VISVESVARAYA TECHNOLOGICAL UNIVERSITY BELAGAVI-590014, KARNATAKA

A Mini Project Report

on

"Forensic Database Management System"

Submitted in Partial Fulfillment of the Requirement for

"DBMS Laboratory with Mini Project(18CSL58) -V Semester"

For the Award of Degree

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE & ENGINEERING

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SAPTHAGIRI COLLEGE OF ENGINEERING

Affiliated to VTU, Belagavi, Approved by AICTE, NEW DELHI

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2022-2023

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CERTIFICATE

Certified that the Mini Project Work entitled "FORENSIC DATA MANAGEMNT" carried out by SANTHOSH.D(1SG20CS094) & VIVAN KUSHAL HENEGER(1SG20CS114), bonafide students of Sapthagiri College of Engineering, in partial fulfillment for the award of Bachelor of Engineering degree in Computer Science and Engineering of Visvesvaraya Technological University, Belagavi during the academic year 2022-23. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The mini-project report has been approved as it satisfies the academic requirements in respect of DBMS Laboratory with Mini Project (18CSL58) prescribed for the said Degree.

Signature of the Guide	Signature of the Guide	Signature of the HOD
Prof. Shashi Rekha G	Prof. Vanitha TN	Dr. Kamalakshi Naganna
Assistant Professor	Assistant Professor	Professor & Head

EXTERNAL EXAMINATION

Name of the Examiners	Signature with Date
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2._____	_____

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-SANTHOSH D
-VIVAN KUSHAL HENEGER

ABSTRACT

- Modern science and technology has revolutionised the field of crime solving and has made the process much faster and more reliable. The word Forensic refers to all the science and technology used in the solving of crime. The aim of this system is to manage the large volumes of data that are produced in the process of solving crimes by the application of scientific methods and modern technology.
- All detective notes will also have to be entered on this system. In the event that a detective has to cooperate with other departments, this system can be used to easily collaborate on case files.
- A forensic management is the system where the crime details are displayed and respected crime officers will be able to visit and view the crime details of the criminal. The officers are also given an authorised to create, update and dismiss the crime and criminal details so that there will be immediate access to the case of a particular crime.
- With the help of Forensic Management System the admin will be able to create and access entire forensic activities on their own given ID
- An important feature of this system will be its search feature. Repeat criminals generally repeat their modus operandi and there may be other similarities in cases that can be exploited for quickly solving cases. Since the system forces all case files to be stored in a uniform format it will be easy detectives to search old case files for similarities in cases.

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CHAPTER 1

INTRODUCTION

1.1 Introduction to DBMS

Database is a collection of related data. DBMS came into existence in 1960 by Charles. Again in 1960 IBM brought IMS-Information management system. In 1970 Edgor Codd at IBM came with new database called RDBMS. In 1980 then came SQL Architecture Structure Query Language. In 1980 to 1990 there were advances in DBMS e.g. DB2, ORACLE. A database has the following implicit properties:

- A database represents some aspect of the real world, sometimes called the mini world or the universe of discourse. Changes to the mini world are reflected in the database.

- A database is a logically coherent collection of data with some inherent meaning. A random assortment of data cannot correctly be referred to as a database.

- A database is designed, built, and populated with data for a specific purpose. It has an intended group of users and some preconceived applications in which these users are interested.

In other words, a database has some source from which data is derived, some degree of interaction with events in the real world, and an audience that is actively interested in its contents.

Metadata (meta data, or sometimes meta information) is "data about data", of any sort in any media. An item of metadata may describe a collection of data including multiple content items and hierarchical levels, for example a database schema. In data processing, metadata is definitional data that provides information about or documentation of other data managed within an application or environment. The term should be used with caution as all data is about something, and is therefore metadata.

A database management system (DBMS) is a collection of programs that enables users to create and maintain database. The DBMS is a general-purpose software system that facilitates the process of defining, constructing, manipulating and sharing databases among various users and applications.

Defining a database specifying the database involves specifying the data types, constraints and structures of the data to be stored in the database. The descriptive information is also stored in the database in the form database catalogue or dictionary; it is called meta-data. Manipulating the data includes the querying the database to retrieve the specific data. An application program accesses the database by sending the queries or requests for data to DBMS. The important function provided by the DBMS includes protecting the database and maintain the database.

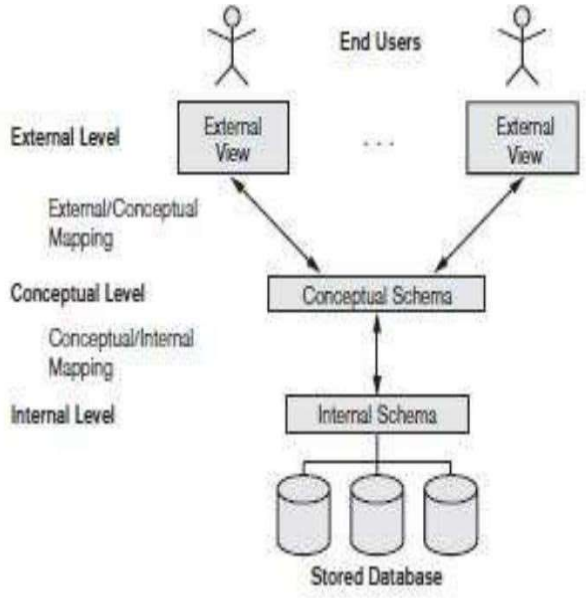


Figure1.1: Three Schema Architecture

The Figure 1.1 shows the Three Schema Architecture of Database Management System. The architecture has three levels.

