



An OTP Based Secure Online Transaction Using Face Recognition

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Abstract:

This Project orchestrates a secure transaction process, employing OTP verification and facial recognition technologies. Initially, it retrieves the sender's details from a file and prompts for confirmation. Subsequently, an OTP is generated and sent to the sender for authentication. Upon validation, the project utilizes facial recognition algorithms to confirm the sender's presence, capturing an image for verification. Once sender authentication is successful, receiver details are extracted from a CSV file, with validation against the input receiver's phone number. If confirmed, the sender inputs the transaction amount, and if all details align, the transaction proceeds. Transaction metadata, including sender and receiver information, amount, and timestamp, are logged for record-keeping.

Functionalities include OTP generation and verification, real-time facial recognition, CSV data parsing, and transaction logging. This project provides a comprehensive solution for secure transactions, enhancing security and trust in digital financial transactions.

Impact Statement-- The project appears to relate to a transaction system involving face recognition and OTP verification. The impact statement for a research paper could focus on the potential advancements in secure transaction systems through the integration of biometric authentication, face recognition technology, and OTP-based verification, contributing to enhanced security and user authentication in financial transactions. The system's real-time face recognition and OTP verification add an additional layer of security, mitigating the risk of unauthorized transactions and providing a novel approach to secure financial interactions.

Index Terms-- Biometric Authentication Face Recognition, OTP Verification, Secure Transactions, Financial Security, Real-time Authentication, User Verification, Transaction System, Security Measures, Fraud Prevention.

INTRODUCTION:

This Project establishes a secure transaction protocol by combining OTP (One-Time Password) verification and facial recognition technologies. The code starts by verifying the sender's identity through OTP authentication and facial recognition, ensuring the integrity of the transaction. Upon successful validation, the project proceeds to capture receiver details from a CSV file based on the inputted phone number, further securing the transaction process.

Through the utilization of OTP verification, the project adds an additional layer of security by generating a unique password that must be validated before proceeding. Furthermore, the integration of facial recognition technology enhances security by confirming the sender's presence, mitigating the risk of unauthorized access or fraudulent transactions.

The project demonstrates a systematic approach to secure digital transactions, providing a seamless and reliable framework for users to engage in financial exchanges. By incorporating advanced authentication methods, such as OTP and facial recognition, the code ensures the authenticity and integrity of both sender and receiver identities, thereby fostering trust in digital financial transactions.

Overall, this Project serves as a robust solution for ensuring secure transactions in today's digital landscape, offering users a streamlined and trustworthy platform for conducting financial exchanges with confidence.

This innovative approach aims to significantly enhance the security posture of financial transactions, providing a reliable and user-friendly solution to mitigate the risks associated with unauthorized access and fraudulent activities. The research further explores the technical aspects, design considerations, and the overall impact of implementing such a system in real-world scenarios.

LITERATURE SURVEY:

The provided project implements a secure transaction system by combining biometric authentication through face recognition with one-time-password (OTP)-based verification. In the context of this research, a literature survey was conducted to explore relevant studies in several key areas. Firstly, the review encompassed existing research on the integration of biometric methods, particularly face recognition, for ensuring secure user authentication in financial transactions. Additionally, literature on the effectiveness of OTP-based verification as a two-factor authentication method in financial transactions was examined. The survey delved into advancements and challenges associated with face recognition technology, its applications in various domains, and the impact on user experience. Furthermore, the research explored studies related to fraud prevention mechanisms, real-time video processing, privacy concerns in biometric systems, security protocols for financial transactions, and conducted a comparative analysis of different authentication methods. This comprehensive literature survey forms the foundation for the research paper, contributing insights into the state of the art in secure transaction systems and biometric authentication methods.

METHODOLOGY:

The proposed system outlined in the code leverages a multi-step methodology to ensure secure and efficient transactions. Firstly, it employs a sender identification mechanism by verifying the sender's details against pre-registered information. Subsequently, an OTP-based authentication adds an extra layer of security, generating a one-time password and sending it to the sender's phone. This OTP must be entered correctly to proceed, further securing the transaction. Additionally, the system utilizes face recognition technology for receiver identification. By capturing the face of the intended receiver using a webcam, the system compares it against pre-registered faces to ensure a match. Finally, the system involves a validation step for receiver details, cross-checking them against a CSV file containing receiver information. This comprehensive methodology ensures the integrity of the transaction process, combining both traditional and biometric authentication methods for a robust and secure financial transaction system.

