A Project Report

on

TO GENERATE A QR CODE USING PYTHON

Submitted in partial fulfilment of requirements for the award of the course

of

CGB1121 – PYTHON PROGRAMMING

Under the guidance of

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(Autonomous)

KARUR – 639 113

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M. KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous Institution affiliated to Anna University, Chennai)

KARUR – 639 113

BONAFIDE CERTIFICATE

Certified that this project report on **"TO GENERATE A QR USING PYTHON "** is the bonafide work of **R.RASMITHA (927623BIT95)** who carried out the project work during the academic year 2023- 2024 under my supervision.

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DEPARTMENT OF INFORMATION TECHNOLOGY

VISION OF THE INSTITUTION

To emerge as a leader among the top institutions in the field of technical education

MISSION OF THE INSTITUTION

- Produce smart technocrats with empirical knowledge who can surmount the global challenges

- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students

- Maintain mutually beneficial partnerships with our alumni, industry, and Professional associations

VISION OF THE DEPARTMENT

To create groomed, technically competent and skilled intellectual IT professionals to meet the current challenges of the modern computing industry.

MISSION OF THE DEPARTMENT

- To ensure the understanding of fundamental aspects of Information Technology.

- Prepare students to adapt to the challenges of changing market needs by providing an environment.

- Build necessary skills required for employ ability through career development training to meet the challenges posed by the competitive

world.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Graduates will be able to solve real world problems using learned concepts pertaining to Information Technology domain.

PEO 2: Encompass the ability to examine, plan and build innovative software Products and become a successful entrepreneur.

PEO 3: Graduates will be able to carry out the profession with ethics, integrity, leadership and social responsibility.

PEO 4: Graduates will be able to pursue post-graduation and succeed in academic and research careers.

PROGRAM OUTCOMES (POs)

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional

engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clearinstructions

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

1. **PSO1: Professional Skills:** Comprehend the technological advancement and practice professional ethics and the concerns for societal and environmental well-being.

2. **PSO 2: Competency Skills:** Design software in a futuristic approach to support current technology and adapt cutting-edge technologies.

3. **PSO 3: Successful career:** Apply knowledge of theoretical computer science to assess the hardware and software aspects of computer systems.

ABSTRACT

This paper "QR CODE GENERATION " presents a comprehensive QR code generation system designed to meet the diverse needs of users in various domains, including marketing, secure data transmission, and user engagement. The proposed system offers a web-based interface that simplifies the creation and customization of QR codes, providing real-time previews and a wide array of customization options, such as color schemes, error correction levels, and the ability to embed logos and emojis.

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LIST OF ABBREVIATIONS

ABBREVIATIONS

IDE	-	Integrated development environment
VS Code	-	Visual Studio Code
re	-	Regular Expression
iOS	-	iPhone Operating System
NLP	-	Natural Language Processing
GUI	-	Graphical User Interface
APIs	-	Application Programming Interface

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO PYTHON

1.1.1. OVERVIEW

Python is a widely-used, high-level programming language renowned for its readability and simplicity, making it an ideal choice for both novice and seasoned programmers. Created by Guido van Rossum and released in 1991, Python's core philosophy emphasizes code readability and straightforward syntax, allowing developers to write clear and concise code more efficiently compared to other languages like C++ or Java.

1.1.2. PROGRAMMING PARADIGMS

Python supports various programming paradigms, including procedural, object-oriented, and functional programming. This flexibility, combined with a dynamic type system and automatic memory management, facilitates the development of a wide range of applications, from simple scripts to complex software systems.

1.1.3. STANDARD LIBRARY

The language's comprehensive standard library, often referred to as "batteries-included," provides built-in modules and functions for handling many programming tasks, such as file I/O, system calls, and even web services. This extensive library helps streamline the development process by offering ready-to-use solutions for common programming challenges.

