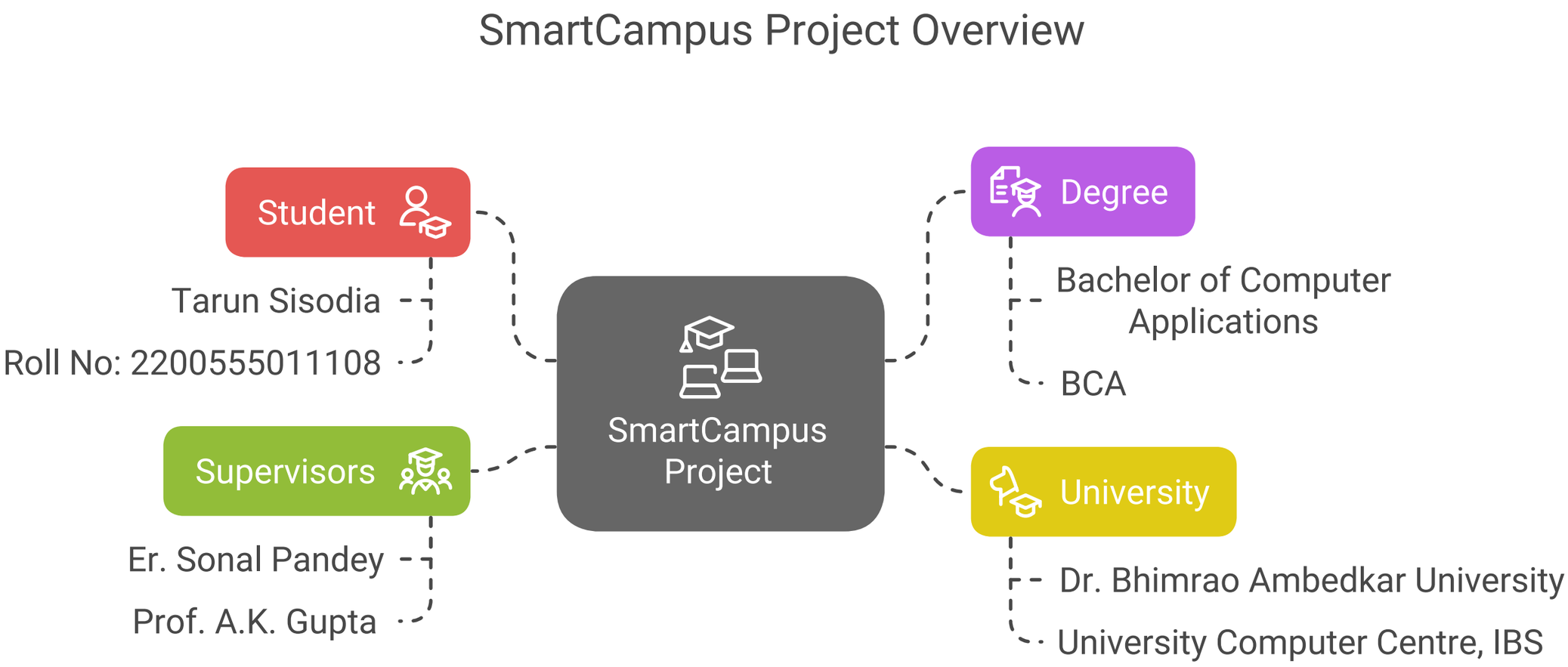
SmartCampus - An Attendance Management System

Project Overview

Project Details

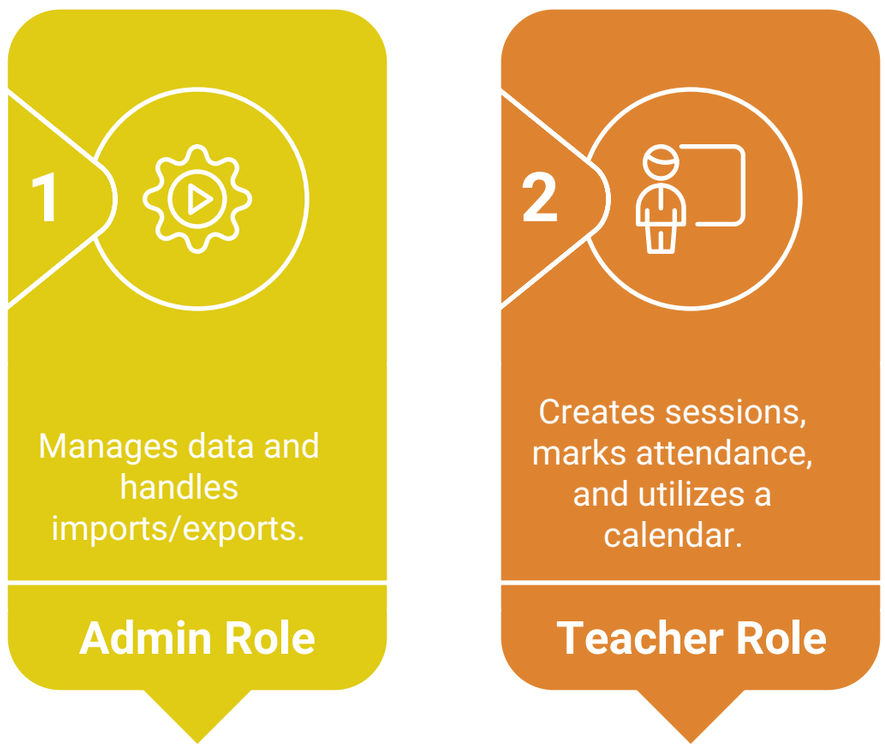
- **Title**: SmartCampus - An Attendance Management System
- **Student**: Tarun Sisodia (Roll No: 2200555011108)
- **Degree**: Bachelor of Computer Applications (BCA)
- **University**: Dr. Bhimrao Ambedkar University, Agra (University Computer Centre, IBS)
- **Supervisors**:
  - Er. Sonal Pandey (Internal Supervisor)
  - Prof. A.K. Gupta (Head of the Department)



Abstract

SmartCampus is a cross-platform web and mobile application designed to streamline attendance tracking in educational institutions. It features two main interfaces:

- **Admin**: Manages data and handles imports/exports.
- **Teacher**: Creates sessions, marks attendance using a carousel with student images, and utilizes a calendar feature.