- **External level:**

The external level is the view that the individual user of the database has. This view is often a restricted view of the database and the same database may provide a number of different views for different classes of users. In general, the end users and even the application programmers are only interested in a subset of the database.

- **Conceptual level**:

The conceptual view is the informational model of the enterprise and contains the view of the whole enterprise without any concern for the physical implementation. The conceptual view is the overall community view of the database and it includes all the information that is going to be represented in the database.

- **Internal level:**

The internal view is the view about the actual physical storage of data. It describes what data is stored in the database and how.

1.2 Overview of project

The Forensic Database Management System (FDMS) is a web based system that houses data on a centralized database in order to store all forensics evidence in one receptacle. The forensic evidence may include pictures of suspects, fingerprints, handwriting samples, etc.

Law enforcement agencies will have the ability to enter a new case with all relevant evidence and enter a description of the data.

The agencies will also have the opportunity to search for existing cases and forensic evidence attached to that case.

The focus of this study is to produce a database system that will allow all evidences to have a common link, thereby allowing various agencies to obtain needful information.

Theproposed database will keep track of who has handled the evidence in order to reduce the risk of mistrials related to evidence tampering or evidence gone missing.

The investigation of a crime scene can be an agonizing one. It can yield leads towards the assailant as well as clues that indicate how the offense took place.

The investigator(s) are faced with the mammoth task of collecting as much evidence without overlooking anything. Once the collection is complete, tracking the evidence through the course of the investigation which may be weeks, months and sometimes years, is vital towards getting a conviction. It is for this reason that collecting and tracking information is crucial towards the investigation.

1.3 Scope/Objective of the Project

- The main objective behind this project is to making an use of technology to have a secured list of documents for each case.
- It provides a platform to exhibit ease of sharing documents and manipulate the data.
- Forensic management system is to manage details of criminals, crime case and evidence.
- This project is built at administrative end and thus only the administrator is guaranteed the access.
- The main purpose of this project is to reduce manual work and paper work.
- Superiors in the police department generally have to keep tabs on their subordinates and this system will enable this without the need of personally meeting the officer being reviewed. All the details relating to a case will be stored on the system on a regular basis and this can be accessed by user with valid credentials.
- A forensic database system can be used to keep track of incoming evidence instances and their results. Forensic scientists can enter the obtained results from the evidence after analysing the samples. These results can then be viewed by police officers and other officials working on the case.
- This project allows forensic scientist and police officers to view and also add new evidence. It supports all CRUD operations. Users can also run SQL queries of their own as well as see the results of predefined queries.

CHAPTER 2

System Design and methodology

2.1 System Development

We have chosen to link MySQL via servlets. Doing so allows access to the FEMIS system to run across various platforms such as Mac, Linux and or Microsoft.

Moreover the system has been implemented with security in mind and thus direct access to internal pages through URL manipulation would be impossible. With that in mind, the FEMIS system will not tolerate SQL injections such as empty double quotes and or using quotes or double dashes for the username and password.

We have done our best to make sure that the systems interface is friendly and accessible. Additionally, FEMIS allows the every authorized user to access and navigate throughout the system without any previous knowledge of databases and or MySQL.

2.2 ER DIAGRAM

An entity-relationship model describes inter-related things of interest in specific domain of knowledge. An ER module is composed of entity types and specifies relationships that can exist between instances of those entity types. It is a data modeling technique that graphically illustrates an information systems entities and the relationship between those entities.

- This document is an entity-relationship diagram, or "ERD," for a system to manage University Management System.

- An ERD is a model that identifies the concepts or entities that exist in a system and the relationships between those entities.

- An ERD is often used as a way to visualize a relational database: each entity represents a database table, and the relationship lines represent the keys in one table that point to specific records in related tables.

- ERD may also be more abstract, not necessarily capturing every table needed within a database, but serving to diagram the major concepts and relationships.

- This ERD is of the latter type, intended to present an abstract, theoretical view of the major entities and relationships needed for management of electronic resources.

