A

MINOR PROJECT SYNOPSIS

ON

QR CODE GENERATO

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

Submitted by

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DECLARATION

I hereby declare that the synopsis entitled **"QR Code Generator"** submitted to the Department of Computer Science, Accurate College, Greater Noida, is a record of an original work done by me under the guidance of miss SEEMA YADAV and this research is being submitted to fulfil the requirements for the award of degree of Bachelor of Technology.

The results embodied in this research work have not been submitted to any other university or institution for the award of any degree or diploma.

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CERTIFICATE

This is to certify that the synopsis entitled **"QR Code Generator"** by **Aditya Singh Arju Alam/Abhishek Kumar Jha** submitted to Accurate College, towards the fulfilment of requirements of the degree of Bachelor of Technology is a record of bonafide work carried out by him/her in the Department of Computer Science, Accurate College, Greater Noida. The results/findings contained in this report have not been submitted in part or full to any other University/Institute for award of any other Degree/Diploma.

Signature of Supervisor

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Signature of HOD (CSE)

Name: **Sunil Kumar Yadav**

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Place:

Date:

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INTRODUCTION

- **Problem Statement:**

In today's digital age, cashless transactions are becoming the norm. UPI has made digital payments easier, but a simple and secure method for payment generation is needed. This project addresses that need by allowing the generation of QR codes linked to specific payment details.

- **Objective:**

The main objective of this project is to create an automated system for generating QR codes for UPI payments using Python. This project aims to make digital transactions more accessible, secure, and easy to use by generating QR codes that can be scanned using any UPI-based payment app (like Google Pay, PhonePe, or Paytm). The specific objectives include:

- Automating QR Code Generation
- Seamless Payment Integration
- Improving Accessibility
- Enhancing Security
- Future Scalability

TOOLS & TECHNOLOGIES USED

- **Python:**

The core programming language used for the project due to its ease of use and availability of libraries.

- **QR code Library:**

Used for generating QR codes in Python.

- **UPI (Unified Payments Interface):**

A digital payment system that facilitates transactions between banks.

- **IDE/Editor:**

(e.g., VS Code, PyCharm) for writing and running Python code

METHODOLOGY

The process of generating QR codes and linking them to payment details is as follows:

- **Input:**

The program takes the UPI ID and the amount to be paid as inputs.

- **URL Construction:**

A URL is constructed using the UPI ID and payment amount.
Example: upi://pay?pa=example@upi&am=500&cu=INR

- **QR Code Generation:**

The constructed URL is passed to the QR code library to generate the QR code.

- **Saving QR Code:**

The generated QR code is saved as an image file (payment_qr.png).

- **Payment:**

The QR code is scanned by a UPI-based payment app for completing the transaction.
The generated QR code links to a UPI payment interface. Users scan it to make secure payments using UPI apps.

IMPLEMENTATION

The Python program is designed to generate QR codes for UPI payments. It uses the QR code library, which provides an easy way to generate QR codes by encoding data into a graphical format that can be read by scanners.

- **Code:**

```
import qrcode

def generate_payment_qr(upi_id, amount):
# Construct the UPI payment URL
upi_url = f"upi://pay?pa={upi_id}&am={amount}&cu=INR"
    qr = qrcode.make(upi_url)

    # Save the QR code as a PNG file
qr.save("payment_qr.png")
 print("QR Code generated and saved as 'payment_qr.png'.")

# Input details for UPI ID and payment amount upi_id
= input("Enter UPI ID: ")
amount = input("Enter amount: ")

# Call the function to generate QR code
generate_payment_qr(upi_id, amount)
```

CODE EXPLANATION

- **Library Import:**

The code starts by importing the qrcode library, which is crucial for generating QR codes. This library makes it easy to convert information (in this case, a UPI payment URL) into a scannable QR code.

