E-Vaccine

Final Year Project Report

Session 2020-2024

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of

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Project Details

Type (Nature of project)	✓ **D**evelopment	**R**esearch	**R&D**
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Project Group Members				
Sr.#	Reg. #	Student Name	Email ID	*Signature
(i)	BSSE-FA20-026	Fahad Naseer	BSSE-FA20-026@tuf.edu.pk	
(ii)	BSSE-FA20-100	M. Raheel Anjum	BSSE-FA20-100@tuf.edu.pk	
(iii)	BSSE-FA20-043	Ahmad Shafiq	BSSE-FA20-043@tuf.edu.pk	

*The candidates confirm that the work submitted is their own and appropriate credit has been given where reference has been made to the work of others.

Plagiarism Free Certificate

This is to certify that, I am _____ S/D/O _____, group leader of FYP under registration no _____ at the Department of Computer Science, The University of Faisalabad. I declare that my FYP proposal is checked by my supervisor and the similarity index is _____% that is less than 20%, an acceptable limit by HEC. The report is attached herewith as Appendix A.

Name of Group Leader: _____   Signature: _____

Member Name: _____   Signature: _____

Member Name: _____   Signature: _____

Name of Supervisor: _____   Co-Supervisor (if any): _____

Designation: _____   Designation: _____

Signature: _____   Signature: _____

HOD: _____

Signature: _____

Declaration

We here by declare that the content of this project report title "**E-Vaccine**" submitted to the "**DEPARTMENT OF COMPUTER SCIENCE**", is a documentation of a unique work we created under the supervision of Supervisor "**Miss Amina Iqbal**" and that no part has been plagiarized (except the references, some standard mathematical or genetic models/questions/protocols, etc.). Additionally, this project is presented in partial completion of the degree requirements for a Bachelor of Science in Software Enigineering. The University may take action if the above statement is found inaccurate at any stage.

Student Name	Registration No	Signature
Fahad Naseer	BSSE-FA20-026	
M. Raheel Anjum	BSSE-FA20-100	
Ahmad Shafiq	BSSE-FA20-043	

Supervisor: Miss Amna Iqbal   **Signature/Date**

Certificate

We accept the work contained in the report titled "E-Vaccine", written by "Fahad Naseer, M. Raheel Anjum & Ahmad Shafiq" as a confirmation to the required standard for the partial fulfilment of the degree of Bachelor of Science in Software Engineering.

Approved by:

Supervisor: Amna Iqbal

Signature: _____

Internal Examiner:

Signature: _____

External Examiner:

Signature: _____

FYP Coordinator: Uzair Saeed

Signature: _____

Head of the Department: Prof Dr. Majid Hussain

Signature: _____

Date:

Abstract

The sole purpose of this project is to provide an application to make it easy for parents to get their children vaccinated. This application is designed to streamline and enhance the process of managing child vaccinations, ensuring timely and accurate administration of vaccines. It provides the people with location of vaccine centres and provides a chart which vaccine is needed when and the amount of dosage for the age group of 1-9 years old. So, in the heart of Pakistan, where the land owns rich culture and prestigious soil, a silent battle unfolds. Where many preventable diseases come across to nation's child. The major reason for these preventable diseases is untimely vaccinations, it has become a challenge that echoes through the corridors of public health. According to the surveys, 66% nation's children are vaccinated of aged 12-13 months but remaining 44% has not received their vaccination. The genesis of the "E-Vaccine" project stems from the recognition of this challenge. In the backdrop of these challenges the vision of E-Vaccine took route. Inspired by the transformative potential of technology, we envisioned a mobile application that transcends traditional barriers, offering a lifeline to parents and guardians striving to secure the best possible health outcomes for their children. The focus of this project is to outline the understandable plan for the development and implementation of the E-Vaccine for children, having the focus on children aged 1st day to 9 years. This project looks forward to addressing gaps in immunization coverage, to improve healthcare, and ultimately a positive impact on the overall health and well-being of the target age group. By the power of technology, data, and community engagement, this project is determined to make a significant impact on childhood vaccination rates, thereby reducing the burden of diseases (Preventable) and fostering a stronger foundation of our children's lifelong health and nourishment.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The purpose of this project is to make it easy for parents to get their children vaccinated by giving them an application. This application under development is designed to streamline and enhance the process of children vaccination management, making sure timely and accurate administration of vaccines. Our app provides people with location of vaccine centers and provides a chart of which vaccine is needed when and the amount of dosage for the age group of 1-9 years old. Our mobile application is as a one-stop solution, providing essential information about vaccines, accessible to pediatricians, and convenient location tracking for nearby vaccine centers. By integrating features such as baby vaccine records and vaccination schedules, the application proactive and informs parents about their child's immunization journey. Through this project, we intend to contribute to the well-being of children by providing a valuable tool that simplifies the vaccination experience, informed decision making, and ultimately helps protect the most vulnerable members of our society.

1.2 Aim & Objectives

The aim of E-Vaccine is to outline an understandable plan for the development and implementation of the E-Vaccine for children, with sole focus on children aged 1st day to 9 years. This project seeks to address gaps in immunization coverage, improving health-care access, and ultimately enhance the overall health and well-being of the target population. By harnessing the power of technology, data, and community engagement, this project aspires to make a significant impact on childhood vaccination rates, thereby reducing the burden of preventable diseases and fostering a stronger foundation of our children's lifelong health and nourishment. However, navigating the world of vaccines can be daunting for parents, especially for those with young children. To address this challenge, our project aims to develop a comprehensive mobile application tailored for children vaccination.