1.1.4. THIRD-PARTY LIBRARIES AND FRAMEWORKS

One of Python's significant strengths is its extensive ecosystem of third-party libraries and frameworks. Popular libraries such as NumPy and Pandas enable efficient data manipulation and analysis, while frameworks like Django and Flask

streamline web development. In the realm of machine learning and artificial intelligence, libraries like TensorFlow and PyTorch are widely adopted for building and deploying sophisticated models.

1.1.5. VERSIONS OF PYTHON

Python has undergone significant evolution since its inception, with two major versions in use today:

Python 2: Released in 2000, Python 2.x series was a major milestone and widely used for many years. However, it reached its end of life on January 1, 2020, and is no longer maintained.

Python 3: Introduced in 2008, Python 3.x series brought substantial improvements and changes to the language, such as better Unicode support, a more consistent syntax, and enhanced standard libraries. Python 3 is the recommended version for all new projects.

1.1.6. PYTHON TOOLS

Python's ecosystem includes numerous tools that enhance productivity and development experience:

➢ **IDEs and Code Editors:** Popular options include PyCharm, VS Code, and Jupyter Notebook, which offer features like syntax highlighting, code completion, and debugging.

➢ **Package Management:** Tools like pip and conda facilitate the installation and management of Python libraries and dependencies.

➢ **Virtual Environments:** virtualenv and venv allow developers to create isolated environments for different projects, ensuring dependency conflicts are avoided.

- ➢ **Testing Frameworks:** unittest, pytest, and nose are commonly used for writing and running tests to ensure code reliability and correctness.

- ➢ **Build Tools:** setuptools and wheel help in packaging Python projects, making them easy to distribute and install.

- ➢ **Documentation Generators:** Tools like Sphinx are used to create comprehensive documentation for Python projects.

- ➢ **Linters and Formatters:** pylint, flake8, and black help maintain code quality and consistency by enforcing coding standards and formatting.

1.1.7. VERSATILITY AND ADOPTION

Python's simplicity and versatility have led to its widespread adoption in various fields, including web development, data science, artificial intelligence, automation, and scientific computing. Its active community continually contributes to a rich repository of resources, tutorials, and documentation, making it easier for developers to learn and apply Python effectively.

CHAPTER 2
PROJECT DESCRIPTION

2.1.PROJECT INTRODUCTION

A QR code is much like a bar code, except that because it carries data in two dimensions (horizontally and vertically), it is able to hold much more information than a one-dimensional bar code. In fact, compared to a bar code's 20 alphanumeric character limit, a QR code can hold thousands of characters of data.

2.2.PROJECT OBJECTIVE

Targeted to mobile users, QR Codes are cost-effective, universally applicable, and help you reach your target audience in the offline world and connect them directly to your digital platforms. People now keep track of their favorite brands and products through their mobile devices, which is what makes QR Codes especially attractive for marketing.

2.3. PROBLEM STATEMENT

A QR code consists of black squares arranged in a square grid on white

background, including some fiducial markers, which can be read by an imaging

device such as a camera, and processed using error correction

until the image can be appropriately interpreted.

The required data is then extracted from patterns that are present in both horizontal and vertical components in the image. QR codes are mainly used for making payments fastly, share product

information.

CHAPTER 3
SYSTEM ANALYSIS

3.1. EXISTING SYSTEM

- QR Code Generator by goQR.me: Simple online tool to create QR codes with various customization options.
- **QRStuff**: Offers QR code generation with options for different data types and customization.
- **QRCode Monkey**: Allows customization of the design and color of QR codes.
- **Kaywa**: Provides both free and paid services for QR code generation and management.

3.1.1. DISADVANTAGE.

The disadvantages of existing in QR code generation application systems include:

1. **LIMITED COVERAGE**

Many existing systems do not support the full range of emojis, especially new and extended emojis (Emojis), leading to incomplete or incorrect text processing.

2. **INCONSISTENT INTERPRETATION**

Emojis can be rendered differently across platforms (e.g., iOS vs. Android), and existing tools may not account for these variations, causing inconsistencies in text interpretation and analysis.

