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BLOCKCHAIN BASED FACE DETECTION AND RECOGNITION FOR CRIMINAL IDENTIFICATION SYSTEM

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ABSTRACT:

The process of identifying and spotting a criminal is slow and difficult. Criminals, these days are getting smarter by not leaving any form of biological evidence or fingerprint impressions on the crime scene. A quick and easy solution is using state-of-the-art face identification systems. With the advancement in security technology, CCTV cameras are being installed at most of the buildings and traffic lights for surveillance purposes. The video footage from the camera can be used to identify suspects, criminals, runaways, missing persons etc. This paper explores away to develop a criminal identification system using ML and deep neural networks. The following method can be used as an elegant way to make law enforcement hassle-free.

1 INTRODUCTION

In an era where technological advancements continuously shape the land scape of security and surveillance, the integration of innovative technologies is crucial for enhancing public safety and criminal justice. This project explores the development of a "Blockchain Based Face Detection and Recognition System" tailored for criminal identification, merging there liability of blockchain technology with the precision of modern facial recognition techniques.

Facial recognition systems have become a critical tool in identifying and apprehending criminals, offering unparalleled accuracy and speed. However, traditional systems are often plagued by concerns over data integrity, privacy, and the risk of tampering or unauthorized access. This project seeks to address these challenges by leveraging blockchain technology, renowned for its decentralized, transparent, and immutable nature.

By embedding facial recognition data within a blockchain framework, this system aims to createarobustandsecureenvironmentforstoringand managingsensitiveinformationrelated to criminal identification. The use of blockchain ensures that the data is not only secure but also verifiable and resistant to tampering, thereby enhancing the credibility and reliability of the identification process.

The integration of these technologies represents a significant leap forward in law enforcement and security systems, offering a powerful tool for crime prevention and investigation. This project aims to develop a prototype that demonstrates the feasibility and advantages of such a system, ultimately contributing to more efficient and secure criminal identification processes.

2 LITERATURESURVEY

Criminals, these days are getting smarter by not leaving any form of biological evidence or finger print impressions on the crime scene. A quick and easy solution is using state- of-the-art face identification systems. With the advancement in security technology, CCTV cameras are being installed atmost of the buildings and traffic lights for surveillance purposes.

Nowadays criminal activities are growing at an exponential rate. Crime prevention by effective identification of criminals is the main issue before the police and on the other hand, the availability of police officers is inadequate. There are various technological solutions for detecting criminals but they are not upto the mark. In this project by K.Kranthi Kumar, a face detection and recognition system for criminal identification is developed using the multi-task cascade neural network. This system will be able to detect faces and recognize faces of criminals automatically in real-time. This system would also just require a single image of the criminal to recognize him, also known as one-shot learning. The purpose is to identify the criminal face, retrieve the

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information stored in the database for the identified criminal and a notification is sent to the police personnel with all the details and the location at which he was under the surveillance of the camera.

Finding and apprehending a criminal is a complex and time-consuming process. Criminals' tactics for leaving no fingerprints or biological evidence at crime scenes are becoming increasingly complicated. A simple and straightforward approach is to implement cutting-edge facial recognition technology. As security technology has progressed, most buildingsandtrafficlightsnowhaveCCTVcamerast oprovidemonitoring.The camera's video footage can help identify criminals, runaways, missing people, and suspicions. This project by K.ChandraSekhar investigates the use of deep neural networks and machine learning to create a criminal detection system. The concept detailed below is a clever approach to streamlining law enforcement.

3 SYSTEMANALYSIS

3.1 EXISTINGSYSTEM

Matching faces obtained in surveillance film to a database of known criminals is a typical practice in traditional criminal identification systems that use facial recognition technology. Machine learning methods are used to identify and verify persons in these systems. Facial data and metadata are often stored in centralized databases. The implementation of these systems within closed networks makes them vulnerable to vulnerabilities like data breaches, unauthorized access, and record manipulation, even though they have been effective in many circumstances. Furthermore, these systems depend on a single point of control, which can be compromised, which creates substantial concerns about privacy and data integrity due to their centralized structure.

