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Blockchain-based Documents Verification for Smart Learning Management System

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ABSTRACT -In the current era of Information Technology, the documentation in the major spectrums of society has gone digital. The physical documents are generally served as PDF files and are easy to handle and to share also. Since the documents validate the particular facts and credentials, and hence the genuineness of these documents should also be taken care of. Now a days, lots of online tools are available to edit the documents and hence the forgery of the documents is very easy task. But forgery of documents is a digital crime and hence can impact the ecosystem of the society. In the proposed work, we have implemented the mechanism of detecting the fake or forged documents using a Blockchain technology. Blockchain technology is well known for preserving the integrity of the data by using SHA-256 cryptographic hash algorithm and hence using Blockchain, we proposed a methodology along with implementation to detect the fakeness of the documents. The Blockchain is deployed at the origin of creation of the document itself on the server side and thus the client can validate the authenticity of the document via QR code assigned to each document. Even if the QR codes are compromised at the preliminary level, the actual uploading the document on the server side shall surely detect the changes made in the documents and thus the cyber criminals will no longer be able to make the alterations in the documents for taking the undue advantage. The smartphones are successfully deployed to detect the forgery at preliminary level and to confirm the alteration, the server side mechanism is also built.

Keywords: Blockchain, SHA-256, QR code, Document Forgery, Smartphones

I. INTRODUCTION

In the current era of Information Technology, the documentation in the major spectrums of society has gone digital. The physical documents are generally served in digital form as PDF files and are easy to handle and to share also.Since the documents validate the particular facts and credentials, and hence the genuineness of these documents should also be taken care of. Now a days, lots of online tools are available to edit the documents and hence the forgery of the documents is very easy task. But forgery of documents is a digital crime and hence can impact the ecosystem of the society. In the proposed work, we have implemented the mechanism of detecting the fake or forged documents using a Blockchain technology.Blockchain technology is well known for preserving the integrity of the data and hence using Blockchain, we proposed a methodology along with implementation to detect the fakeness of the documents. The Blockchain is deployed at the origin of creation of the document itself on the server side and thus the client can validate the authenticity of the document via QR code assigned to each document.Even if the QR codes are compromised at the preliminary level, the actual uploading the document on the server side shall surely detect the changes made in the documents and thus the cyber criminals will no longer be able to make the alterations in the documents for taking the undue advantage.

II. LITERATURE SURVEY

1] Paper Name: Blockchain Based Framework For Educational Certificates Verification, Authors: Omar S. Saleh, Osman Ghazali, Muhammad Ehsan Rana, Journal of Critical Reviews ISSN- 2394-5125 Vol 7, Issue 3, 2020, In this research, authors have identified the security themes required for document verification in the blockchain. This research also identifies the gaps and loopholes in the current blockchain based educational certificate verification solutions., and states Blockchain based

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framework for verifying educational certificates including authentication, authorization, confidentiality, privacy.

2] A blockchain-based smart home gateway architecture for preventing data forgery, Younghun Lee, Shailendra Rathore, Jin Ho Park and Jong Hyuk Park,Lee et al. Hum. Cent. Comput. Inf. Sci. (2020) 10:9 https://doi.org/10.1186/s13673-020-0214-5, Authors implemented the proposed network on the Ethereum blockchain technology and evaluated in terms of standard security measures including security response time and accuracy. The evaluation results demonstrate that the proposed security solutions outperforms over the existing solutions.

3] Authenticity of a Diploma Using the Blockchain Approach, UntungRahardja , Sandy Kosasi, EkaPurnamaHarahap , Qurotul Aini, International Journal of Advanced Trends in Computer Science and Engineering , Volume 9, No.1.2, 2020 , ISSN 2278-3091 , Authors contributes to the field of education which cones on the falsification of diplomas based on the use of blockchain technology in the field of education in proving the authenticity of diplomas which is feasible to be applied in Indonesia which has many cases of diploma fraud. level of diploma forgery.