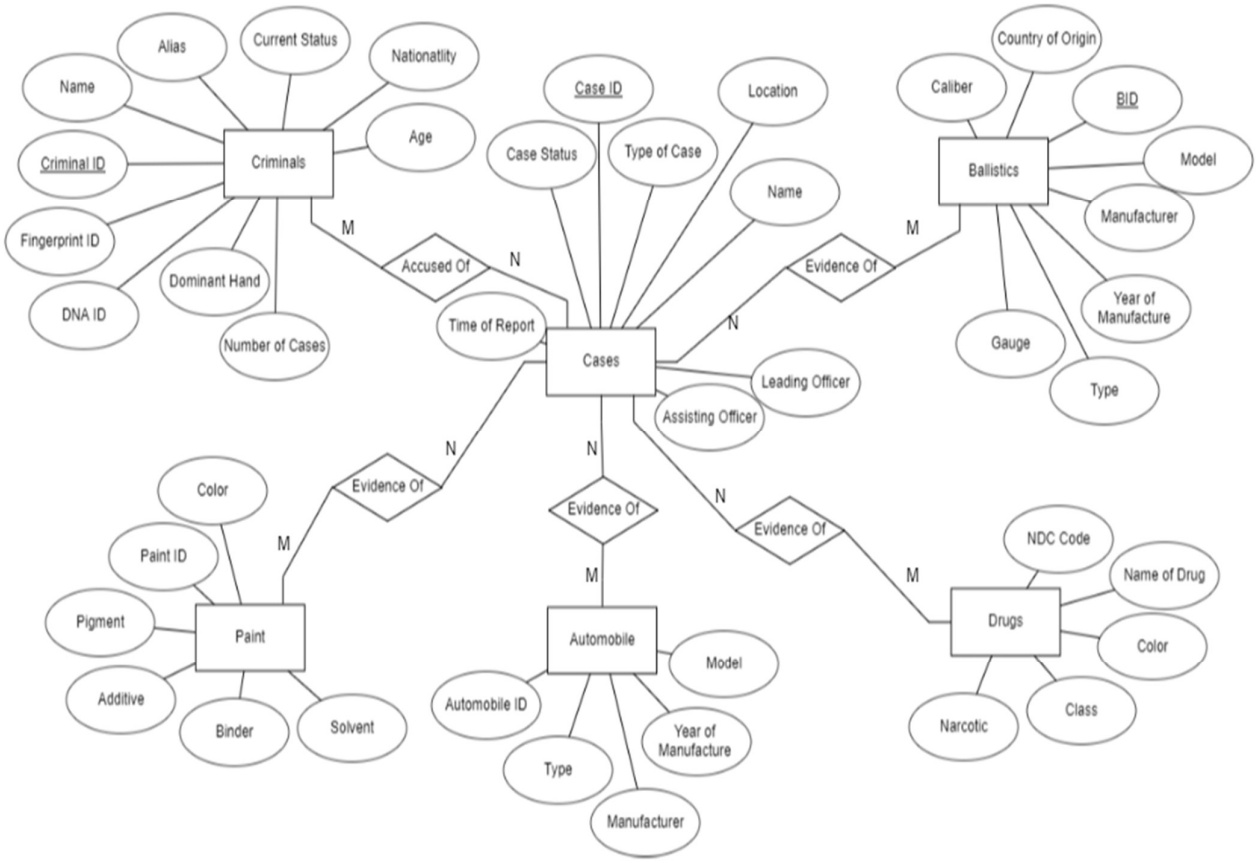


Figure : ER Diagram

2.3 SCHEMA DIAGRAM

A database schema is a skeleton structure that represents the logical view of the entire database. It defines tables, views and integrity constraints.

- It defines how the data is organized and how the relations among them are associated. It formulates all the constraints that are to be applied on the data.

- A database schema defines its entities and the relationship among them. It contains a descriptive detail of the database, which can be depicted by means of schema diagrams.

- It's the database designers who design the schema to help programmers understand the database and make it useful.

A database schema can be divided broadly into two categories −

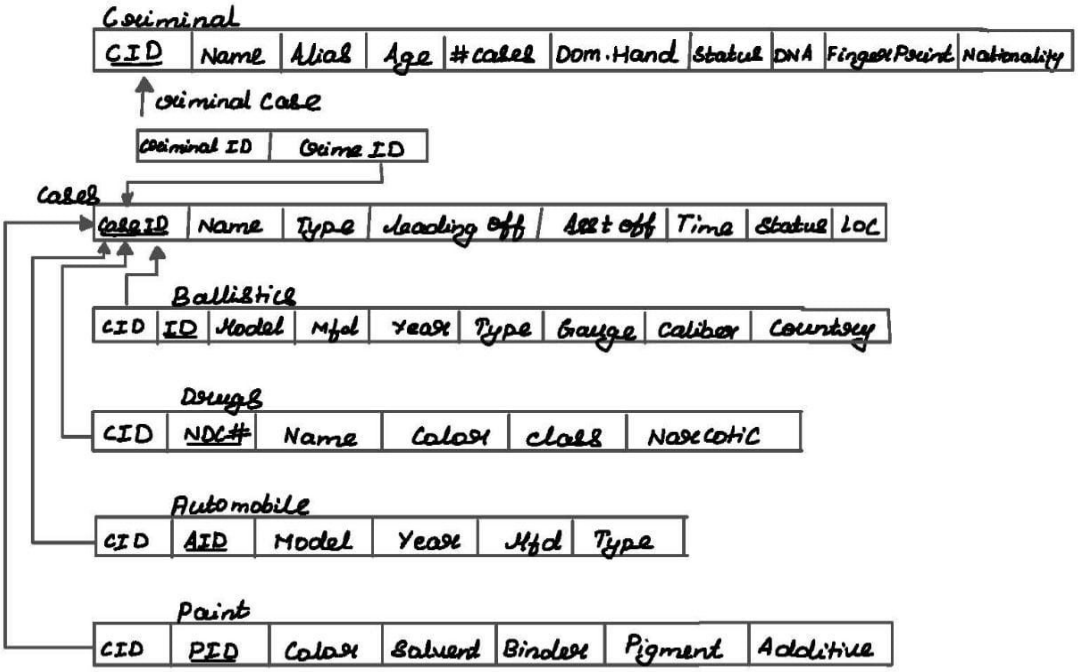
- Physical Database Schema − This schema pertains to the actual storage of data and its form of storage like files, indices, etc. It defines how the data will be stored in a secondary storage.

