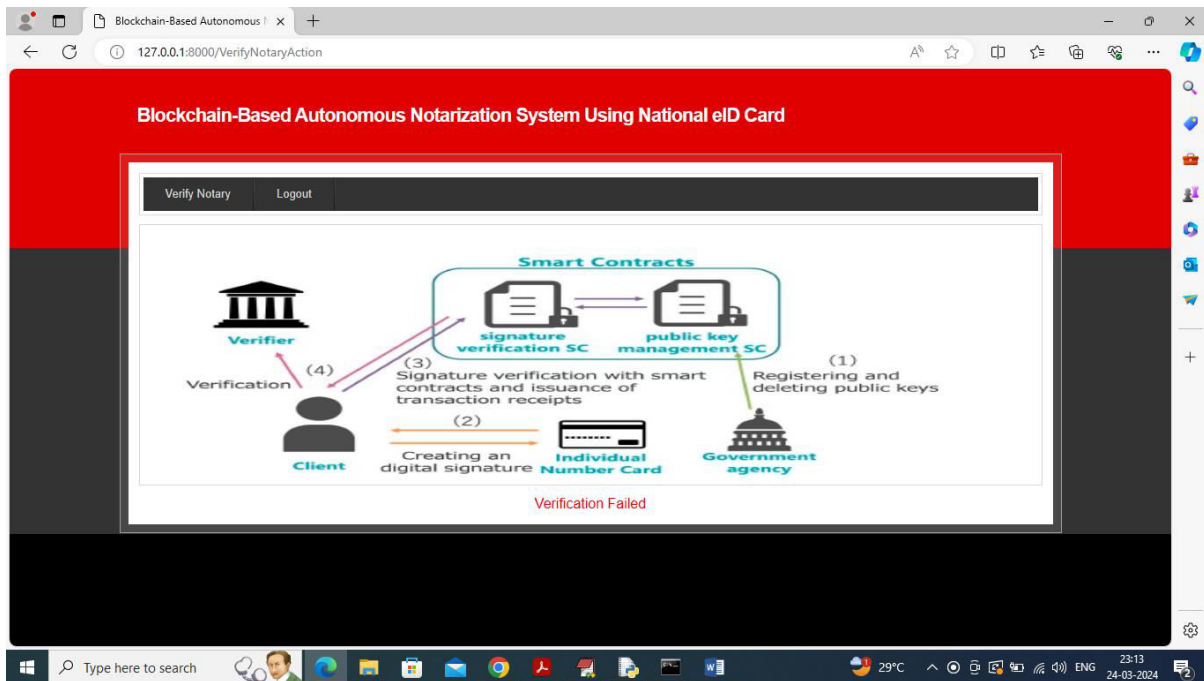
In above screen user has to give correct pin no and eID card to verifier to verify his notary and in above screen I am giving correct details and then press button to get below page



In above screen notary is verified and 'Verifier' can view all details as proof and now enter wrong details in below screen



In above screen I am entering wrong pin no and below is the verification result from smart contract



In above screen verification got failed

Similarly by following above screens you can manage all notary services in Blockchain without fearing of alteration.



8.0 CONCLUSION :

In conclusion, the Blockchain-Based Autonomous Notarization System (BANS) utilizing National eID cards represents a significant advancement in document authentication and notarization processes. By leveraging blockchain technology and digital identity verification features, BANS offers a secure, efficient, and accessible platform for individuals and organizations to notarize their documents remotely. BANS addresses the limitations of traditional notarization methods by eliminating the need for physical presence at notary public offices, streamlining the authentication process, and enhancing the security and transparency of notarized documents. The integration of National eID cards ensures reliable identity verification, while blockchain technology provides tamper-proof and immutable records of notarization transactions. The system's user-friendly interface, real-time access to notarization records, and notification alerts enhance user experience and trust in the notarization process. Moreover, BANS facilitates interoperability across different jurisdictions, making it suitable for cross-border transactions and document authentication.

9.0 FUTURE WORK :

In future work, several areas could be explored to further enhance the capabilities and effectiveness of the Blockchain-Based Autonomous Notarization System (BANS) using National eID cards:

1. **Integration with Smart Contracts:** Explore the integration of smart contracts into BANS to automate notarization processes further. Smart contracts could facilitate the execution of predefined actions upon the fulfillment of specific conditions, such as automatically issuing notarization certificates once documents are successfully verified.
2. **Enhanced Identity Verification:** Investigate advanced biometric authentication techniques, such as facial recognition or iris scanning, to further enhance identity verification using National eID cards. This could improve the accuracy and reliability of identity authentication, reducing the risk of unauthorized access to the system.
3. **Blockchain Scalability Solutions:** Research scalability solutions for blockchain networks to accommodate the increasing volume of notarization transactions on BANS. Implementing techniques such as sharding or sidechains could help improve transaction throughput and reduce network congestion, ensuring smooth operation during periods of high demand.
4. **Enhanced Privacy and Confidentiality:** Implement privacy-enhancing technologies, such as zero-knowledge proofs or homomorphic encryption, to enhance privacy and confidentiality in BANS. This could allow users to notarize sensitive documents without exposing their contents to third parties, further enhancing trust and security.



5. **Regulatory Compliance and Legal Frameworks:** Work with regulatory authorities to develop legal frameworks and standards for blockchain-based notarization systems. This could help clarify the legal status of notarized documents on the blockchain and ensure compliance with existing regulations governing document authentication and verification.

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