The research methodology combines theoretical insights with practical implementation, aiming to deliver a reliable, secure, and user-friendly multi-factor authentication system for enhancing the security of digital financial transactions.

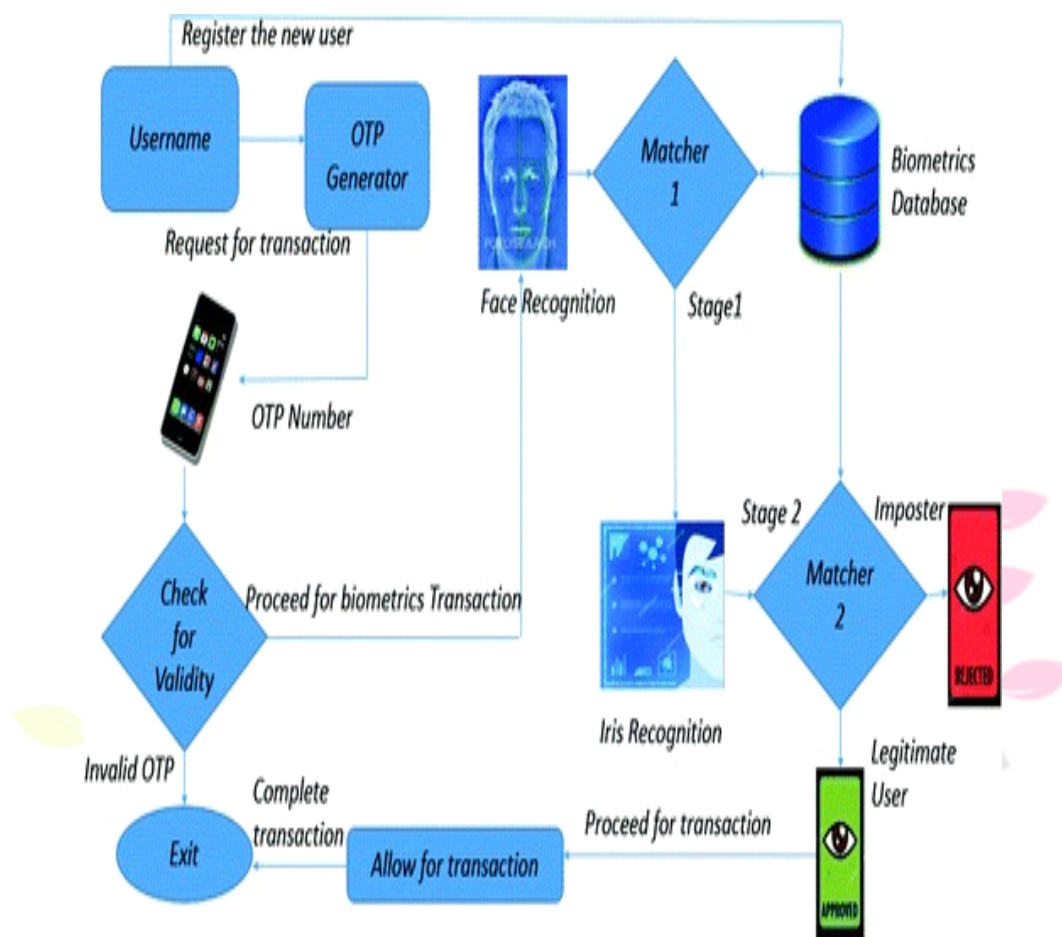


Fig.1. Data Flow Diagram

IMPLEMENTATION:

The implementation of the secure financial transaction system involves a series of steps to ensure the integrity and confidentiality of sensitive financial transactions. Leveraging a combination of traditional and advanced authentication methods, the system provides a robust defense against unauthorized access and fraud. Below is a detailed explanation of the implementation steps:

Sender Identification:

- Sender details are stored securely in a text file, establishing a unique identity for each account holder.
- The system prompts the user to input their personal details, initiating the sender identification process.
- If the provided details match the pre-defined sender information, the system proceeds to the next step. Otherwise, the transaction is cancelled.