1.3 Problem Statement

This project aspires to make a significant impact on childhood vaccination rates, thereby reducing the burden of preventable diseases and fostering a stronger foundation of our children's lifelong health and nourishment. In this project we will have to overcome the language and literacy barriers to spread awareness about our application and how important vaccines are for children. Parents and guardians do not have much information about vaccine centers they mainly rely on government vaccine services due to which sometimes the vaccines not provided by the government gets missed out. Due to improper details of vaccines, we cannot determine what vaccine is needed, how much dosage is needed, and which vaccines are more suited to which age group.

1.4 Proposed System

The E-Vaccine Project which targets children of 1st day to 9 years old is aimed to address several critical problems related to childhood vaccinations. It resolves missed vaccines by sending automated reminders to reduce the number of missed vaccines. It resolves incomplete records or track by digitally maintained records. It focuses on reducing health inequities by identifying under-served areas and implementing strategies to make health-care better. Mismanaged vaccination can lead to different health issues which we tackle by up-to-date data and information. The project also addresses concerns that relates to the security and privacy of health information. Our project plans to improve vaccination rates and reduce the burden of diseases which are preventable among children, promoting their health and well-being. Our project includes children hospitals and pediatricians in order to deal with any health issues.

1.5 Project Scope

The "E-Vaccine" mobile application plans to assist parents, guardians, and healthcare professionals to track and manage children vaccinations. The application provides a user-friendly interface to schedule, record, and monitor vaccine doses, as well as offer educational resources with any realtions to vaccinations.

1.6 Assumptions & Constraints

1.6.1 Assumptions:

User Adoption:

Assumption: Users will be willing to adopt and engage with "E-Vaccine".

Rationale: The assumption is on the bases of the premise that parents and guardians value the convenience and benefits offered by the application for managing children vaccinations.

Internet Connectivity:

Assumption: Users will be having access to the internet for real-time updates and notifications.

Rationale: The application is relying on internet connectivity for features such as push notifications, real-time updates, and accessing educational resources.

Health-care Guidelines:

Assumption: The application aligns with local and international health-care guidelines for vaccine information and schedules provided by it.

Rationale: This is based on the collaboration with reputable healthcare organizations and the use of correct vaccine databases.

Device Compatibility:

Assumption: "E-Vaccine" is compatible with a wide range of mobile devices.

Rationale: Developing and testing efforts are undertaken to make sure its compatibility with popular Android devices. However, there may be limitations on very old or uncommon devices.

Regulatory Compliance:

Assumption: The development and deployment processes have compliance with relevant data protection and healthcare regulations.

Rationale: The assumption is because regulatory requirements and adherence to best practices in data security and privacy.

User Data Accuracy:

Assumption: Users will provide accurate information when making or updating child profiles.

Rationale: The application's effectiveness is relying on the accuracy of user-provided data for generating customized vaccine schedules and maintaining vaccine records.

1.6.2 Constraints:

Limited Device Resources:

Constraint: The application operates efficiently on devices with different levels of processing power and memory/storage.

Rationale: Not all users have high-end devices, so optimization for performance is necessary.

Privacy Concerns:

Constraint: Adhering strictly to data privacy regulations, applying a limit on the collection of sensitive information.

Rationale: Privacy concerns are foremost, especially when dealing with health-related data of children. The application should have a priority on user privacy and data security.

Budgetary Constraints:

Constraint: Budgets for development and maintenance are limited.

Rationale: Resource limitations may impact the scope of features, development timelines, and ongoing support and updates.

Dependency on External Data Sources:

Constraint: The availability and accuracy of vaccine information depend on external databases.

Rationale: The application is relying on external sources for vaccine data, and any discrepancies or changes in these sources may affect the its functionality.

Regulatory Changes:

Constraint: Any changes in healthcare regulations or data protection regulations may require adjustments to the application.

Rationale: Monitoring of regulatory changes is necessary to make sure ongoing compliance.

User Education:

Constraint: Engagement and understanding of user of the application depends on effective educational resources present within the app.

Rationale: Application's success relies on users' understanding of vaccination-related information and the application's features.

1.7 Social Benefits

1.7.1 Increased Vaccination Rates:

By providing easy access about vaccine information, schedules, and reminders, the application may improve vaccination rates among children. This contributes to the better immunity rates in community and reduces the spread of vaccine-preventable diseases, benefiting society.

Health Equity: The application bridge gaps in healthcare access by providing necessary vaccination resources to underserved communities or regions with poor healthcare infrastructure. This promotes health equity by making sure that all children, regardless of socioeconomic status or geographical location, have access to life-saving vaccines.

1.7.2 Empowering Parents:

Empowering parents with knowledge and tools to make informed decisions about their child's health, the application fosters a sense of confidence. It may lead to positive health outcomes for children and families, as parents feel empowered to prioritize preventive care and advocate for their children's well-being.

1.7.3 Reduced Healthcare Burden:

Promoting proactive vaccination and preventive care, the application can help alleviate the burden on healthcare systems, particularly during times of high demand or public health emergencies. By reduction of the incidence of vaccine-preventable diseases, healthcare resources can be redirected towards addressing other pressing health needs.