3. **COMPLEXITY IN INTEGRATION**

Integrating emoji processing into existing text-based systems can be complex and time consuming, often requiring custom solutions that are difficult to maintain.

4.PERFORMANCE ISSUES

Handling and processing graphical content can be resource-intensive, potentially leading to performance bottlenecks in applications that need to process large volumes of text.

5. LACK OF STANDARDIZATION

There is no universal standard for emoji-to-text conversion, resulting in varied approaches and outputs, which can hinder data consistency and interoperability between systems.

3.2. PROPOSED SYSTEM

The proposed system will be web-based application allowing users to generate, customize, and download QR codes. It will include functionalities for embedding logos or images, handling different types of data, and providing analytics for generated QR codes.

3.2.1. ADVANTAGES

This proposed Python Application offers several advantages over existing systems:

1. **.Easy and Quick Access to Information**:

   QR codes enable instant access to URLs, contact details, text, or other information simply by scanning with a smartphone camera, bypassing the need for manual entry.

2.Versatile and Flexible:

QR codes can store various types of data, including website links, plain text, email addresses, phone numbers, and more. This versatility makes them suitable for diverse applications like marketing, product packaging, and event management.

3.Improved User Engagement and Tracking:

 enhance user engagement by providing quick access to multimedia content, special offers, and interactive features. They can also be tracked to gather analytics, such as the number of scans, location, and device type, helping businesses measure campaign effectiveness.

4.Enhances User Experience:

By providing a seamless and immediate way to access information, QR codes enhance the user experience, making interactions with products and services more convenient and enjoyable.

5.Secure and Reliable:

QR codes are robust and can still function even if partially damaged, thanks to error correction capabilities. Additionally, they can be encrypted and used for secure transactions, access control, and authentication processes.

CHAPTER 4
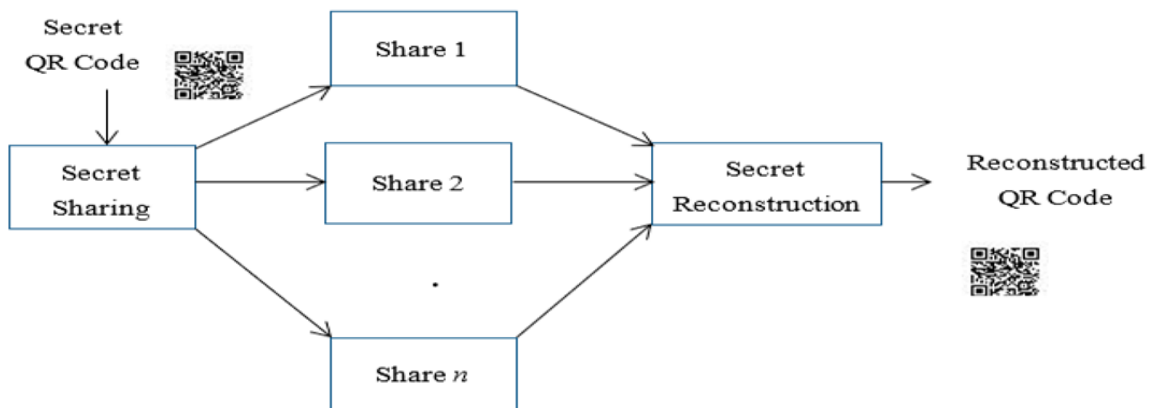# SYSTEM DESIGN & MODULES

4.1. BLOCK DIAGRAM

Fig 4.1 block diagram

4.2. MODULE DESCRIPTION

4.2.1 INPUT HANDLER: This component manages the input provided by the user. It validates the data to ensure it is suitable for encoding into a QR code.