- Logical Database Schema − This schema defines all the logical constraints that need to be applied on the data stored. It defines tables, views, and integrity constraints

ACCOUNT

Username	Password

Schema Diagram



CHAPTER 3

SYSTEM IMPLEMENTATION

To implement this system Python,Python(Streamlit) is used for frontend and Backend.

System Requirements:

3.1 Software Requirements

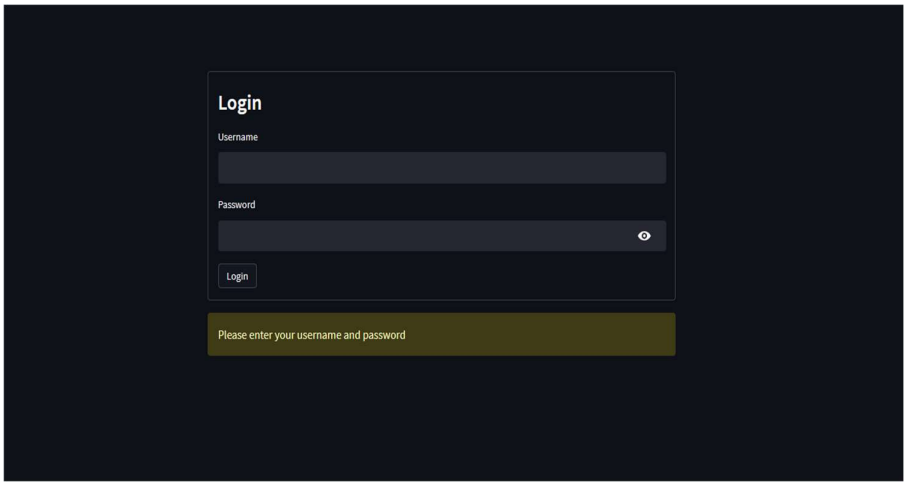
- Operating system : Windows 10 or 11
- Application server : Python,Anaconda Navigator
- Front end : Python-Streamlit(Module)
- Connectivity : MySQL Connector
- Database : MySQL
- Tools used :Visual Studio code,MySQL,Anaconda(Python)

3.2 Hardware Requirements:

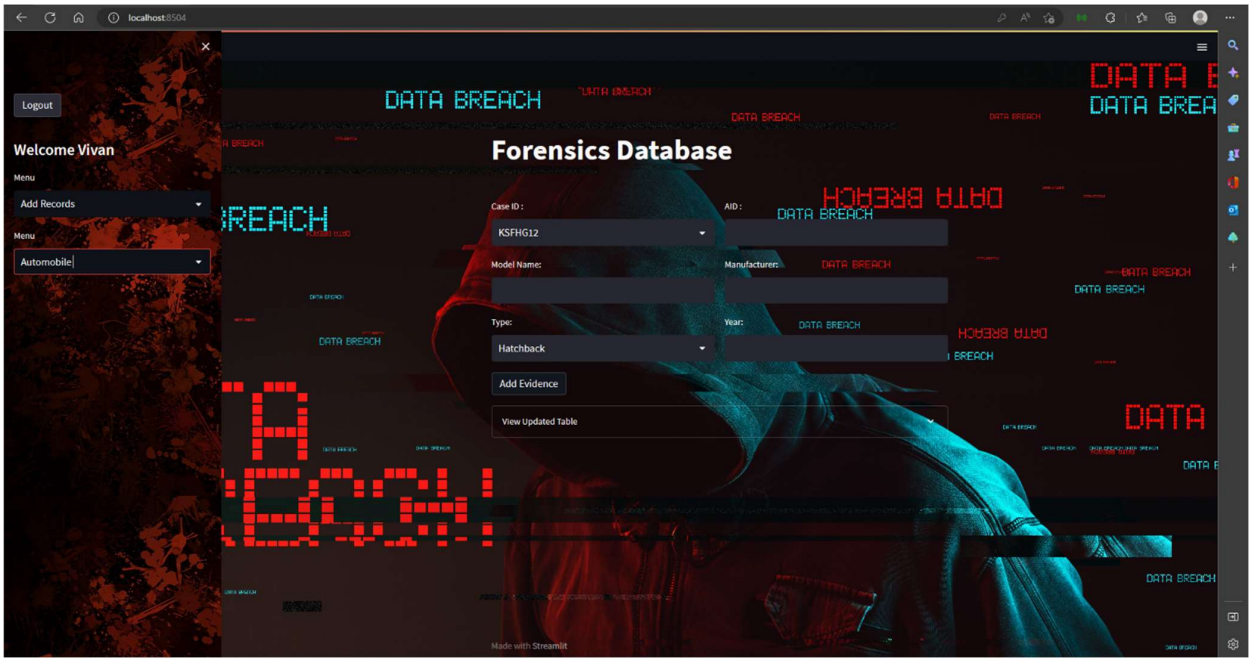
• Hard Disk – 2 GB
• RAM – 1 GB
• Processor – Dual Core or Above
• Mouse
• Keyboard
• Monitor
• Printer