1.8 Community Engagement:

The application serves as a platform for community engagement and education on vaccination-related topics. By fostering dialogue and sharing reliable information, it

helps gain trust between healthcare providers, parents, and communities, ultimately strengthening public health efforts and promoting a society of health and well-being.

1.8.1 Data-driven Public Health Initiatives:

By collecting redacted data on vaccination rates, trends, and user interactions, the application contributes valuable insights to public health authorities and policymakers. This data informs targeted interventions, vaccination campaigns, and policy decisions aimed at improving health outcomes and addressing disparities in immunization coverage.

1.9 Business Plan

1.9.1 Business Model Canvas

Figure Business Canvas Model 1.9.1

1.9.2 Problem

Parents sometimes struggle to keep track of their child's vaccination schedule and miss important vaccine doses, which leads to potential health risks. Old school record-keeping methods are prone to errors, and there are less centralized digital solutions for vaccine management.

1.9.3 Solution

"E-Vaccine" address the problems by providing a user-friendly mobile application that generate customized vaccine schedules, sends reminders, and maintains a digital record of administered vaccines. It conveniently offers, accuracy, and educational resources, empowering parents to give priority to their child's health.

1.9.4 Customers

Primary Customers: Parents/guardians of children.

Secondary Customers: Professionals and administrators of healthcare.

1.9.5 Competitors

Traditional Methods: Manual record-keeping or paper-based systems.

Other Apps: Mobile applications already existing with similar features.

1.9.6 Marketing Plan

Product:

Unique Selling Proposition (USP): Diverse vaccine management with customized schedules and educational resources.

Promotion:

Online Marketing: Campaigns on social media, influencer partnerships, and content marketing.

Partnerships: Collaborating with healthcare providers for joint promotions.

Distribution:

App Stores: Leveraging the reach of Google Play.

Healthcare Partnerships: Integration with healthcare providers for wider distribution.

Sales Strategy:

Educational Events: Partnering with healthcare organizations for events.

1.9.7 Revenue

Ads: Using ads on our application.

Partnership Revenue: Collaborations with healthcare providers for specialized services.

1.9.8 SWOT (Strength Weakness Opportunities Threats) Analysis

Strengths

User-friendly interface.

Comprehensive vaccine database.

Push notification system for reminders.

 Weaknesses

Dependency on external vaccine databases.

Initial user adoption may be slow.

 Opportunities

Growing awareness of vaccine importance.

Expansion into international markets.

Threats

Competition from established healthcare apps.

Changes in healthcare regulations affecting data handling.

1.9.9 FAB (Features, Attributes, Benefits) Analysis

Features

Personalized vaccine schedules.

Digital record-keeping.

Educational resources.

Advantages

Convenient vaccine management.

Increased accuracy and data accessibility.

Empowered and informed parents.

Benefits

Timely administration of vaccines.

Improved child health outcomes.

Peace of mind for parents and healthcare professionals.

CHAPTER 2: LITERATURE REVIEW/BACKGROUND AND EXISTING WORK

2.1 Background

In the heart of Pakistan, where the land owns rich culture and prestigious soil, a silent battle unfolds. Where many preventable diseases come across to nation's child. The major reason for these preventable diseases is untimely vaccinations, it has become a challenge that echoes through the corridors of public health. According to the surveys, 66% nation's children are vaccinated of aged 12-13 months but remaining 44% has not received their vaccination. The genesis of the "E-Vaccine" project stems from the recognition of this challenge. In the backdrop of these challenges the vision of E-Vaccine took route. Inspired by the transformative potential of technology, we envisioned a mobile application that transcends traditional barriers, offering a lifeline to parents and guardians striving to secure the best possible health outcomes for their children.

2.2 Literature Review

2.2.1 Introduction

Childhood vaccination is a cornerstone of public health, serving as a powerful tool in the prevention of communicable diseases. In the context of Pakistan, where the burden of preventable diseases remain significant, innovative solutions are imperative to enhance vaccination coverage. This literature review explores the landscape of child vaccination in Pakistan and examines the potential impact of our project "E-Vaccine" in addressing existing challenges.

2.2.2 Current State of Child Vaccination in Pakistan

Existing literature highlights persistent challenges in child vaccination programs in Pakistan. Factors such as insufficient awareness, logistical barriers, and the absence of streamlined information system contribute to suboptimal vaccinations coverage. Studies indicate the need for interventions that not only address these challenges but also empower parents and healthcare providers with accessible tools for better immunization management.

2.2.3 Role of technology in healthcare and vaccination

Many studies emphasize the transformative role of technology in healthcare, particularly in low and middle-income countries. Mobile health applications have shown promise in healthcare delivery, increasing accessibility, and enhancing patient outcomes. The utilization of mobile technology in the context of child vaccination aligns with global efforts to leverage digital solutions for public health challenges.

2.2.4 Mobile application in vaccination programs

The literature underscores the emergence of mobile application design to support vaccination programs. This application often focusses on aspects such as appointment reminders, educational content, and digital record keeping. Successful implementations in diverse settings demonstrate the potential of mobile applications. To bridge gaps in healthcare delivery, particularly in the context of child immunization.