➢ **Improved Security: By sanitizing input data, the system can prevent injection attacks and other security vulnerabilities.**

➢ **Data Integrity: Ensures that the data being encoded into the QR code is valid and correctly formatted.**

➢ **Error Handling: Provides clear error messages when the input data is invalid, helping users understand and correct their input.**

4.2.2 DATA ENCODER

The Data Encoder is a critical component in the QR Code generation system. Its main role is to convert the sanitized input data into a format suitable for generating the QR code.

4.2.3 BIT STREAM GENERATION

It plays a role in converting the encoded data into a continuous sequence of bits. This bit stream forms the basis for creating the QR code matrix, which is then rendered into a visual QR code.

4.2.4 OUTPUT TEXT MODULE

This is the visual representation of the QR code containing encoded information such as text, URL, or other data types.

The small squares located at three corners of the QR code that help scanners detect and decode the code.

✓ **Position Detection Patterns:** These are the small squares located at three corners of the QR code that help scanners detect and decode the code.

✓ **Alignment Patterns:** Alignment patterns are used to ensure accurate scanning, especially for larger QR codes. The output may indicate the positions of these patterns within the QR code.

4.2.5 Version and Size

QR codes come in different versions, which affect their size and capacity to store data. The output may indicate the version used and the physical size of the generated QR code.

CHAPTER 5
CONCLUSION & FUTURE ENHANCEMENT

5.1. CONCLUSION

QR code generation is a process that involves encoding data into a two-dimensional matrix of black and white squares, resulting in a visually recognizable code that can store various types of information

The output of a QR code generation module includes the QR code image itself, error correction level, encoded data, version and size information, quiet zone specifications, format information, position detection patterns, alignment patterns timing patterns, quiet zone handling, and module placement details.

QR codes have become widely used for storing data such as URLs, text, contact information, and more, making them a versatile tool for information sharing and data storage in various applications.

5.2. FUTURE ENHANCEMENT

There are several opportunities for future enhancement and expansion.

Extend the system's capabilities. QR codes can be enhanced to store more data by improving their error correction capabilities or by using more advanced encoding schemes.

QR codes can be designed with more customization options, such as adding logos, colors, and gradients while maintaining scanning reliability.

Implementing stronger security measures to prevent unauthorized scanning or tampering with QR code data, especially for sensitive information like payments or personal data.

Promoting widespread adoption of QR codes globally, especially in regions where they are less commonly used, through education, standardization, and interoperability.
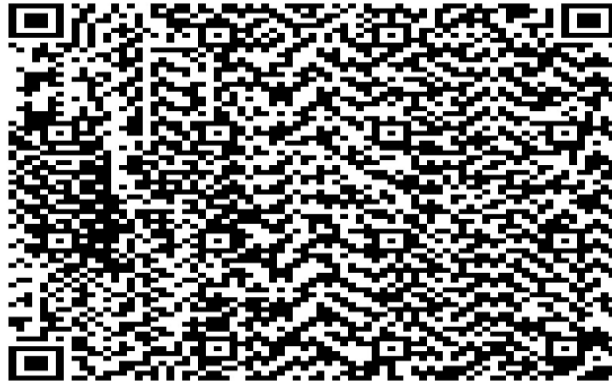
APPENDICES

APPENDIX A-SOURCE CODE

To generate a QR   code :

```
import qrcode
qr=qrcode.QRCode(
   version=15,
   box_size=10,
   border=5
)


        data="https://contacts.google.com/?hl=en_IN"
qr.add_data(data)
qr.make(fit=True)
img=qr.make_image(fill="black",back_color="white")
img.save('text.png')
```

APPENDIX B -SCREEN SHOTS

C:\Program Files\Python312\python.exe' 'c:\Users\R.RASMITHA\.vscode\extensions\ms-python.debugpy-2024.6.0-win32-x64\bundled\libs\debugpy\adapter/../..\debugpy\launcher' '63500' '--' 'c:\Users\R.RASMITHA\Downloads\qr code.py'
PS C:\Users\R.RASMITHA\Downloads>