4] Proposing a Blockchain-based Solution to Verify the Integrity of Hardcopy Documents, Sthembile Mthethwa, Nelisiwe Dlamini, Dr. Graham Barbour, 978-1-5386-6477-3/18©2018 IEEE, Authors presents a proposed solution that incorporates the combination of 2D barcodes, OCR, cryptographic hashing and blockchain. As this is still on-going work, experiments are still required to demonstrate the viability of the solution.

III. OBJECTIVE

- To implement efficient techniques that should not only be effective but affordable, and implemented well to ensure the security of a document in making sure that unauthorized alterations can be detected.
- To provide an effective, simple and fast method of document integrity verification through the usage of OCR, cryptographic techniques and Blockchain.
- To make the detection of the fake documents easy through the smartphones too and the detection to made available through server also if QR code is compromised.

IV. DETAILS OF IMPLEMENTATION

- The Web application is created using Servlets and Java server pages in J2EE.
- The XAMPP utility is used to deploy the SQL server.
- Apache Tomcat is used as Application Server.
- Third-party library named ZXing (Zebra Crossing) is used for QR code generation.
- QR code scanner of the Android smartphone is used to scan the QR code.
- The localhost is made to run on mobile handset by connecting the machine and the smartphone to the same wifi connection so as to get same IPv4 for the demonstration purpose.

V. FLOW OF WORK

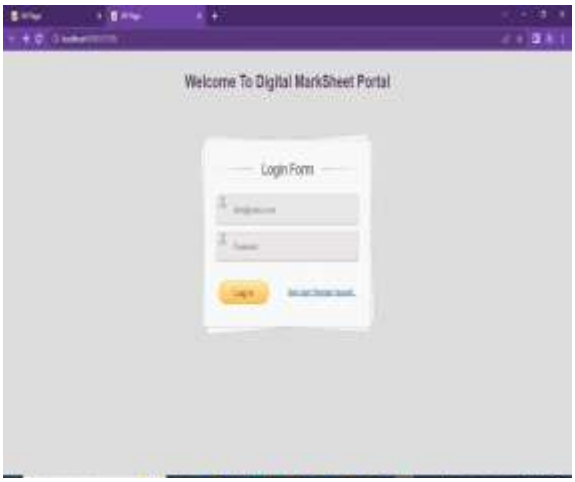

Fig.1 Login Page

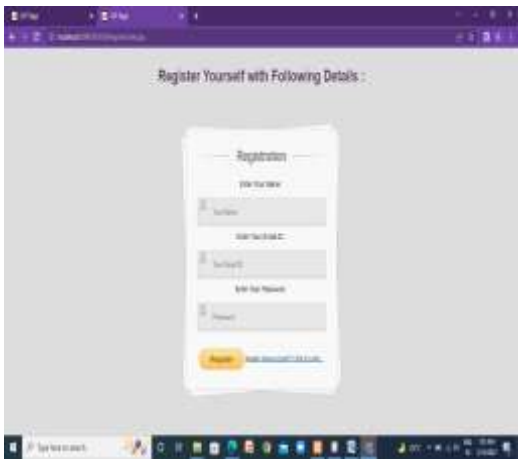

Fig.2 Registration Page

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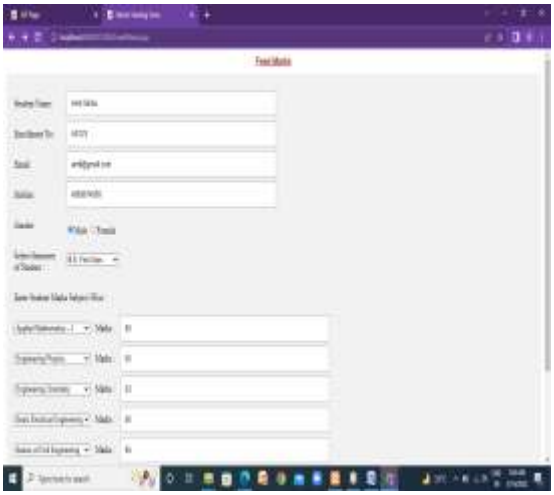