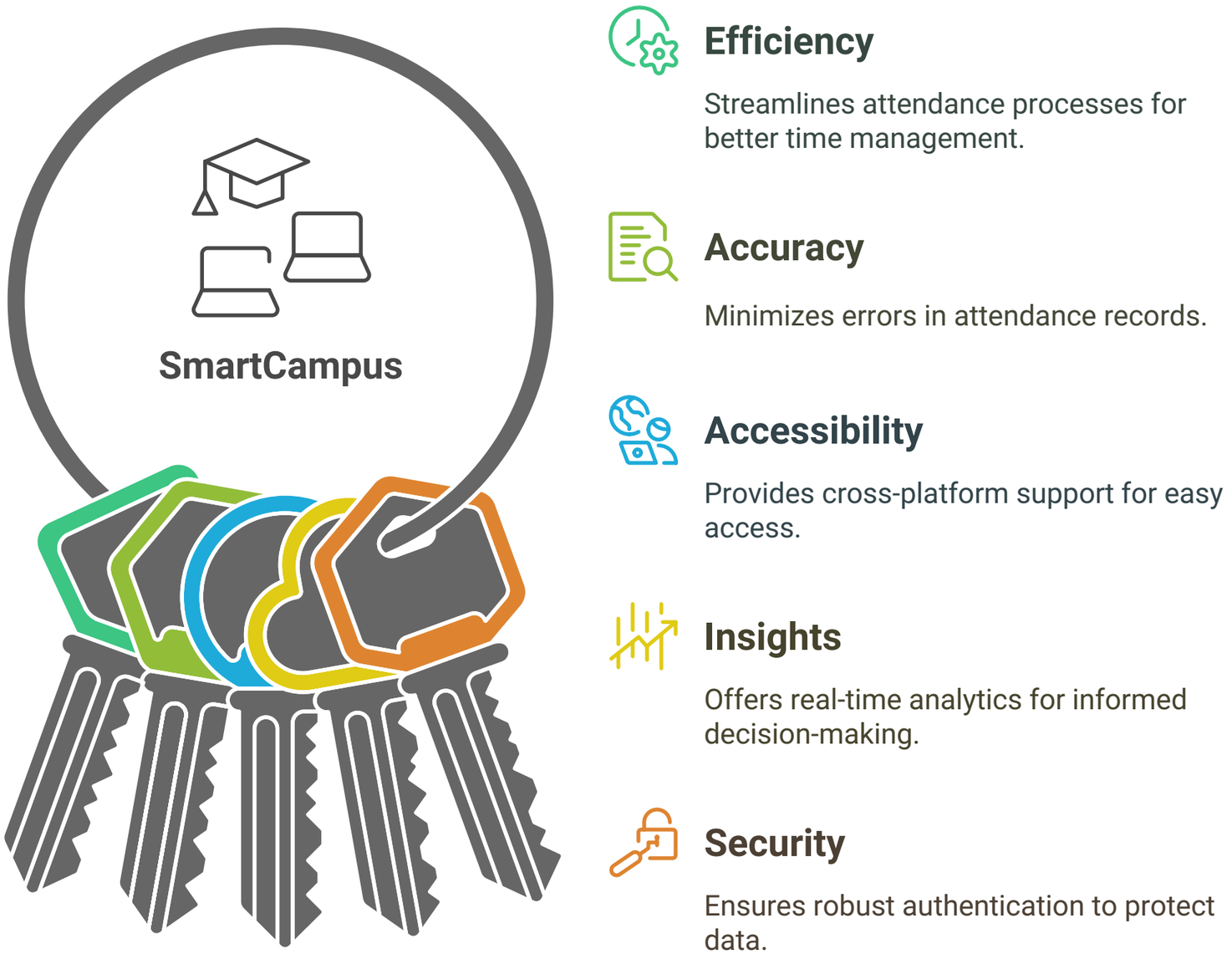


The system reduces manual work, minimizes errors, and ensures scalability while showcasing full-stack development skills.

Introduction

SmartCampus is built with **Flutter** and powered by **Supabase**, offering:

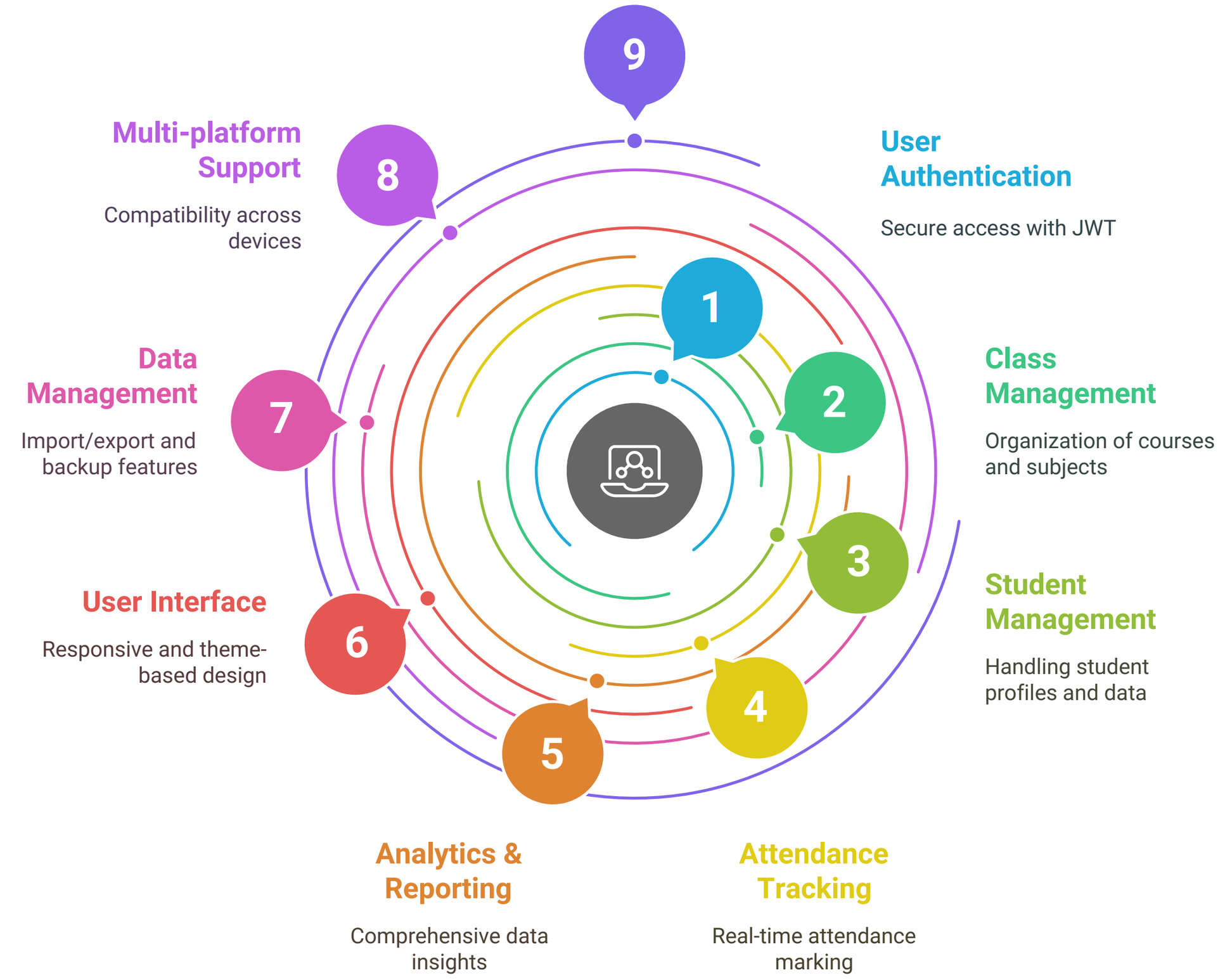
- **Efficiency**: Simplifies attendance processes.
- **Accuracy**: Reduces errors.
- **Accessibility**: Cross-platform support.
- **Insights**: Real-time analytics.
- **Security**: Robust authentication.