- **Function Definition:**

generate_payment_qr(upi_id, amount):

This function is the core of the program. It accepts two inputs

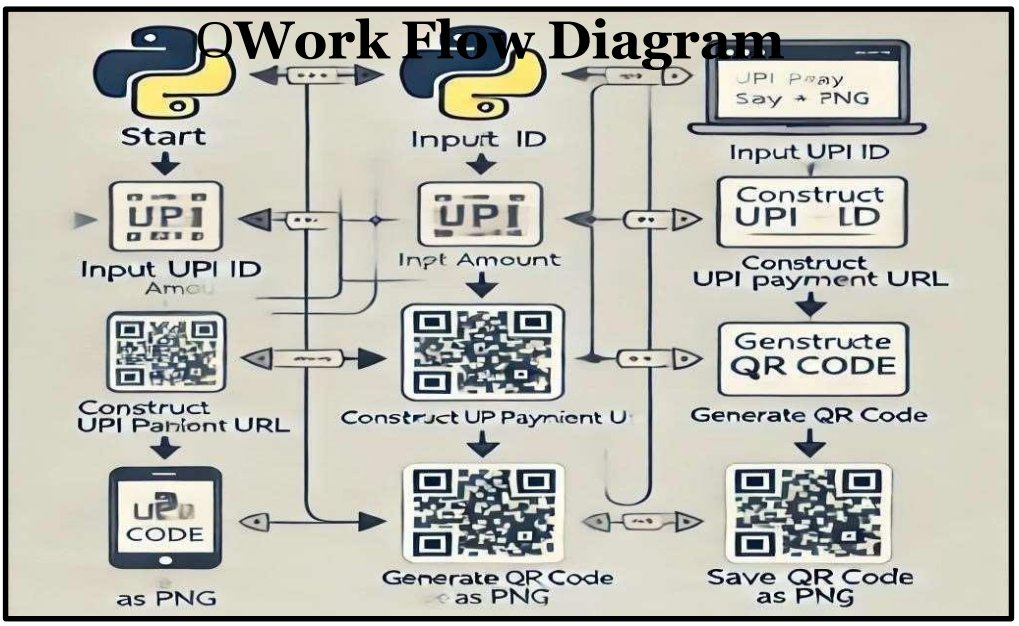
- **upi_id:** The UPI ID of the receiver.
- **amount:** The amount to be paid.

These details are used to construct a valid UPI payment URL.

URL Construction: The program constructs a UPI URL in the format. [upi://pay?pa={upi_id}&am={amount}&cu=INR]

QR Code Generation: The UPI URL is passed to the qrcode.make() function to create the QR code. **Saving:** The QR code is saved as payment_qr.png.

Work Flow Diagram



RESULT

Generated QR Code: Once the program runs, it generates a QR code based on the user's input. The generated QR code can be scanned using any UPI app.

```python
import qrcode

# Function to generate QR code
def generate_payment_qr(upi_id, amount):
    # UPI payment URL format
    upi_url = f"upi://pay?pa={upi_id}&am={amount}&cu=INR"
    qr = qrcode.make(upi_url)

    # Save the QR code
    qr.save("payment_qr.png")
    print("QR Code generated and saved as 'payment_qr.png'.")

# Input details
upi_id = input("Enter UPI ID: ")
amount = input("Enter amount: ")

# Generate the QR code
```

```
PS C:\Users\shikh\OneDrive\Desktop\python> & "C:/Program Files/Python313/python.exe" c:/Users/shikh/OneDrive/Des
ktop/python/qr_code_generator.py
PS C:\Users\shikh\OneDrive\Desktop\python> & "C:/Program Files/Python313/python.exe" c:/Users/shikh/OneDrive/Des
ktop/python/qr_code_generator.py
Enter UPI ID: 9718770538@ptyes
Enter amount: 1
QR Code generated and saved as 'payment_qr.png'.
PS C:\Users\shikh\OneDrive\Desktop\python>
```

Output

CHALLENGES FACED

- **Library Installation:**

Initially, installing the qrcode library caused some issues due to version incompatibility with the system's Python version. This was resolved by updating Python and using the correct version of the library.

- **Error Handling:**

There was a challenge in managing invalid or incomplete UPI IDs, which could have caused QR codes not to work. I added error handling to address this.

Conclusion & Future Scope

Conclusion:

This project successfully generates QR codes for UPI payments, making the payment process easy and efficient. The system is simple and can be used to facilitate small transactions without the need for physical cards or cash. **Future Scope:**

Security: Integrating OTP verification for added security during transactions.

Database Integration: Storing payment details in a database for easy tracking and history.

Cross-Platform Support: Expanding this solution to mobile applications for wider usage.

REFRENCES

Python Documentation: https://docs.python.org

qrcode Library Documentation:
https://pypi.org/project/qrcode/

UPI API:
https://www.npci.org.in/what-we-do/upi