2.2.5 E-Vaccine:

Addressing challenges and enhancing vaccination coverage the literature on E-Vaccine outlines its unique features designed to overcome challenges in Pakistani context. The applications emphasize on improving awareness to educational content, streamlining appointment scheduling, real time vaccine availability, and digital immunization records align with recommendation from global health organization. The features included empower parents and enhance the efficiency of healthcare providers in delivering timely vaccination.

CHAPTER 3: REQUIREMENTS ANALYSIS

3.1 Stakeholders List (Actors)

3.1.1 Parents and Guardians:

Role: Users who are using this application to manage their child's vaccinations.

Interest: Convenience in accessing vaccine schedules, reminders, and educational resources.

3.1.2 Children (if age-appropriate):

Role: Users who may use the application as they grow older to track their own vaccination history.

Interest: Making sure a user-friendly experience as they transition to manage their vaccinations independently.

3.1.3 Healthcare Professionals:

Role: Doctors, nurses, and healthcare providers who are involved in administering vaccinations.

Interest: Accessing accurate vaccine records, efficient communication with parents, and integrating healthcare systems.

3.1.4 Application Developers:

Role: Developers and programmers involved in creating and maintaining mobile applications.

Interest: Compatibility of technical requirements, delivering a robust and secure application, and making sure compatibility with various devices.

3.1.5 Regulatory Bodies:

Role: Health departments of government or regulatory bodies oversee applications about healthcare.

Interest: Making sure it complies with health and data protection regulations.

3.1.6 Educational Institutions:

Role: Schools and educational institutions where immunization records might be needed for enrollment.

Interest: Making sure accurate and easy access o vaccination records for compliance with school health policies.

3.2 Requirements Elicitation

3.2.1 Functional Requirements

User Registration and Authentication

Registration

Users should be able to make an account by providing necessary information.

Registration should do a verification by email or alternative secure authentication methods.

Login

Users registered should be able to log in securely by using their credentials.

Biometrics like (fingerprint, facial recognition) should be supported.

Child Profile Management

Add Child Profile

Users should be allowed to add profiles for other children.

Every profile must include details i.e., name, date of birth, and relevant medical history.

Edit and Delete Child Profile

Users should be able to edit and update information in a child's profile.

There must be an option to delete a child's profile if necessary.

Vaccine Schedule

Generate Schedule

The application should generate a customized vaccine schedule based on the child's profile and regional vaccination guidelines.

View Schedule

Users should have the ability to view the upcoming and overdue vaccine doses in a clear and an easily accessible format.

Reminder Notifications

Push Notifications

The application should send push notifications to remind users of upcoming vaccine appointments and doses.

Users should get the option to enable or disable push notifications.

Vaccine Record Keeping

Record Administration

Users should have the ability to record the administration of vaccines with details such as date, type of vaccine, and administration of healthcare professional.

View Vaccine History

Users should be able to access to a digital record of administered vaccines for each child.

History should be organized sequentially and be easily accessible.

Educational Resources

Informational Content

The application should provide the user with educational resources about vaccines, their importance, and common misconceptions.

Content must be presented in an engaging and informative manner.

Administrator Features

User Management

Administrators should be able to manage user accounts, including adding, modifying, and deactivating accounts. User roles and access levels should be defined.

Vaccine Database Management

Administrators should update and maintain the vaccine database regularly to ensure accuracy and compliance with health guidelines.

User Interface

Intuitive Design

The interface should be intuitive, user-friendly, and consistent on Android platforms for users.

Navigation through the app should be easy and logical.

Accessibility

The application should easily be accessible to users with disabilities, complying with accessibility standards.

Security

Data Encryption

User data, personal and health-related information, should be securely stored, and communication should be encrypted.

Authentication Security

Robust security measures must be implemented to protect user accounts from unauthorized access.

3.2.2 Non-Functional Requirements

Performance

The application should be able to respond to user interactions within 2 seconds and handle concurrent user loads without significant degradation in performance.

Security

User data, especially personal and health-related information, storage should be secure, and communication between the application and external services should be encrypted.

Reliability

The application's availability should be 99% of the time, with minimal downtime for maintenance.

Scalability

The system must be designed in a way to accommodate a growing user base and increasing data volume.

Usability

The application's navigation should be easy, and features should be self-explanatory, minimizing the necessity for user training.

Compliance

The app should comply with relevant data protection laws and health guidelines.

3.2.3 Requirements Traceability Matrix

Table Requirements Traceability Matrix 3.2.1

Requirement	Feature	Functional Requirement
Display vaccine information	Vaccine Information Module	- Display detailed information on various vaccines recommended for children aged 1st day to 9 years old.
		- Provide descriptions of vaccine-preventable diseases and their corresponding immunization schedules.
Integrate online pediatrician consultation	Online Pediatrician Consultation	- Implement a platform for parents to consult with pediatricians remotely for vaccine-related queries or general child health concerns.
		- Include real-time messaging or video call functionality for direct communication with healthcare professionals.
Utilize geolocation for vaccine center locator	Vaccine Centre Locator	- Utilize geolocation services to identify and display nearby vaccine centers on a map.
		- Provide information on operating hours, contact details, and available services for each vaccine center.
Create and manage baby vaccine records	Baby Vaccine Record Management	- Create digital records for individual children to track their vaccination history.
		- Store essential details such as vaccine names, dates of administration, and dosage information.
Generate and manage vaccination schedules	Vaccination Schedule Management	- Generate personalized vaccination schedules based on the child's age, medical history, and local immunization guidelines.
		- Send reminders and notifications for upcoming vaccinations to help parents stay on track.
Design intuitive user	User Interface and	- Design an intuitive and child-