Key Features

1. **User Authentication**: Role-based access using JWT.
2. **Class Management**: Courses, subjects, semesters, and sections.
3. **Student Management**: Profiles, photos, and roll numbers.
4. **Attendance Tracking**: Real-time marking with multiple statuses.
5. **Analytics & Reporting**: Comprehensive insights.
6. **User Interface**: Responsive and theme-based.
7. **Data Management**: Import/export and backup.
8. **Multi-platform Support**: Mobile and desktop.
9. **Additional Features**: Multi-language support, real-time updates, and document management.

SmartCampus System Overview



Objectives

- Digitize attendance processes.
- Enhance efficiency and data accuracy.
- Provide real-time insights.
- Ensure secure authentication.
- Create a user-friendly UI.
- Enable comprehensive reporting.
- Support multiple languages.
- Facilitate student management.
- Promote institutional oversight.

SmartCampus Objectives Overview

Digitize Attendance Processes

Transition from manual to digital attendance tracking

Enhance Efficiency and Data Accuracy

Improve operational speed and data reliability

Provide Real-Time Insights

Offer immediate data analysis and feedback

Ensure Secure Authentication

Implement robust security measures for user access

Create a User-Friendly UI

Develop an intuitive and easy-to-navigate interface

Enable Comprehensive Reporting

Generate detailed and insightful reports

Support Multiple Languages

Accommodate diverse user needs with multilingual support

Facilitate Student Management

Streamline student data and administrative tasks

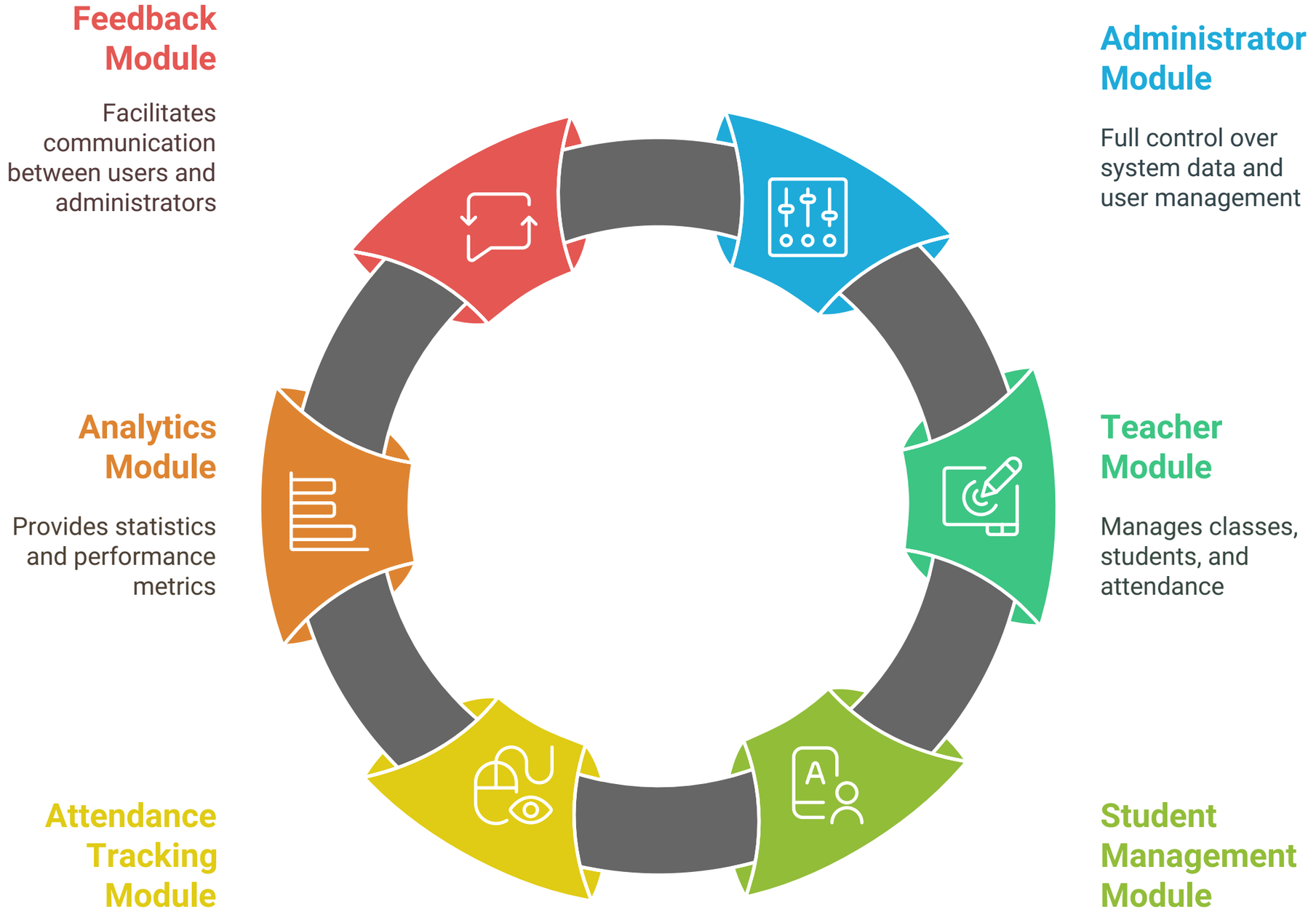
Promote Institutional Oversight

Enhance administrative control and monitoring

Functional Modules

1. **Administrator Module**: Full control over system data, user management, and analytics.