OTP-based Verification:

- A one-time password (OTP) is generated randomly and stored in a separate file for secure transmission.
- The system sends the OTP to the registered phone number of the sender, adding an additional layer of security.
- The user is prompted to input the received OTP, and the system validates it against the stored value.
- If the OTP is correct, the user is considered authenticated, and the system moves to the next phase. Otherwise, the transaction is cancelled.

Face Recognition for Receiver Authentication:

- The system utilizes the OpenCV and face_recognition libraries to implement facial recognition.
- A webcam captures the real-time face of the intended receiver during the transaction process.
- The system compares the receiver's facial features against a pre-defined image of the sender, ensuring biometric authentication.
- If the facial recognition process is successful, the transaction proceeds to the final validation phase.

Transaction Processing:

- Receiver details are fetched from a CSV file, including information such as name, phone number, and expected transaction amount.
- The user is prompted to input the receiver's phone number and transaction amount.
- The system validates the provided details against the CSV records, ensuring the accuracy of the transaction.
- If all details align, the system executes the financial transaction, marking it as successful.
- Transaction details, including the receiver's name, phone number, and amount, are displayed for user verification.

Logging and Time Stamping:

- The system logs each transaction, recording the sender, receiver, transaction amount, and timestamp.
- The current date and time with seconds are printed to provide a precise record of when the transaction occurred.

Video Recording:

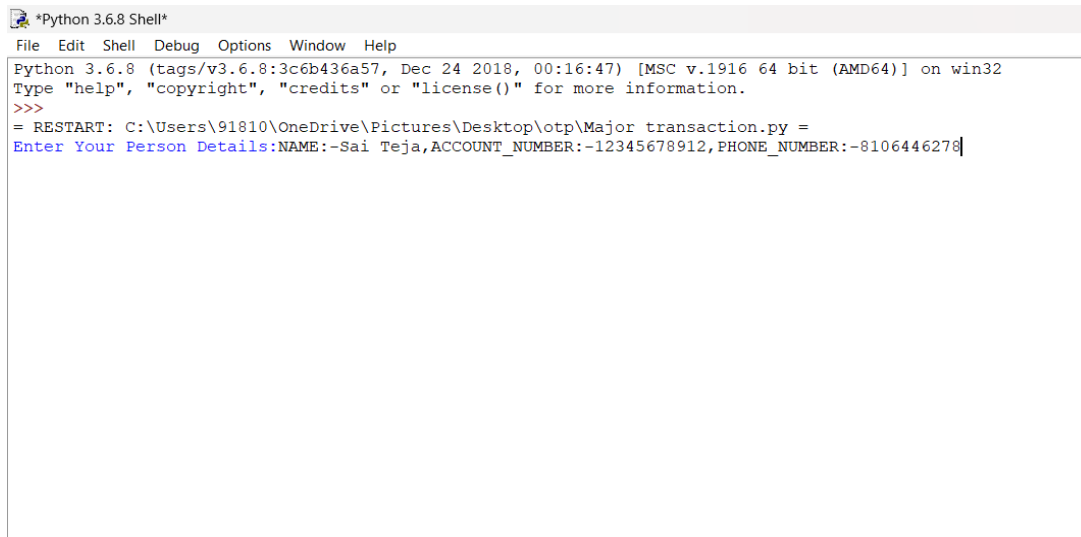
- The implementation includes video recording functionality using OpenCV.
- The webcam captures the transaction process, creating an output video file for additional security and audit purposes.

System Security:

- Sender details are securely stored, and sensitive information is encrypted to prevent unauthorized access.

