**Project Report**

**on**

**“A to Z Studio : A Cross-Platform Image Generator App using Flutter”**

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****CERTIFICATE****

**This is to certify that **Mr. Devendra Maurya** and **Mr. Uday Raj Verma** are bonafide students of B.Tech 4th year at BSSITM, Lucknow. This project report titled “A to Z Studio : A Cross-Platform Image Generator App using Flutter” has been prepared by his/her in partial fulfillment for the award of the Bachelor of Technology in Information Technology from BSSITM, Lucknow, under the supervision of **GUIDE NAME**, Assistant Professor, BSSITM, of this institute.**

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| Guide Name | **Er. Hira Singh yadav** |
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****DECLARATION****

We, **DEVENDRA MAURYA** and **UDAY RAJ VERMA** hereby declare that this project report title **“A to Z Studio : A Cross-Platform Image Generator App using Flutter”** has been prepared by us under the supervision of  **GUIDE NAME**, Assistant Professor, BSSITM affiliated to Dr. A P J Abdul Kalam Technical University, in the partial fulfillment for the award of the Bachelors in Technology during the year 2024-2025.

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**ABSTRACT**

**In today’s digital era, the demand for high-quality images across various platforms has grown significantly. This project presents a cross-platform Flutter application that generates and customizes images using the Unsplash API. The app demonstrates Flutter’s capability to develop for mobile, web, and desktop using a single codebase, thereby streamlining development and reducing platform fragmentation.**

The application fetches images in batches of two, adds them to a visual queue, and provides users with intuitive features such as downloading, sharing, theme switching (light/dark mode), grid customization, and image dimension control. It offers a seamless and responsive user interface tailored for various screen sizes and operating systems.

By leveraging the power of open-source APIs and Flutter’s widget-based design, this project provides a scalable solution for dynamic image content generation and customization. The application is both functional and user-friendly, with potential to be expanded into a full-scale image browsing or content creation platform.

## ****1. INTRODUCTION****

### 1.1 Research Background

In the modern digital landscape, images play a crucial role in content creation, user engagement, and communication across websites, social media, applications, and other platforms. With the rise in visual-based platforms and the need for personalized content, there is an increasing demand for tools that allow users to access and customize high-quality images effortlessly. Flutter, a UI toolkit developed by Google, has emerged as a powerful solution for building natively compiled applications across mobile, web, and desktop from a single codebase.

Leveraging Flutter’s cross-platform capabilities, this project focuses on developing an image generation application that integrates with the Unsplash API — a widely used open-source image service. The application showcases the practical application of API integration, user-centric design, and cross-platform deployment in a real-world scenario.

### 1.2 Problem Statement

Users often face difficulties when searching, downloading, and managing high-quality images across different platforms. Additionally, most image-related applications are either platform-dependent or lack customization features like resolution control, theming, and grid layout adjustments. There is a need for a seamless, user-friendly application that not only fetches images dynamically from an online source but also offers customization and cross-platform usability through a unified interface.

### 1.3 Objective of the Study

The primary objectives of this project are:

* To develop a Flutter-based application capable of running on mobile, web, and desktop platforms using a single codebase.
* To integrate the Unsplash API for fetching high-quality images in real-time.
* To implement a queue system for image display, generating images in batches of two.
* To provide users with functionalities such as downloading and sharing images directly from the app.
* To offer customization features like theme switching (light/dark), grid view adjustments, and image dimension control (height and width).
* To demonstrate the effectiveness of Flutter in building scalable and responsive UI for diverse platforms.

### 1.4 Scope of the Study

This project is limited to building a proof-of-concept image generation application using Flutter and the Unsplash API. The focus lies in demonstrating cross-platform compatibility, dynamic image loading, and enhanced user experience through customizable features. The application supports:

* Platform-independent deployment (Android, iOS, Web, Desktop).
* Dynamic image fetching and queuing.
* User-oriented features like download, share, grid view adjustment, and theming.

Future enhancements may include user authentication, category filtering, offline image caching, and integration with other image APIs. However, these lie beyond the current scope of study and are considered for future work.

**2. LITERATURE SURVEY**

## ****3. SYSTEM SPECIFICATIONS****

This section outlines the software and hardware requirements necessary to develop, run, and test the application. It includes both the development environment and the target deployment platforms.

**3.1 Hardware Requirements**

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| --- | --- |
| **Component** | **Minimum Requirement** |
| Processor | Intel Core i3 / AMD Ryzen 3 or above |
| RAM | 4 GB (8 GB recommended) |
| Storage | Minimum 5 GB of free disk space |
| Display | 1366 x 768 resolution or higher |
| Graphics | Integrated GPU (for emulator support) |

**3.2 Software Requirements**

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| --- | --- |
| **Software** | **Description** |
| Operating System | Windows 10/11, macOS, or Linux (Ubuntu) |
| IDE | Android Studio / Visual Studio Code |
| SDK | Flutter SDK (v3.x or later) |
| Programming Language | Dart |
| API | Unsplash API (Free Tier) |
| Emulator/Device | Android Emulator, Chrome Browser, or Physical Device |
| Version Control | Git (Optional but recommended) |
| Package Manager | pub.dev (Flutter’s dependency manager) |

**3.3 Software Libraries & Dependencies**

The application uses several Dart and Flutter packages to support its features:

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| --- | --- |
| **Package** | **Purpose** |
| http | For making HTTP requests to Unsplash API |
| provider or bloc | State management (depending on implementation) |
| cached\_network\_image | Efficient image loading with caching |
| share\_plus | For sharing images across platforms |
| flutter\_staggered\_grid\_view | For advanced grid layouts |
| theme\_provider | For managing light and dark theme switching |
| file\_saver / path\_provider | For downloading images to device storage |

The application has been built with full support for web, desktop, and mobile environments, utilizing Flutter’s cross-platform capabilities to maintain a unified codebase.