2. **Teacher Module**: Manages classes, students, and real-time attendance.
3. **Student Management Module**: Handles profiles, enrollment, and tracking.
4. **Attendance Tracking Module**: Real-time marking and session control.
5. **Analytics Module**: Provides statistics and performance metrics.
6. **Feedback Module**: Facilitates communication between users and administrators.



Future Scope

Potential enhancements include:

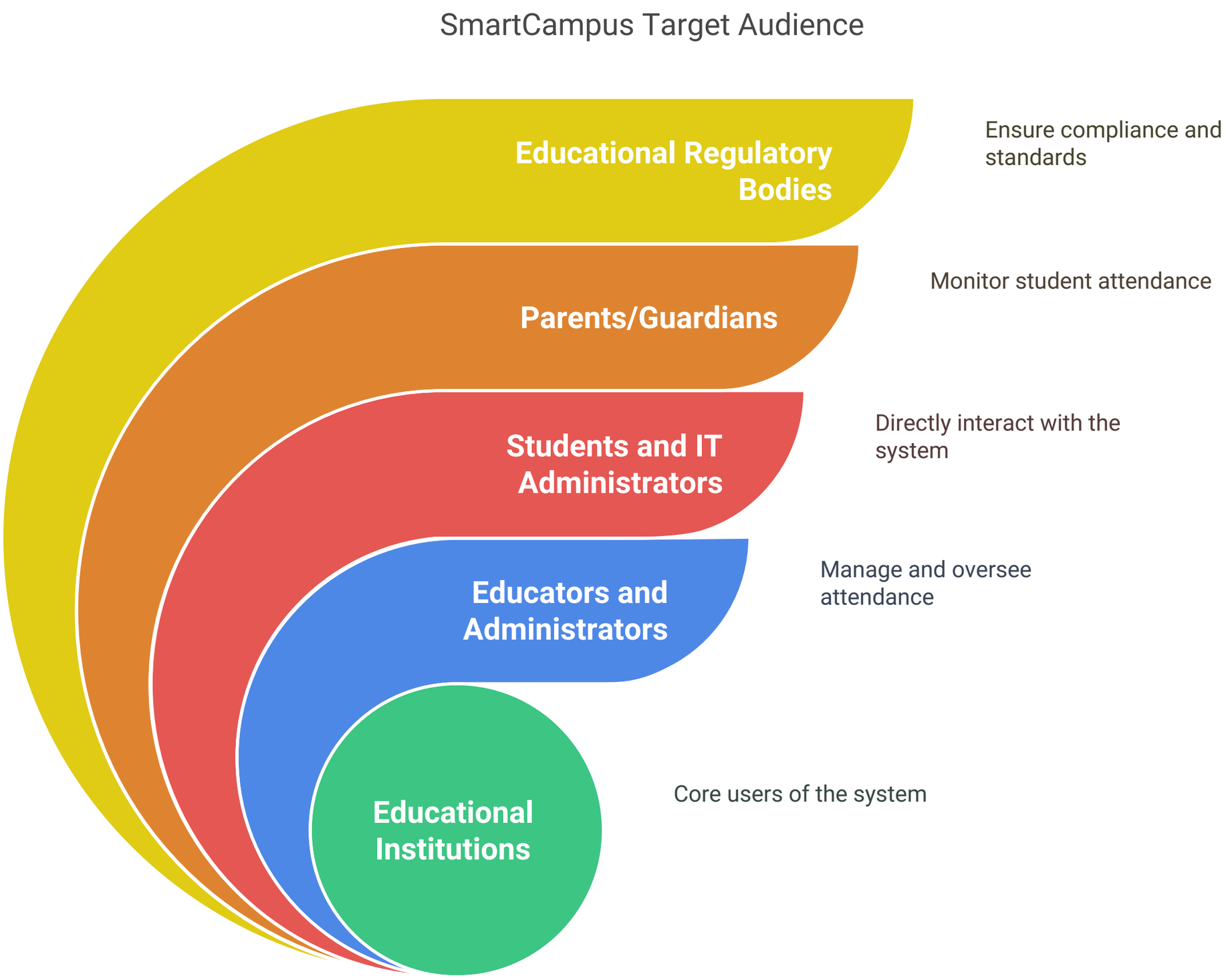
- Advanced biometric integration.
- AI-powered analytics.
- Expanded mobile capabilities (geofencing, QR).
- LMS integration.
- Parent/Guardian portal.
- Blockchain verification.
- Advanced reporting and visualization.
- Multi-institution management.
- Attendance-based gamification.
- Extended API ecosystem.
- Advanced notification system.

- Internationalization expansion.

Platform Features

Target Audience

- Educational institutions (schools, colleges, universities).
- Educators and administrators.
- Students and IT administrators.
- Parents/Guardians.
- Educational regulatory bodies.