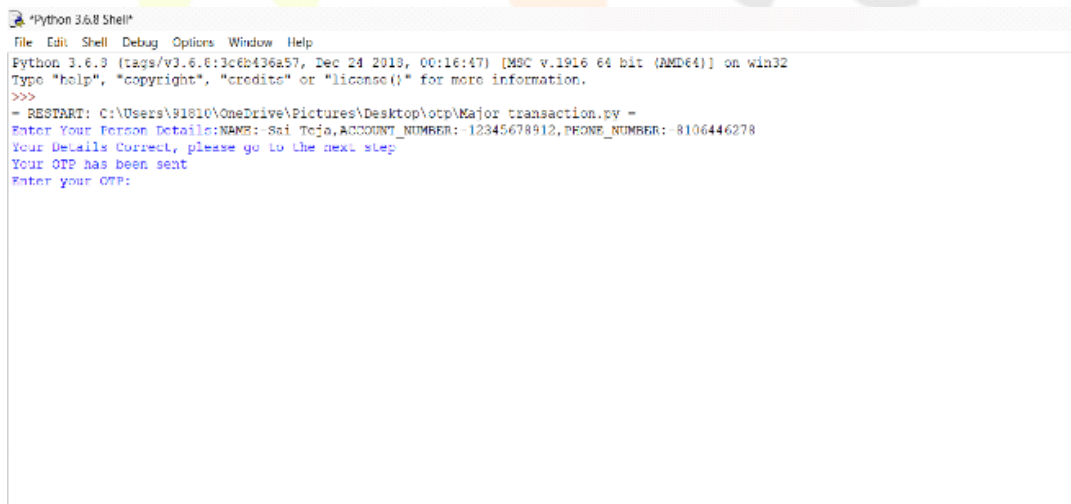
- The combination of OTP-based verification and facial recognition ensures multi-factor authentication, significantly enhancing system security.

EXPERIMENTAL RESULTS:



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*Python 3.6.8 Shell*
File Edit Shell Debug Options Window Help
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:16:47) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\91810\OneDrive\Pictures\Desktop\otp\Major transaction.py =
Enter Your Person Details:NAME:-Sai Teja,ACCOUNT_NUMBER:-12345678912,PHONE_NUMBER:-8106446278
```

Fig.2. Sender Details