interface	Experience	friendly interface with colorful visuals and engaging animations.
		- Ensure seamless navigation and user interactions for accessibility across multiple mobile platforms.
Implement security and privacy measures	Security and Privacy Measures	- Implement robust security protocols to safeguard user data and maintain confidentiality.
		- Ensure compliance with regulatory requirements and industry standards for handling sensitive medical information.
Design for scalability and future enhancements	Scalability and Future Enhancements	- Design the application architecture to accommodate potential expansion and scalability for future features.
		- Incorporate user feedback mechanisms and analytics tools to gather insights and drive continuous improvement.
		- Incorporate user feedback mechanisms and analytics tools to gather insights and drive continuous improvement.

3.3 Software Development Life Cycle Model

The Waterfall Software Development Life Cycle (SDLC) model is a linear and sequential approach where each phase should be completed before the next one begins. While Agile is mostly favored because of its flexibility, the Waterfall model can still be beneficial in certain projects, including in the development of "E-Vaccine" mobile application. Here's how the Waterfall model might be useful for our project:

3.3.1 Clear and Well-Defined Requirements:

The Waterfall model is well-suited for projects with clearly defined and stable requirements. For "E-Vaccine," if the requirements are comprehensive and unlikely to change frequently, the Waterfall model gives us a structured and systematic approach.

3.3.2 Single, Well-Defined Goal:

Waterfall works greatly when the project has a single, well-defined goal. The main objective of "E-Vaccine" is to provide a reliable and user-friendly platform for managing child vaccinations. The chronological nature of Waterfall ensures a focused approach toward achieving this specific goal.

3.3.3 Document-Driven Approach:

Waterfall emphasizes extensive documentation at every phase. This might be beneficial for regulatory compliance, as children vaccination applications may need to stick to specific healthcare regulations. Documentation provides clarity and a reference for further development, maintenance, and audits.

3.3.4 Stability in Technology and Tools:

If the technology stack and tools for the project are stable and well-established, the Waterfall model could be efficient. This is suitable when there are no motives for frequent technology changes during the project.

3.3.5 Predictable Project Timeline:

Waterfall gives a structured timeline, making it easier to ensure the project's completion date. This surety can be advantageous for planning releases, especially if there are regulatory milestones or external deadlines that needs to be taken care of.

3.3.6 Early Planning for Security and Compliance:

The Waterfall model's sequential nature allows for early planning and implementation of measures of security and compliance requirements. This is crucial for an application like "E-Vaccine," which deals with sensitive health-related information.

3.3.7 Simplified Project Management:

With a direct and sequential structure, project management in Waterfall is relatively direct. This simplicity can be beneficial for smaller teams or projects with clear goal/scope and requirements.

3.3.8 Minimal Changes in User Requirements:

If there are minimal predicted changes in user requirements throughout the project, the Waterfall model make sures that the requirements are frozen at the beginning, providing a clearer scope for development.

3.3.9 Potential Challenges and Mitigations:

While the Waterfall model is advantageous, we must be aware of potential challenges:

Limited Flexibility for Changes:

In a Fastly evolving environment, any unexpected changes may be challenging to incorporate. It's critical to perform thorough requirement analysis and consider potential changes during the planning phase.

Late User Feedback:

User feedback is normally collected at the end of the project. To address this, periodic reviews and validations with stakeholders might be scheduled to make sure alignment with user expectations.

Risk of Delivering an Outdated Product:

If market conditions change during development, there's a risk of delivering a product that can no longer meet current needs. Periodic market analysis and a flexible approach to changes can help alleviate this risk.

Extended Time to Market:

Because of the sequential nature of Waterfall, the time to market can be longer in comparison with Agile models. Effective project planning and execution could help manage timelines.

3.4 Specific Requirements (Hardware and Software Requirements)

3.4.1 Hardware Requirements

Smartphones/Tablets:

Compatible with Android devices.

Minimum screen size for optimal user experience.

Storage:

Adequate device storage for the application installation.

Additional storage space for storing vaccine records and data.

Internet Connectivity:

Wi-Fi or mobile data connectivity for real-time updates and notifications.

Offline functionality for limited connectivity scenarios.

3.4.2 Software Requirement

Operating System:

Android: Support for a range of Android versions, ensuring compatibility with popular devices.

Application Dependencies:

Compatibility with common system libraries and frameworks on Android platforms.

Security Software:

Integration with device security features for secure user access.