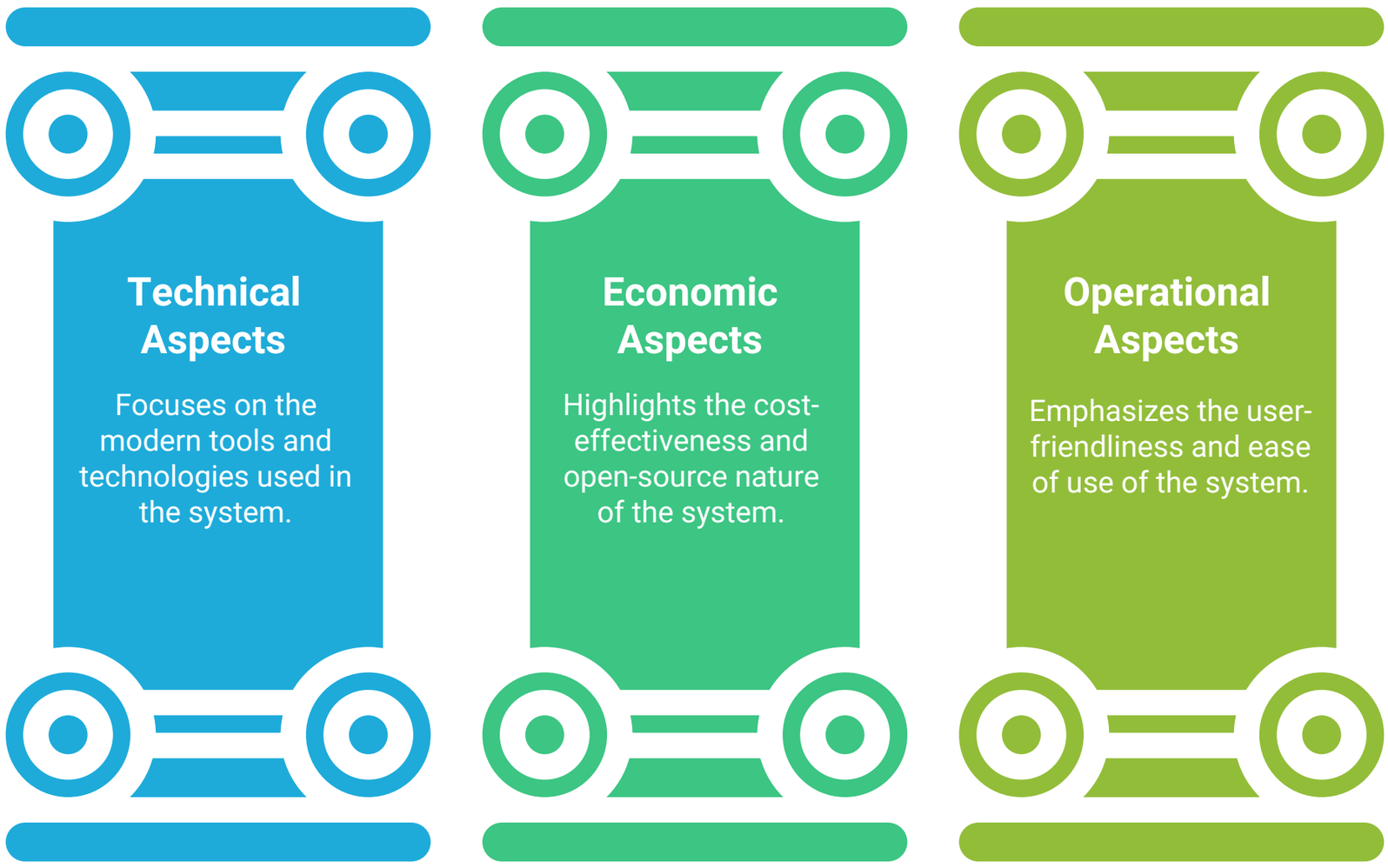
System Analysis

Problem Definition

Traditional attendance methods are inefficient, inaccurate, and lack timely insights. SmartCampus addresses these issues with a digital, cross-platform solution offering comprehensive analytics and integration.

Feasibility Study

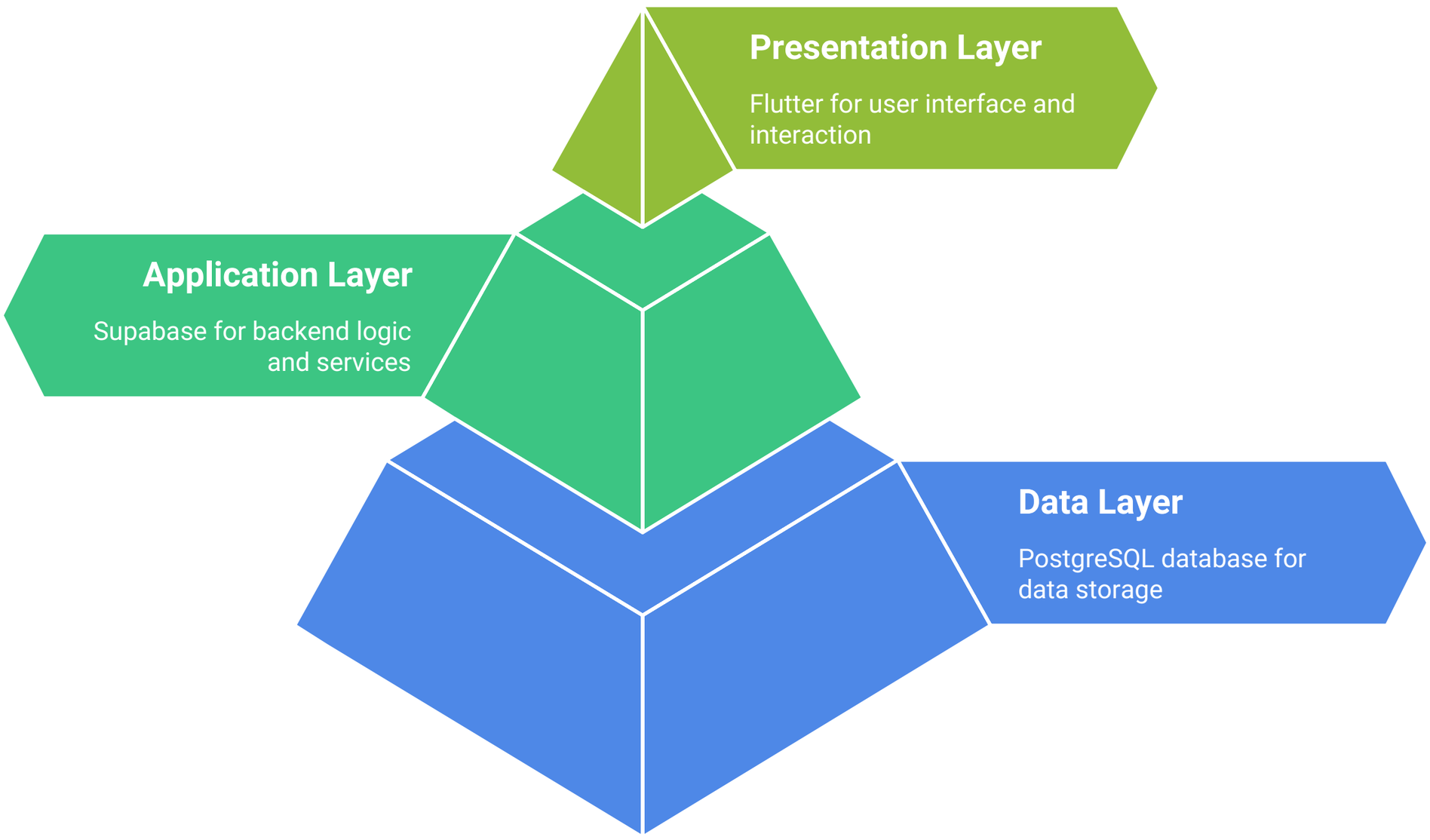
1. **Technical**: Utilizes modern tools like Flutter, GetX, and Supabase.
2. **Economic**: Cost-effective with open-source tools and automation.
3. **Operational**: User-friendly design with minimal training required.