CHAPTER 4

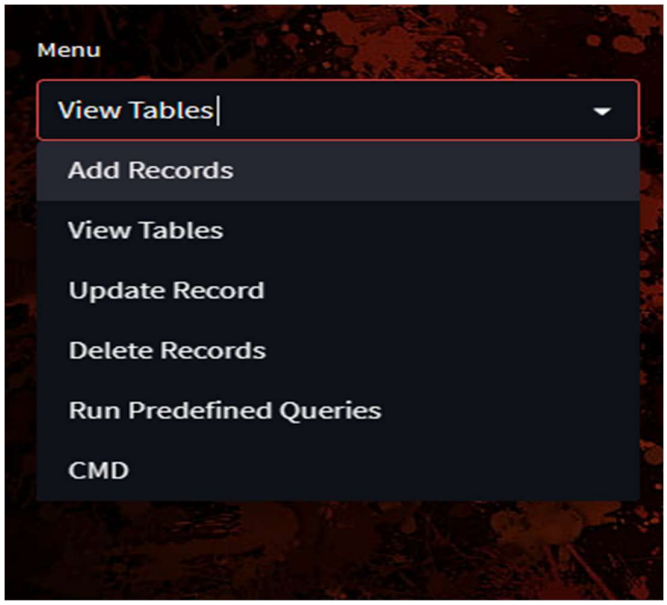
RESULTS AND SCREENSHOTS



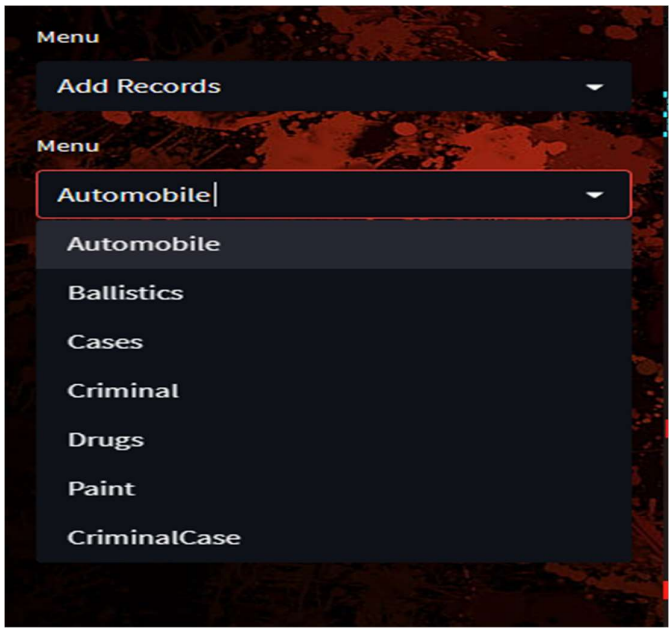
Screenshot 1: Login page



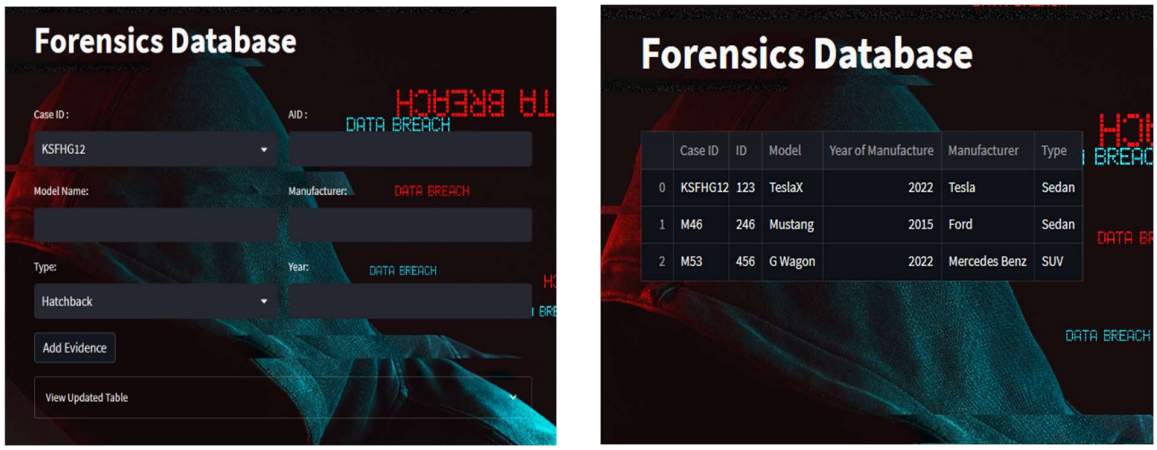
Screenshot 2: Home page



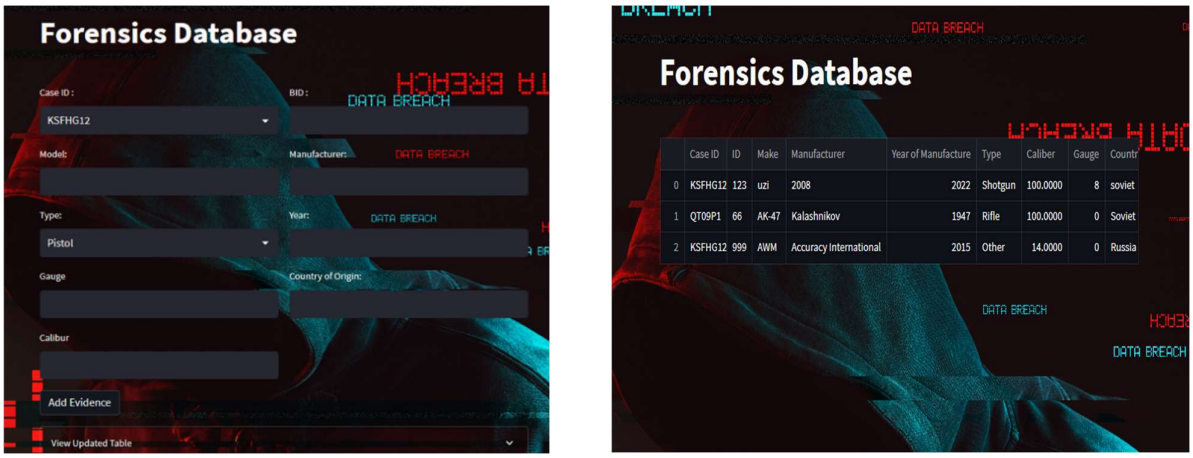
Screenshot 3 : Functions