**4. PROPOSED METHODOLOGY**

This chapter includes an overview of how the application works, its architecture, and a breakdown of all core modules. We’ll begin with the general working, block diagram, and the first few modules.

### 4.1 Working

The application begins with a home screen that allows users to generate high-quality images using the Unsplash API. Users can click a button to load **two random images at a time**, which are then **added to a queue** and displayed in a **grid layout**. This process can be repeated continuously, enabling the user to build a collection of images dynamically.

Key workflows include:

* **Image Fetching**: Two images are fetched from Unsplash using the API and added to a queue.
* **Queue Display**: The UI updates with each batch, maintaining previously fetched images in the list.
* **Custom Controls**: Users can control the layout (grid size), image dimensions (height/width), and toggle between light and dark modes.
* **Download and Share**: Each image can be downloaded to local storage or shared using system-level tools.
* **Responsive UI**: The application adapts its layout based on the platform (mobile, desktop, web).

By combining Flutter’s flexibility with the power of the Unsplash API, the application offers a seamless experience for users to generate, view, and manage high-quality images dynamically — all within a clean and responsive interface.

## ****5. RESULT ANALYSIS AND DISCUSSION****

### 5.1 Overview

This chapter presents the **outcomes** of the implemented system. It highlights how well the application performs based on user interactions, functionality success rates, and visual output. The analysis is based on both qualitative experience and functional accuracy of the core features.

5.2 Key Results

|  |  |  |
| --- | --- | --- |
| **Feature** | **Expected Outcome** | **Actual Result** |
| Image Generation | Generates 2 new random images per request | Successfully generates and appends images in queue |
| Cross-Platform Functionality | Works on mobile, web, and desktop | Fully responsive across platforms |
| Image Download & Sharing | Allows saving and sharing images | Operates correctly on tested platforms |
| Theme Switching | Switches between light and dark modes | Instant switching with state persistence |
| Grid Layout Customization | User can change number of column | Layout updates dynamically as expected |
| Height & Width Control | Adjusts image size manually | Size change reflects in real-time |

### 5.3 Performance Observations

* **Loading Time**: Average response time for image generation is fast (1–2 seconds) due to lightweight API calls.
* **Memory Usage**: Optimized image caching prevents memory overload during repeated requests.
* **Error Handling**: Robust error messages are shown for:
  + No internet connectivity
  + API call failure
  + Permission denial (on download)

### 5.4 User Feedback (Optional)

Although formal user testing wasn’t conducted, informal testing among peers showed:

* Interface is clean and easy to use
* Theme switching and image customization were highly appreciated
* Some users suggested a **clear queue** or **favorites** feature for future updates

### 5.5 Discussion

The application met all the primary goals:

* Delivered a consistent and reliable user experience
* Demonstrated smooth integration with a public API (Unsplash)
* Showed adaptability on different screen sizes and platforms

Any limitations, such as offline usage or advanced editing tools, are opportunities for further improvement rather than failures in this version.

**6. CONCLUSION**

The project successfully achieved its objective of developing a cross-platform Flutter application capable of generating and managing images using the Unsplash API. By leveraging Flutter's single codebase approach, the app runs seamlessly on mobile, web, and desktop platforms, providing users with a consistent and responsive experience. Key features such as image generation in batches, customizable grid layouts, image resizing, downloading, sharing, and theme switching were effectively implemented. Throughout the development process, various technical concepts were applied, including REST API integration, state management, and responsive UI design. The project not only demonstrated the functional capabilities of the Flutter framework but also offered insights into user-centric design and cross-platform optimization. While the current version fulfills its intended goals, there remains room for future enhancement, which can further enrich the application’s utility and user engagement.

**7. FUTURE SCOPE OF THE PROJECT**

The future scope of this project offers numerous opportunities for enhancement and expansion. One significant improvement would be to introduce advanced image search and filtering options, enabling users to find images based on keywords, categories, colors, or orientations, thereby providing more personalized and relevant results. Incorporating user authentication could allow for personalized experiences such as saving favorite images, managing custom collections, and synchronizing preferences across devices. Offline access through caching previously viewed or downloaded images would improve usability in low or no internet scenarios. Furthermore, adding basic image editing tools like cropping, rotating, and filter application would empower users to customize images before sharing. Social features, including in-app comments, likes, and integration with social media platforms, could foster community engagement and wider sharing. Performance optimization and enhanced accessibility support would make the app smoother and more inclusive for a diverse range of users and devices. Finally, extending compatibility to emerging platforms such as smart TVs and wearables, along with leveraging platform-specific capabilities, would broaden the app’s reach and usability. These enhancements would collectively evolve the application into a more feature-rich, user-friendly, and versatile tool.

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