System Design

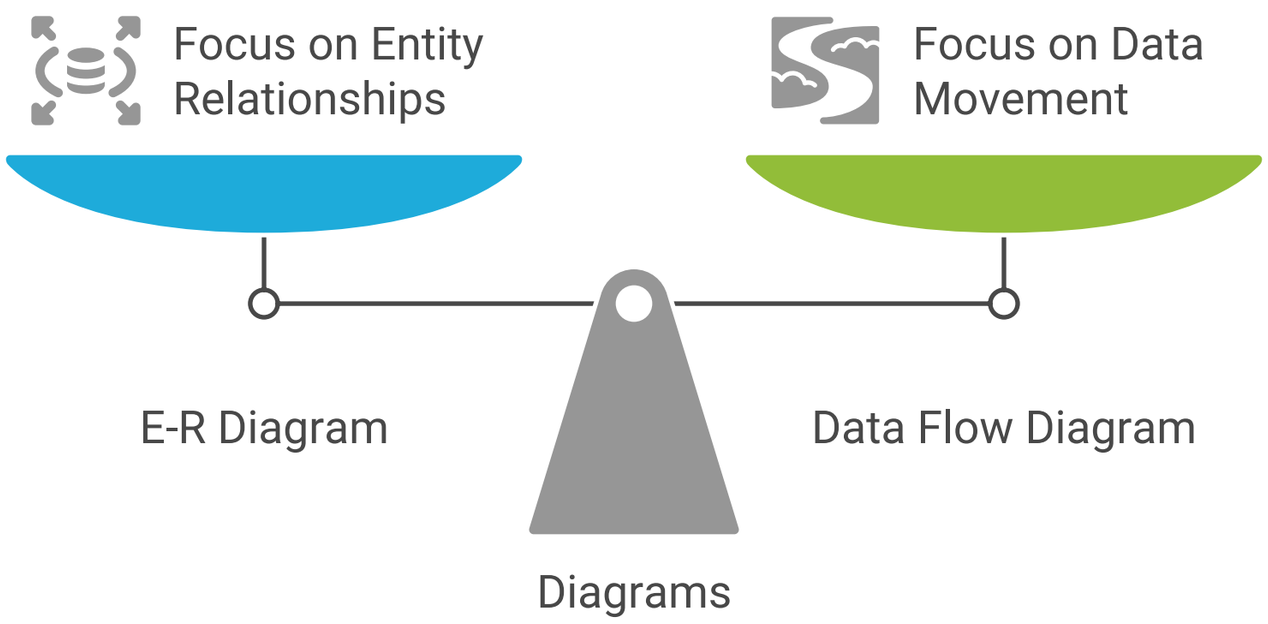
Architecture

- **3-Tier Architecture**:
    - Presentation (Flutter)
    - Application (Supabase)
    - Data (PostgreSQL)
- **Admin Panel**: Integrated with specific admin-level UI and logic.
    - Presentation (HTML,CSS,JS)
    - Application (Supabase)
    - Data (PostgreSQL)



Diagrams

- **E-R Diagram**: Visualizes entities and relationships.
- **Data Flow Diagram (DFD)**: Illustrates data flow through the system.



