EDGE PROJECT

A PYTHON PROJECT ON-

" Fingerprint Matching System"

Submitted By-

Mst. Joairia Akter

Dept. of Criminology & Police Science, MBSTU

Python Batch- 02

PYTHON PROJECT:

Creating a simple Python project about forensic science or forensic investigation can be an interesting way to explore how technology can assist in crime-solving. A basic project idea could simulate an Evidence Analysis System, where we input various types of evidence and try to match it to a criminal profile or solve a crime.

Let's create a basic text-based Python application that simulates fingerprint matching in forensic science, a common forensic investigation process. This project will be basic, simulating how evidence might be compared in a database.

Forensic Science: Fingerprint Matching System:

Concept:

We will create a simplified simulation where the program takes a fingerprint sample from the user, compares it to a database of stored fingerprints, and determines whether there's a match.

Here's an example of a basic forensic science-themed Python project:

Python Coding:

The coding of this python project is described given below:

```python
#Simulated forensic database of fingerprints
fingerprint_database = {
    'Shakib': 'abc123',
    'kader': 'xyz789',
    'Polok': 'def456',
    'Harun': 'ghi012'
}


def display_menu():
    print("\nWelcome to the Forensic Science Fingerprint Matching System")
    print("Please select one of the following options:")
    print("1. Enter fingerprint sample for analysis")
    print("2. View fingerprint database")
    print("3. Exit")


def analyze_fingerprint(input_fingerprint):
    print("\nAnalyzing fingerprint...")
    # Check if the fingerprint matches any in the database
    for person, stored_fingerprint in fingerprint_database.items():
        if input_fingerprint == stored_fingerprint:
            return f"Match found! This fingerprint belongs to {person}."

    return "No match found. The fingerprint is not in the database."


def view_fingerprint_database():
    print("\nFingerprint Database:")
    for person, fingerprint in fingerprint_database.items():
        print(f"{person}: {fingerprint}")


def main():
    while True:
        display_menu()
        choice = input("\nEnter your choice (1-3): ")

        if choice == '1':
            input_fingerprint = input("\nEnter the fingerprint sample to
analyze (e.g., abc123): ")
            result = analyze_fingerprint(input_fingerprint)
            print(result)
        elif choice == '2':
            view_fingerprint_database()
        elif choice == '3':
            print("Thank you for using the Forensic Science system. Stay
safe.")
            break
        else:
            print("Invalid choice. Please select a number between 1 and
3.")


main()
```

How it Works:

Fingerprint Database: The program has a predefined database of fingerprints (just strings in this case). In real life, this would be much more complex, likely involving digital fingerprint images or patterns.

Menu Options:

Option 1: The user is prompted to enter a fingerprint sample. The system compares this sample to the stored fingerprints in the database. If there's a match, it identifies the person; if no match is found, it notifies the user.

Option 2: Displays the stored fingerprints in the database (for demonstration purposes).

Option 3: Exits the program.

Matching Algorithm: The analyze_fingerprint function checks if the input fingerprint matches any in the database and returns a result.

Sample Output:

```
Welcome to the Forensic Science Fingerprint Matching System
Please select one of the following options:
1. Enter fingerprint sample for analysis
2. View fingerprint database
3. Exit

Enter your choice (1-3): 1

Enter the fingerprint sample to analyze (e.g., abc123): bcd679

Analyzing fingerprint...
No match found. The fingerprint is not in the database.

Welcome to the Forensic Science Fingerprint Matching System
Please select one of the following options:
1. Enter fingerprint sample for analysis
2. View fingerprint database
3. Exit

Enter your choice (1-3): 2

Fingerprint Database:
Shakib: abc123
kader: xyz789
Polok: def456
Harun: ghi012
```

```
Fingerprint Database:
Shakib: abc123
kader: xyz789
Polok: def456
Harun: ghi012

Welcome to the Forensic Science Fingerprint Matching System
Please select one of the following options:
1. Enter fingerprint sample for analysis
2. View fingerprint database
3. Exit

Enter your choice (1-3): 3
Thank you for using the Forensic Science system. Stay safe.

Process finished with exit code 0
```

Possible Improvements:

More Complex Evidence Types: We can expand this project to handle other types of forensic evidence, such as DNA samples, blood types, or shoe prints.

Real Image Processing: Integrating libraries like OpenCV or Pillow to work with real images of fingerprints could create a more sophisticated forensic system. This would require more advanced techniques such as image recognition and feature matching.

Crime Scene Simulation: We could simulate a scenario where the user inputs various types of evidence found at a crime scene and then matches them against **stored data to solve a case.**

Graphical User Interface (GUI): We can use libraries like Tkinter to create a GUI for a more user-friendly experience.

Conclusion:

This basic fingerprint matching system gives an introduction to how forensic science might be applied using technology. Of course, real forensic investigations are much more involved, but this provides a fun starting point to simulate one aspect of forensic science.