CHAPTER 4: SOFTWARE DESIGN SPECIFICATION

4.1 Work Breakdown Structure
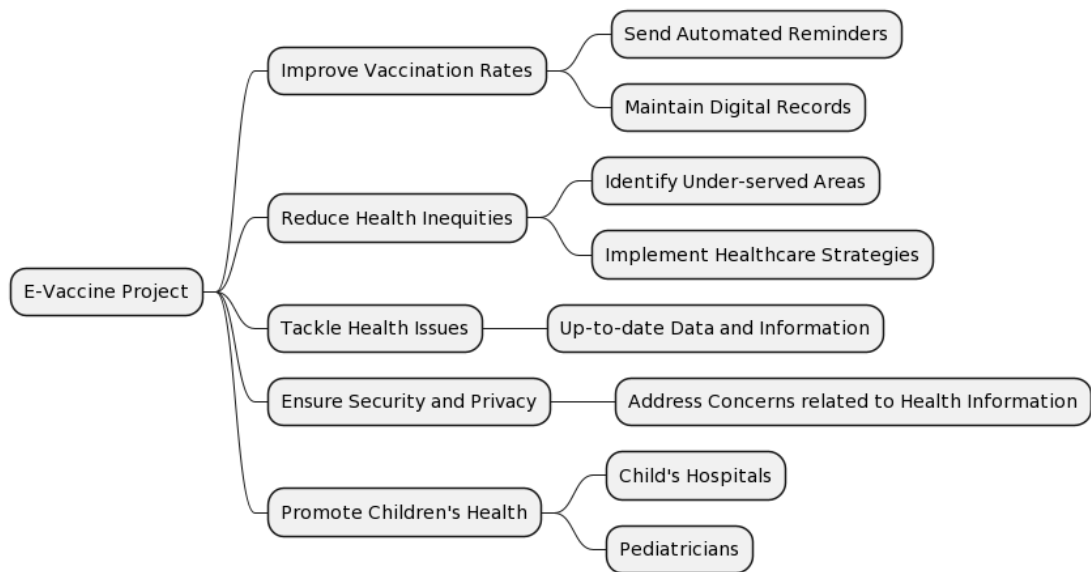
Figure Work Breakdown Structure 4.1.1

4.2 System Architecture

The "E-Vaccine" Android project adopts a client-server architecture, where the Android app serves as the client interfacing with a backend server for data storage, processing, and communication. Core functionalities include scheduling vaccination appointments, tracking charts, and maintaining child vaccine records. A geolocation service enhances accessibility by providing real-time information on nearby hospitals and vaccine centers. Emphasizing secure data handling, encryption protocols are employed, and seamless integration with external databases ensures a wealth of vaccine-related data. The user interface, guided by wireframes and mockups, prioritizes intuitive design, making the system scalable, responsive, and user-friendly for streamlined child vaccination management.