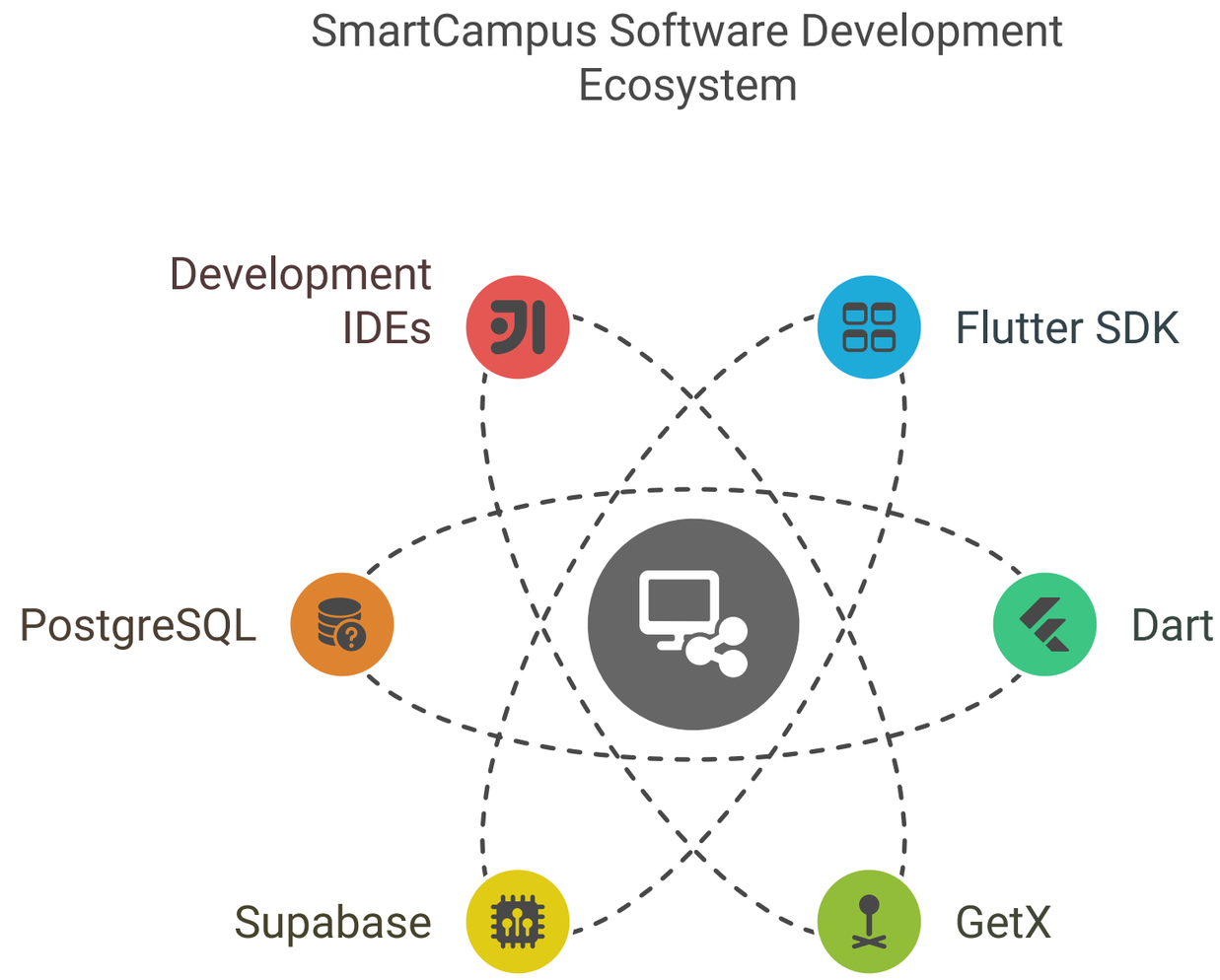
System Requirements

Hardware

- Generic requirements for mobile and desktop devices.

Software

- Flutter SDK, Dart, GetX, Supabase, PostgreSQL, and development IDEs.

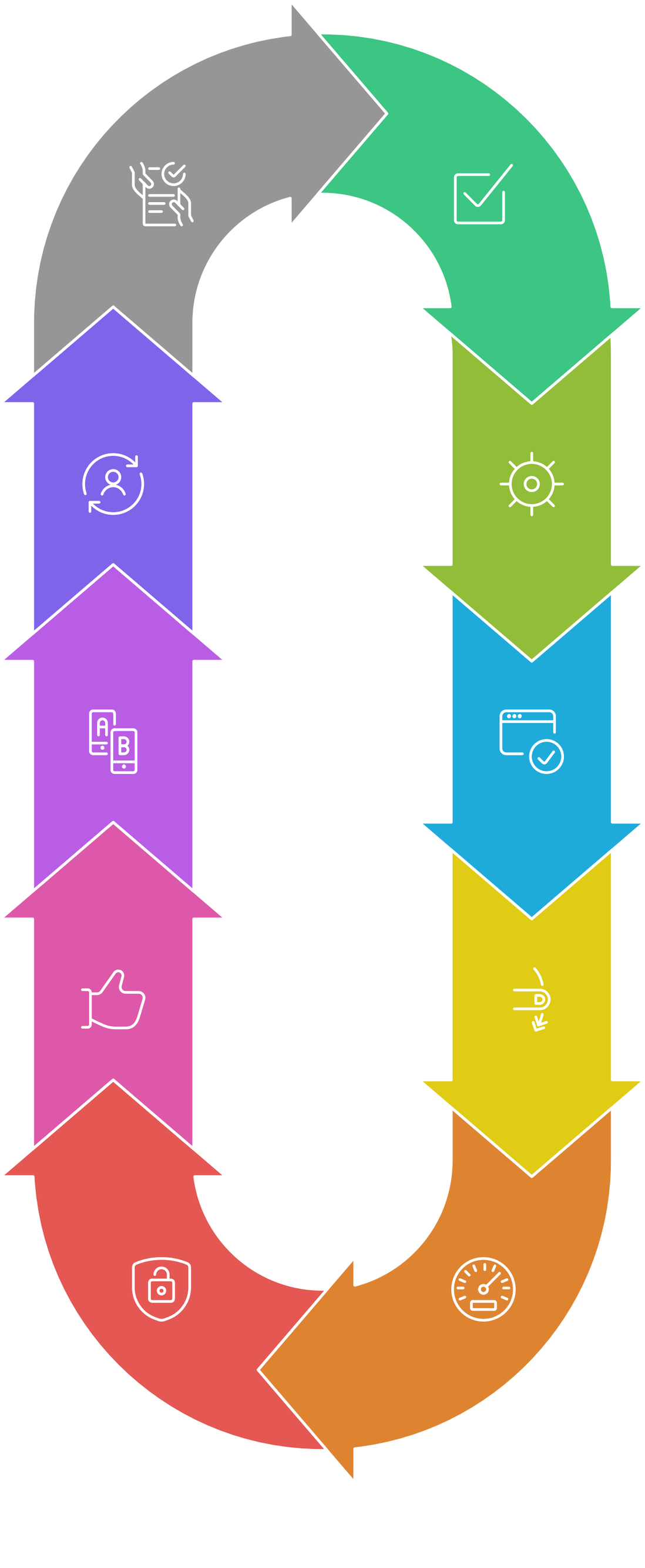


Testing

Types of Testing

1. **Unit Testing**: Validates individual components.
2. **Integration Testing**: Ensures seamless module interaction.
3. **System Testing**: Validates the entire system.
4. **User Interface Testing**: Ensures responsiveness and accessibility.
5. **Performance Testing**: Evaluates system stability.
6. **Security Testing**: Verifies data protection.
7. **Usability Testing**: Assesses ease of use.
8. **Compatibility Testing**: Ensures cross-platform functionality.
9. **Regression Testing**: Confirms new features do not break existing functionality.
10. **Acceptance Testing**: Validates readiness for deployment.