DISADVANTAGES

- Security Risks
- PrivacyConcerns

3.2 PROPOSEDSYSTEM

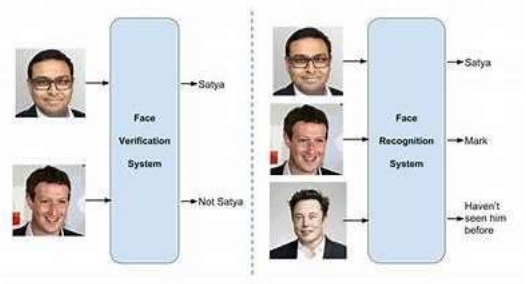
By combining state-of-the-art facial recognition technology with blockchain, the "Blockchain Based FaceD etectionand Recognition for Criminal Identification" project hopes to provide a safe and effective system for identifying criminals. The system's facial detection and identification components will be developed in Python, with the help of libraries like OpenCV and deep learning models, to achieve high accuracy. Following capture, the face data will be securely saved on a blockchain using a hash function. This will prevent any tampering or alteration of the data once it has been recorded. A chronological, immutable trail of data will be created with each item being timestamped and linked to previous records. Further strengthening confidence in the system, blockchain's decentralized nature makes sure that no one entity controls this data. Law enforcement agencies will be able to upload, validate, and match facial data against the blockchain through the system's interface. This will allow for the speedy and reliable identification of suspects.

ADVANTAGES

- Enhanced Data Security
- Efficient Data Management the final user of the system.

4 SYSTEMDESIGN

4.1 System architecture



4.1 UMLDIAGRAM'S

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

TheUMLrepresentsacollectionofbestengineeringp racticesthathaveprovensuccessful in the modeling of large and complex systems.

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A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphicaloverviewofthefunctionalityprovidedbyasystemintermsofactors,theirgoals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.

5 IMPLEMENTATION

5.1 MODULES

1. **Admin**
2. **User**

- **MODULEDESCRIPTION**

ADMIN:

- Login
- PoliceStationManagement
- AddPoliceStation
- ManagePoliceStation
- PoliceOfficerManagement
- AddPoliceofficer
- OfficerDetails
- ListOfOfficer
- CriminalManagement
- AddCriminal
- Manage Criminal
- Criminal List
- AddCrime
- Logout

USER:

- Register& Login
- Dashboard
- SearchCriminal
- MyProfile
- Logout

6 RESULTS/DISCUSSIONS

6.1 SYSTEMTEST

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionalityofcomponents,sub-assemblies,assembliesand/orafinishedproductItist he process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner.There are various types of test. Each test type addresses a specific testing requirement.

TESTCASES

Testcase1:

TestcaseforLoginform:

FUNCTION:	**LOGIN**
EXPECTED RESULTS:	ShouldValidatetheuserandcheck his existenceindatabase
ACTUALRESULTS:	Validatetheuserandcheckingtheuser againstthe**database**
LOWPRIORITY	**No**
HIGHPRIORITY	**Yes**

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Testcase2:

TestcaseforUserRegistrationform:

FUNCTION	**REMOTEUSERREGISTRATION**
EXPECTED RESULTS:	Should check if all the fields are filled by the userand savingtheusertodatabase.
ACTUALRESULTS:	Checking whether all the fields are filled by userornotthroughvalidationsandsaving user.
LOWPRIORITY	No
HIGHPRIORITY	Yes

Testcase3:

TestcaseforChangePassword:

Whentheoldpassworddoesnotmatchwiththenewpassword,thenthisresultsindisplaying an error message as " OLD PASSWORD DOES NOT MATCH WITH THE NEW PASSWORD".

Testcase4:

TestcaseforForgetPassword:

Whenauserforgetshispasswordheisaskedtoenter Loginname,ZIPcode,Mobile number. If these are matched with the already stored ones then user will get his Originalpassword.