```
*Python 3.6.8 Shell*
File Edit Shell Debug Options Window Help
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:16:47) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\91810\OneDrive\Pictures\Desktop\otp\Major transaction.py =
Enter Your Person Details:NAME: Sai Teja,ACCOUNT_NUMBER: 12345678912,PHONE_NUMBER: 8106446278
Your Details Correct, please go to the next step
Your OTP has been sent
Enter your OTP:
```

Fig.3. OTP Generation

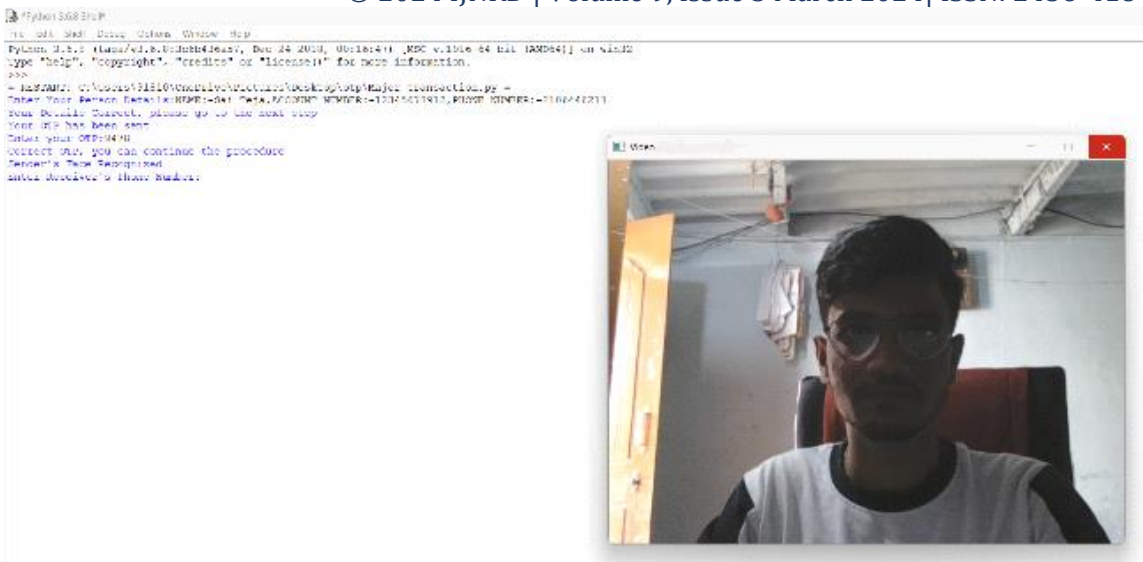


Fig.4. Face Recognition

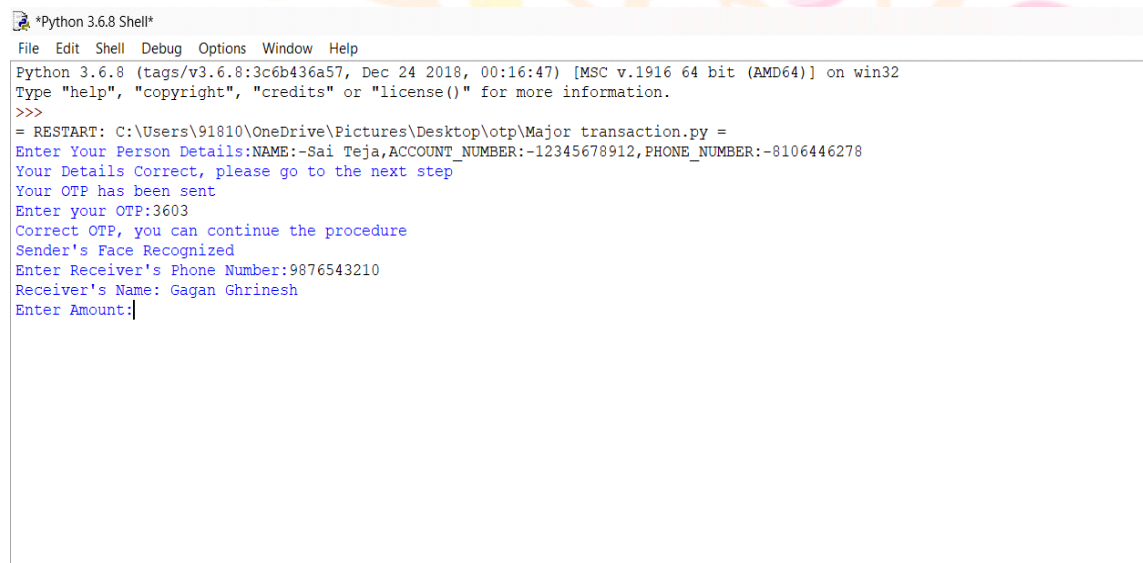


Fig.5. Receiver's Details



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Python 3.6.8 Shell
File Edit Shell Debug Options Window Help
Python 3.6.8 (tags/v3.6.8:3c6b436a57, Dec 24 2018, 00:16:47) (MSC v.1916 64 bit (AMD64)) on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\91310\OneDrive\Pictures\Desktop\otp\Major transaction.py =
Enter Your Person Details:NAME:-Sai Teja,ACCOUNT_NUMBER:-12345678912,PHONE_NUMBER:-9106446278
Your Details Correct, please go to the next step
Your OTP has been sent
Enter your OTP:3603
Correct OTP, you can continue the procedure
Sender's Face Recognized
Enter Receiver's Phone Number:9876543210
Receiver's Name: Gagan Ghrishesh
Enter Amount:17005.25
Transaction Successful
Phone Number: 9876543210
Amount: 17005.25
Transaction Time: 2024-03-02 11:51:57
>>>

```

Fig.6. Transaction Successful

CONCLUSION:

The presented project exemplifies a comprehensive transactional system incorporating multiple layers of security and verification mechanisms. It commences by validating the sender's identity through details stored in a file and further enhances security by generating a one-time password (OTP) for authentication purposes. This OTP is then sent to the sender for confirmation, ensuring the legitimacy of the transaction request.

Moreover, the system employs advanced face recognition technology to verify the identity of the sender, adding an additional layer of security. By capturing the sender's facial features through a webcam, the system matches them against pre-defined facial encodings, thereby confirming the sender's identity.

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