Software Testing Cycle



Unit Testing

Validates individual components

Integration Testing

Ensures seamless module interaction

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Acceptance Testing

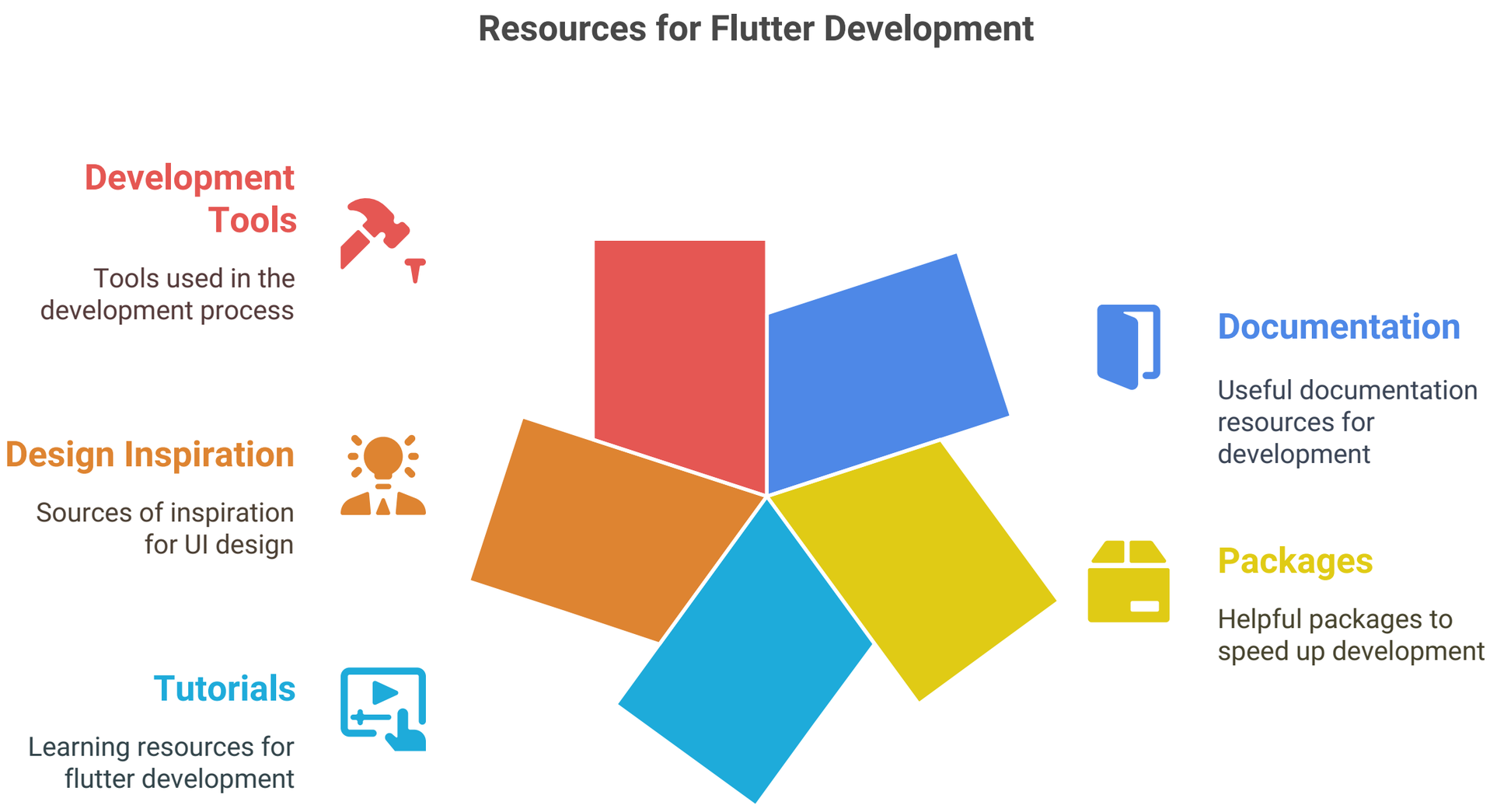
Validates readiness for deployment

Conclusion

SmartCampus successfully addresses the need for a modern attendance tracking solution. It is efficient, user-friendly, and scalable, demonstrating the student's full-stack development skills.

References

- **Documentation**: Flutter, GetX, Supabase.
- **Packages**: GetStorage, Cached Network Image, Iconsax.
- **Tutorials**: Flutter development, Supabase integration.
- **Design Inspiration**: Material Design, Flutter UI challenges.
- **Development Tools**: Visual Studio Code, Android Studio, Git.



Privacy Policy

_Last Updated: [05/05/2025]

Introduction

We respect your privacy and are committed to protecting your personal data. This Privacy Policy explains how we collect, use, and safeguard your information when you use our application.

Information We Collect

- **Personal Information**: User profiles, student details, authentication data, and usage data.
- **Technical Information**: Device details, log data, and cookies.

How We Use Your Information

- To provide and maintain our service.

- To authenticate users and manage access permissions.
- To track and manage attendance records.
- To generate reports and analytics.
- To improve our application and user experience.

Data Storage and Security

- Data is securely stored using Supabase's infrastructure.
- Personal data is retained only as long as necessary.

Data Sharing

- We do not sell or rent personal information.
- Data may be shared with educational institutions, service providers, or legal authorities when required.

Your Rights

- Access, correct, or delete your personal data.
- Object to or restrict certain processing activities.

Terms of Service

Last Updated: [05/05/2025]

Acceptance of Terms

By accessing or using SmartCampus, you agree to be bound by these Terms of Service.

User Accounts

- Maintain confidentiality of your account credentials.
- Notify us immediately of unauthorized use.

User Conduct

You agree not to:

- Use the service for illegal purposes.
- Violate laws or regulations.
- Interfere with or disrupt the service.

Intellectual Property

The application and its content are owned by SmartCampus and protected by intellectual property laws.

Termination

We may terminate or suspend your account for violating these terms.

Open Source Licenses

SmartCampus is built using various open-source software components. Acknowledgments include:

- **Flutter** (BSD 3-Clause License)
- **Dart** (BSD 3-Clause License)
- **GetX** (MIT License)
- **Supabase** (Apache License 2.0)
- **Cached Network Image** (MIT License)
- **Iconsax** (MIT License)
- **Shimmer** (BSD 2-Clause License)
- **GetStorage** (MIT License)

For more details, visit the respective project websites.github.com/tarun1sisodia/smartcampus

flutter build apk --release --obfuscate --split-debug-info=build/app/outputs/symbols
--split-per-abi
flutter build apk --release --obfuscate --split-debug-info=build/app/outputs/symbols