4.3 Block Diagram
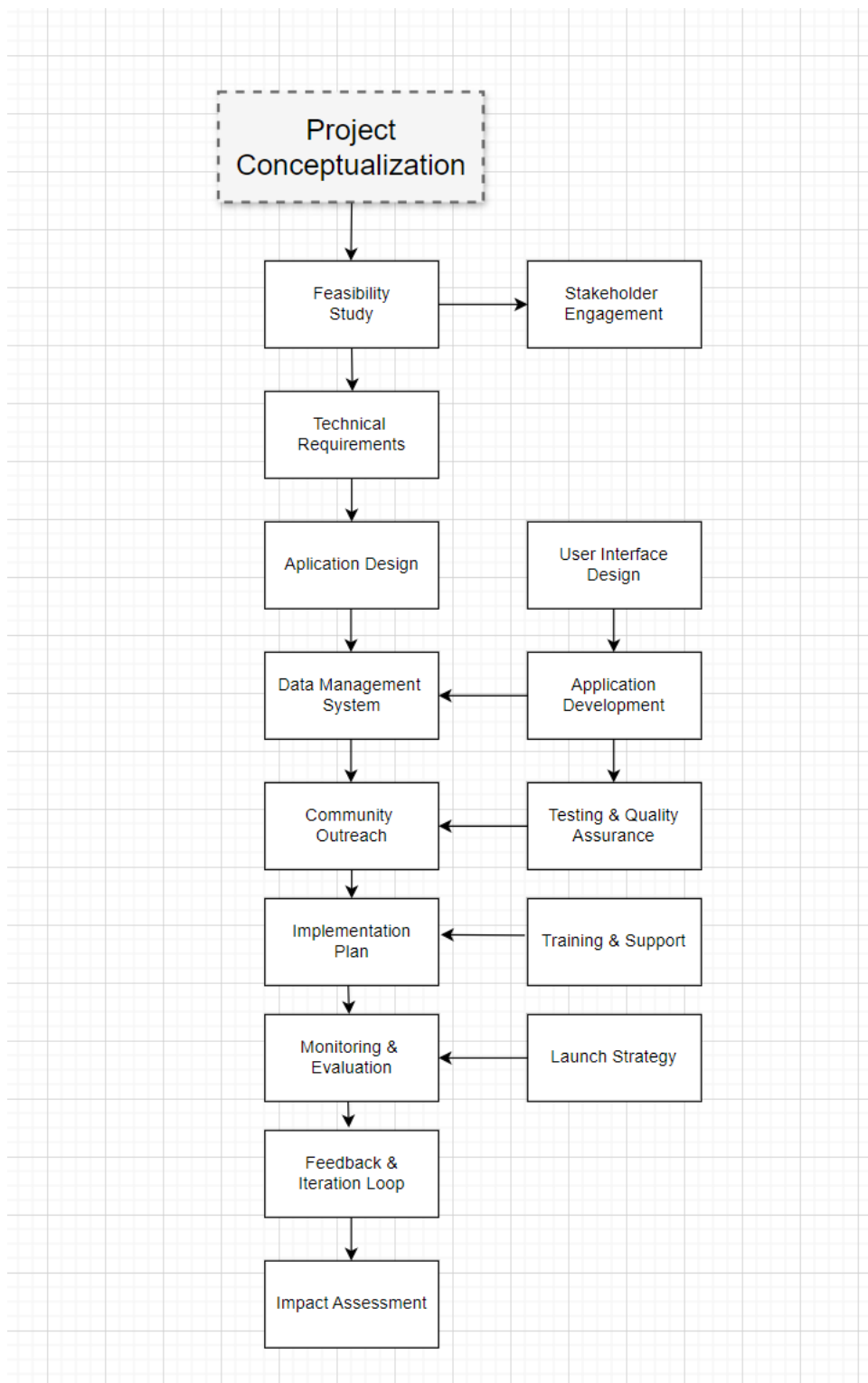
Figure Block Diagram 4.3.1
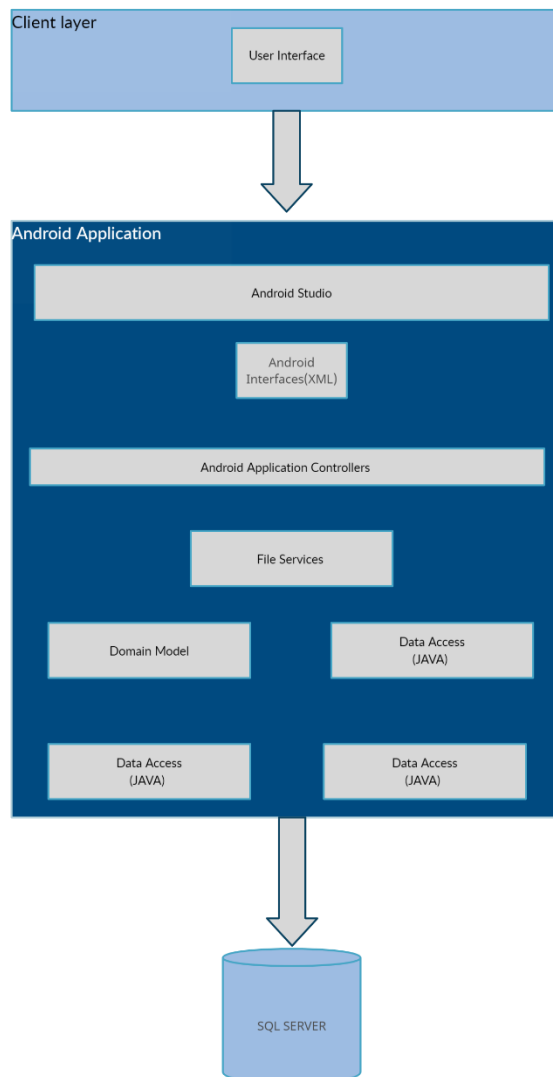
4.4 Software Architecture Diagram

Figure Software Architecture Diagram 4.4.1
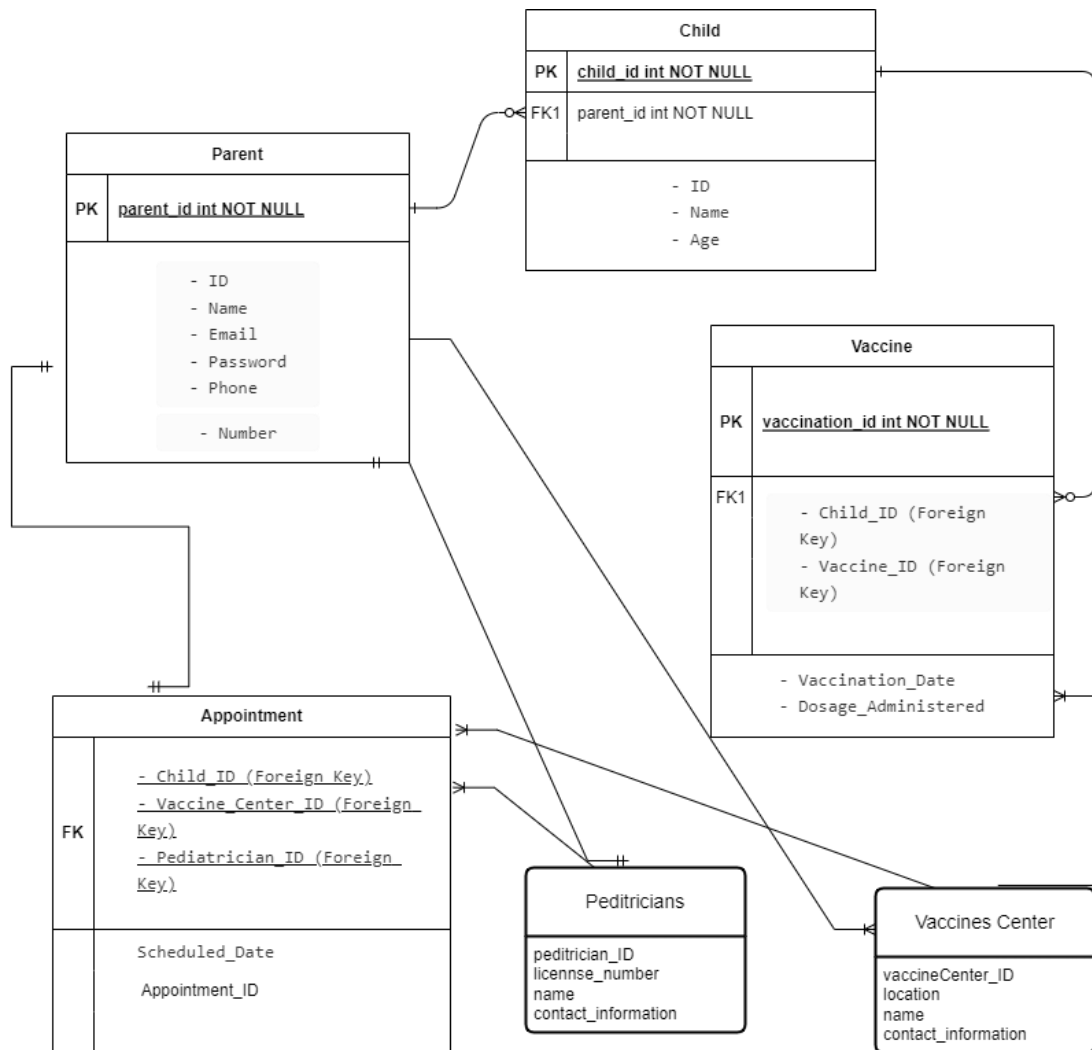
4.5 Entity-Relationship Diagram (ERD)