Module	**Functionality**	**TestCase**	**Expected Results**	**Actual Results**	**Result**	**Priority**
User	Login Usecase	1. Navigate To Www.Sample.Co m 2. Click On Submit Button	A Validation Should Be As Below "Please Enter Valid Username &Password"	A Validation	Pass	High
		1. A Navigate To www.Sample.Co m 2. Click On Submit Button With Out Filling Password And With Valid Username	A Validation Should Be As Below "Please Enter Valid Password Or Password Field Can Not Be Empty "	A Validation Shown As Expected	Pass	High
		1. NNavigate To Www.Sample.Co m 2. EnterBothUsername And Password Wrong AndHit Enter	A Validation Shown Below "The Username Entered	A Validation Shown As Expected	Pass	High

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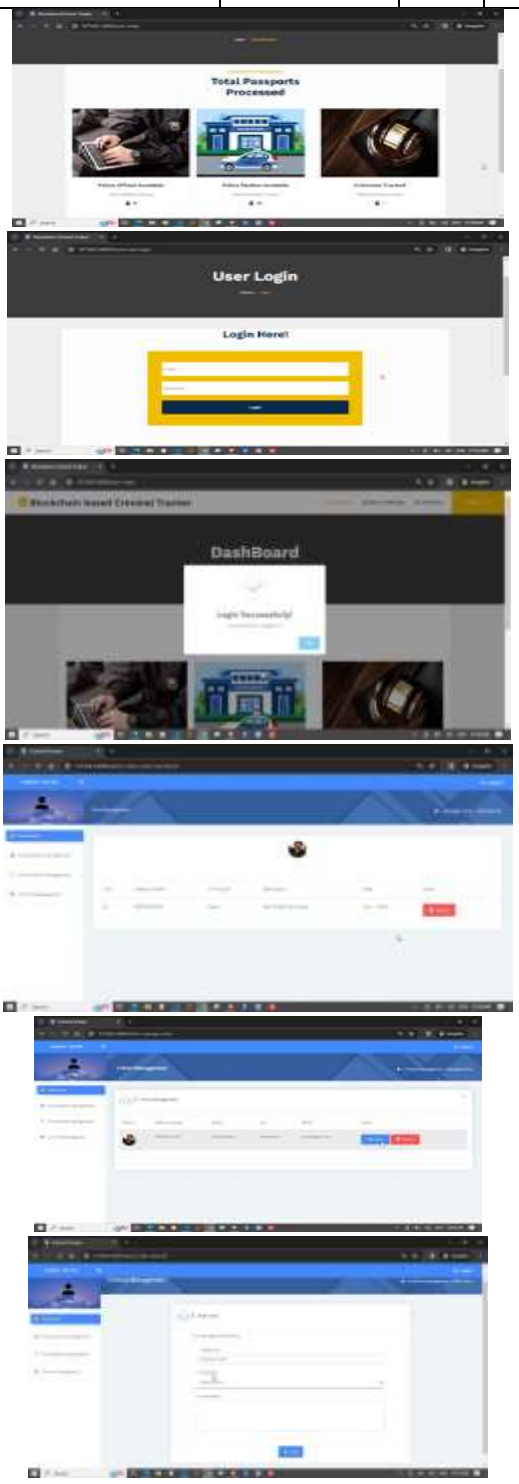
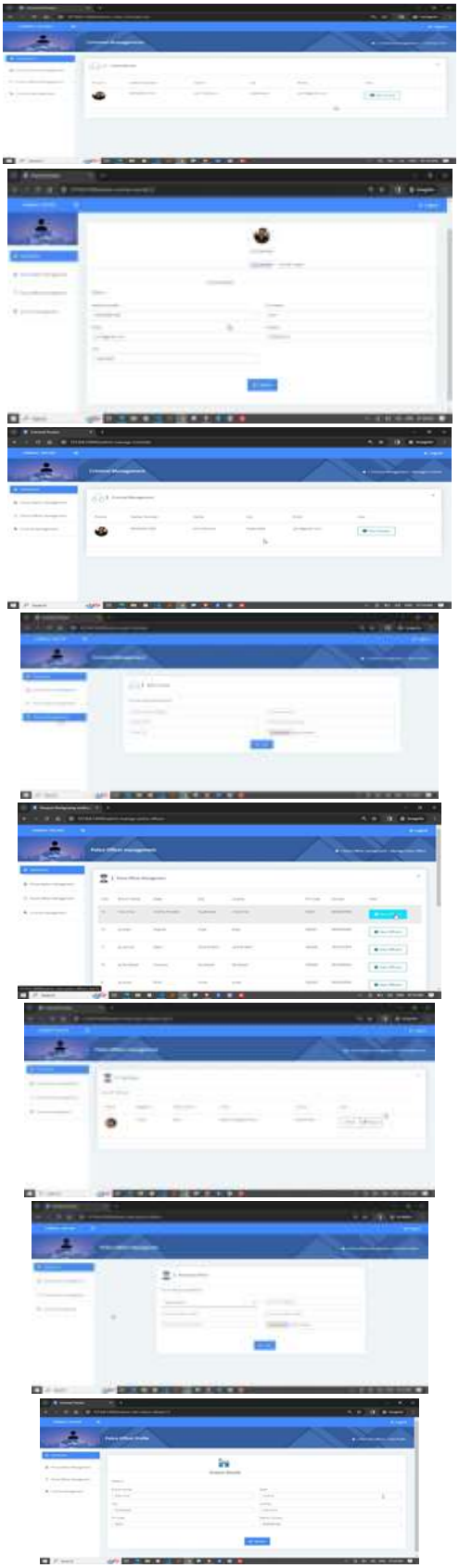
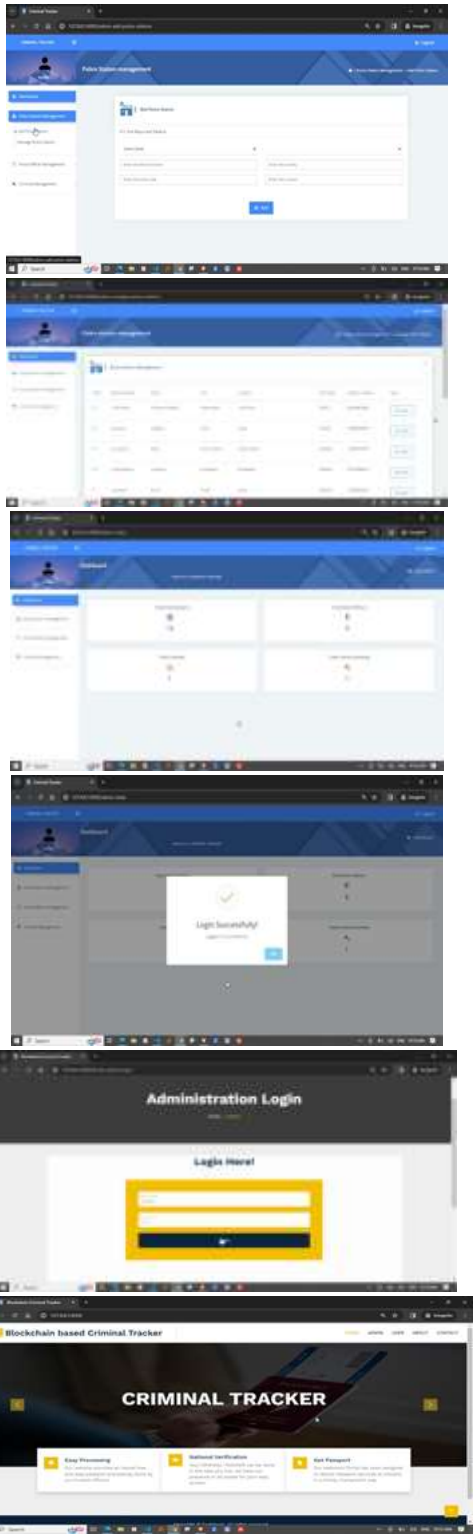
		1. Navigate To Www.Sample.Co m 2. Enter Validate Username AndPasswordAnd ClickOn Submit	Validate UsernameAndPassw ord In DataBaseAnd OnceIfThey Correct	Main Page/ Home PageHas Been Displayed	Pa ss	High

6.1 SCREENSHOTS







7 CONCLUSION

The implementation of a Blockchain Based Face Detection and Recognition System for criminalidentificationmarksasignificantadvancement intheintersectionoftechnologyand public safety. By integrating blockchain technology with facial recognition, this project addressescriticalissuesofdatasecurity,privacy,andintegritythathavetraditionallyplagued surveillance

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systems. The decentralized and immutable nature of blockchain ensures that facial recognition data is securely stored and resistant to tampering, thereby enhancing the reliabilityandtrustworthinessofthecriminalidentification process.Throughthedevelopment and testing of this system, we have demonstrated its potential to revolutionize law enforcement practices by providing a more secure, transparent, and efficient means of identifying and apprehending criminals. This project not only highlights the power of combiningemergingtechnologiesbutalsopavesthe wayforfutureinnovationsinthefieldof criminal justice and security.

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