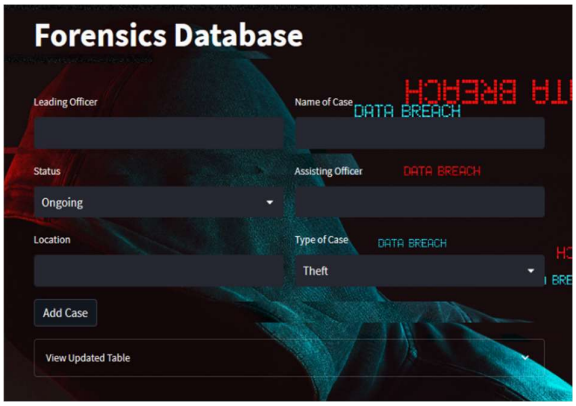
Screenshot 4: Tables

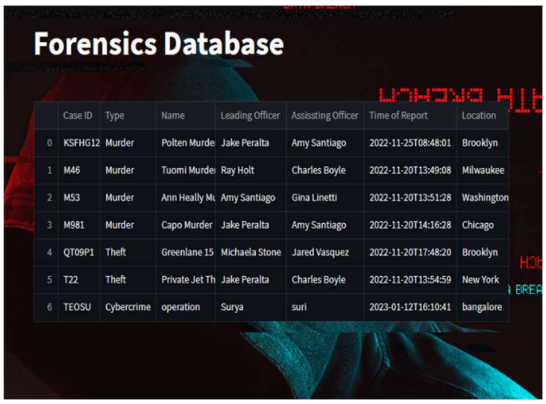


Screenshot 5: Add and view Automobile Table

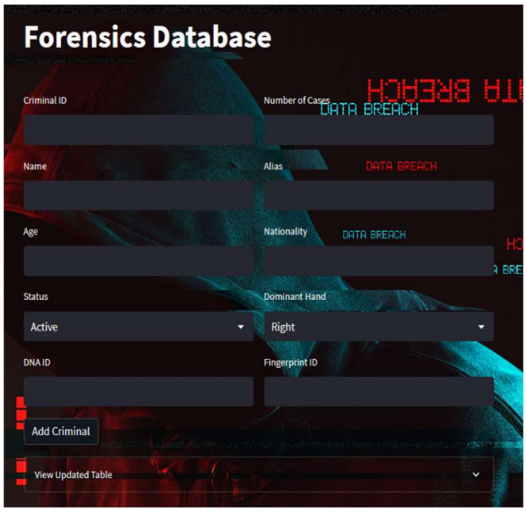


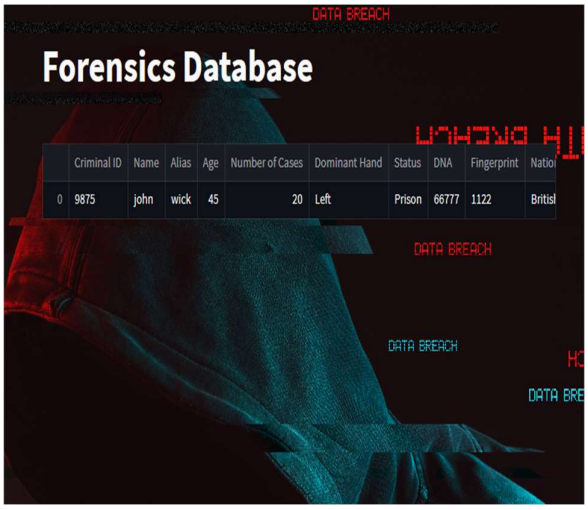
Screenshot 6: Add and view Ballistics Table