Fig.3 Marks Feeding Page

Fig.4 Proposed BlockChain

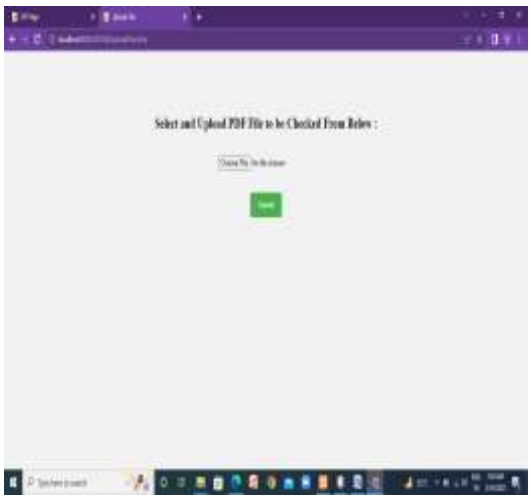

Fig.5 Document Uploading Page

VI. RESULTS

Fig.6 Result on Smartphone

Fig.7 Result on Smartphone

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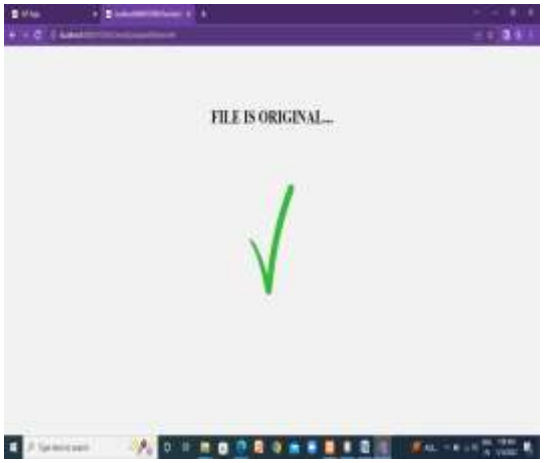

Fig.8 Result on Server

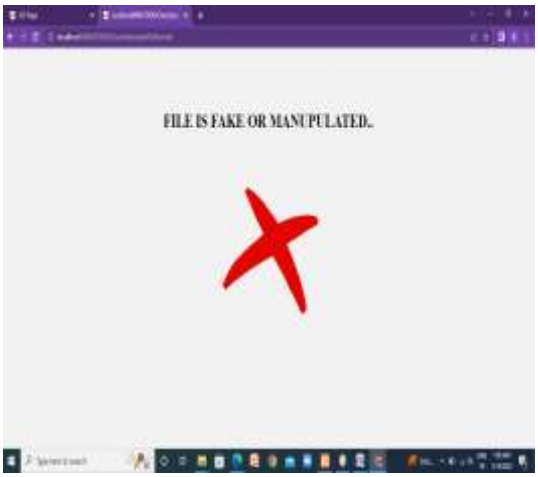

Fig.9 Result on Server

VII. APPLICATIONS

- The application of the proposed work is primarily the detection of the fake documents and to prevent the forgery in the important documents.
- Document forgery is digital crime and thus it will help preventing the cyber crime.
- The prominent feature of the Blockchain is to preserve the integrity of the digital asset and hence the proposed work opens the doors for the use of Blockchain technology in other aspects of digital asset security.
- The proposed application will enhance the smart learning and will give justice to the originality and authenticity.
- The proposed application can be used in all Government, Semi-Government and private organizations that issue the crucial documents.

VIII. CONCLUSIONS

The proposed work is very effective in detecting the alteration in the digital documents and is implemented from the origin or creation of the digital assets. Second, the simplicity of our Blockchain model implies that the custom Blockchains could also be deployed to assign immutability feature to the digital assets without the inherent complexities of the Blockchain like smart contracts, consensus mechanism etc. which is primarily used for generating and maintaining crypto currencies. Ethereum and Hyper Ledger fabric platforms could be bypassed if only some particular features of the Blockchain are to be deployed.

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