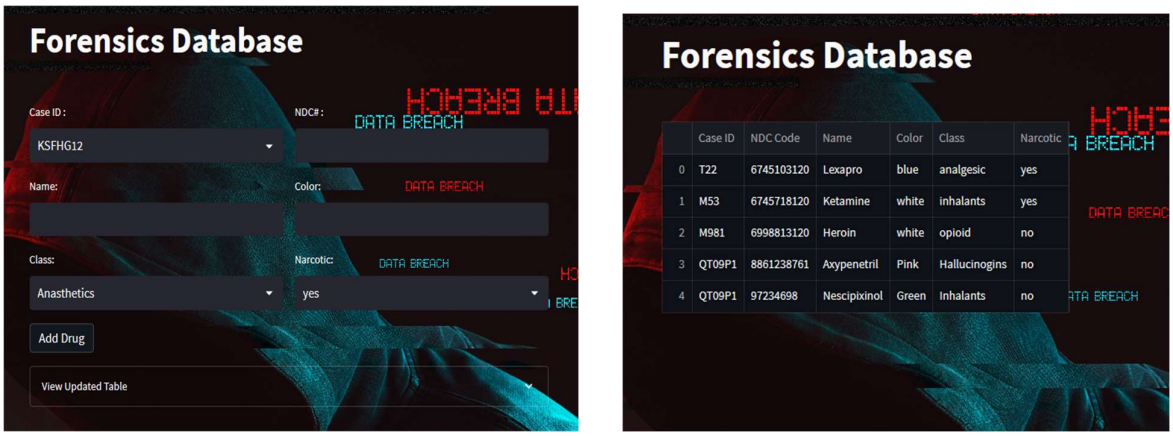


Screenshot 7: Add and view Cases Table

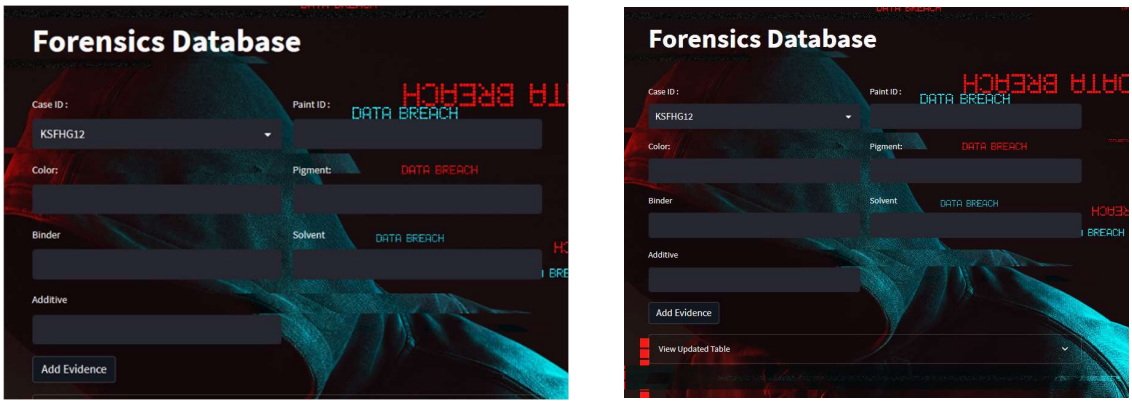




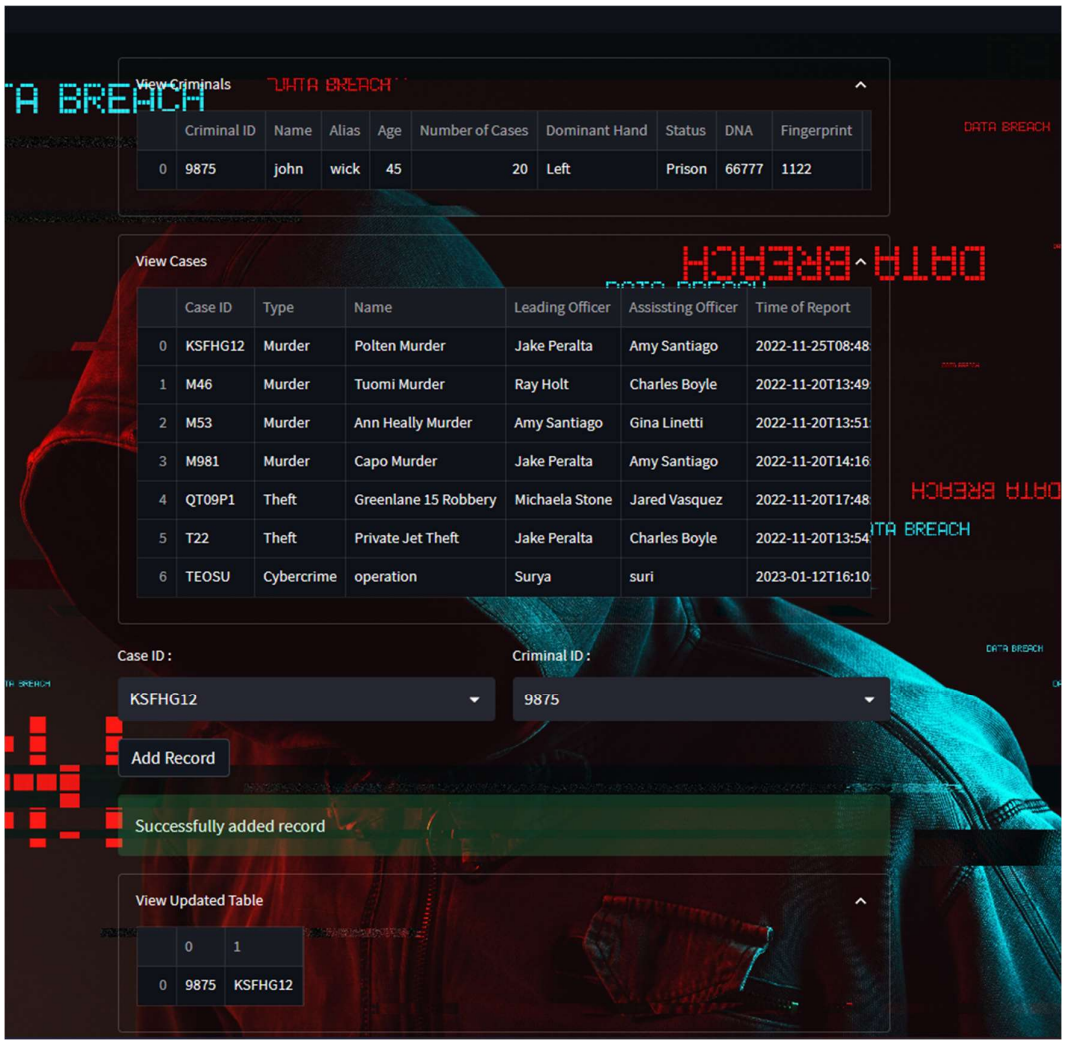
Screenshot 8: Add and view Criminal Table



Screenshot 9: Add and view Drugs Table



Screenshot 10: Add and view Paint Table



Screenshot 11: Add and view CriminalCase Table

CHAPTER 5

CONCLUSION AND FUTURE WORKS

It is the intent of Forensic Database Management to provide a platform that will offer law enforcement, laboratories and district attorneys the opportunity to keep a watch over everything that is brought in as evidence. Any updates made to an investigation will be available to them online to check through FEMIS and any given time and location. Forensic Database Management promotes inter as well as intra agency communication which can sometimes lead to delays. With the help of Forensic Database Management they will unquestionably bring to practice a vice in which various pieces of the puzzle join in order to fight crime.

Today's technology has put us far ahead of the rest, in terms of rightfully identifying villains and such. In order to take this a bit further, however, Forensic Database Management will allow others to quickly access various information on any one case. Collecting information such as DNA, blood and or journaling are at the very core of these cases and can perhaps determine who the correct assailant(s) are.
The gathering of such information has proven to be an important part of the investigation. Many of these materials are time sensitive and in need of quick attention. Information such as DNA, blood and the like are subjected to the sensitivities of weather. Over time, the needed information the attacker has [unknowingly] left behind will start to fade, diminish or perhaps become eaten by creatures of the earth.
Forensic Database Management proposes to remedy this situation by rallying this information in such a way that it will help to bring justice to many victims in a matter of days versus weeks, months or even years.

FUTURE WORKS

Forensic DNA databases are indispensable tools of the law enforcement system. The purpose of establishing forensic DNA databases was to develop investigative leads for solving crime and usually was the purview of "criminal justice agencies for law enforcement identification purposes" (1). The forensic DNA databases of most countries generally contain two types of profiles: 1) reference profiles from convicted offenders and/or arrestee profiles; these profiles are from known sources; and 2) forensic profiles which derive from crime scenes and are characteristically from unknown sources. In a typical database search, an unknown forensic profile is searched against the convicted offender and arrestee profiles (or can be searched against other unknown forensic profiles) to determine if an association, often called a match or hit, can be found. The hit can be used to develop investigation leads. As of May 2013, China and the United States (US) maintain the two largest forensic DNA databases, containing more than 20 and 12 million profiles and have produced over 410 000 (2) and 185 000 hits (3), respectively. In addition to direct matching between known and unknown sample profiles, profiles from missing persons and their relatives, as well as unidentified human remains, are included in a number of databases (2,3). Missing person identification also is an invaluable module for investigating certain crimes. For example, as of June 2013, China has successfully identified and rescued 2455 trafficked children through the use of its DNA database (2). The US National Missing and Unidentified Persons System (NamUs), which uses other meta-data has successfully solved 3499 missing persons cases as of August 2012 (4).

As expected with the great success of the use of forensic DNA databases, new challenges are emerging. The databases are experiencing rapid growth, and thus there is a potential of increased adventitious hits; the power for current and new applications (eg, missing person identification and familial searching) require additional infrastructure support; and there is an increased desire for international data sharing (5-7), which possibly could be hampered if only a relatively small number of loci is shared among laboratories worldwide

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