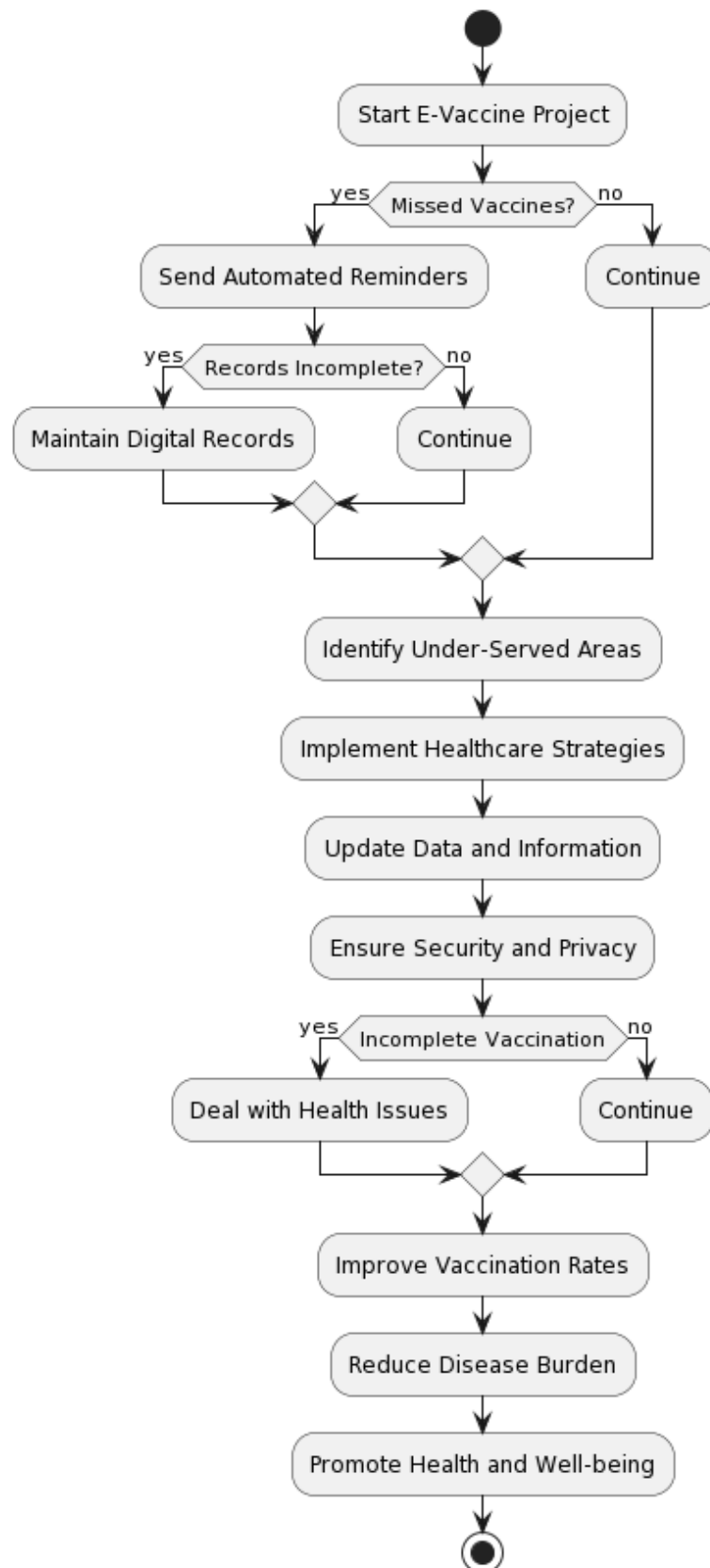*Figure Entity-Relationship Diagram 4.5.1*

4.6 Flowchart

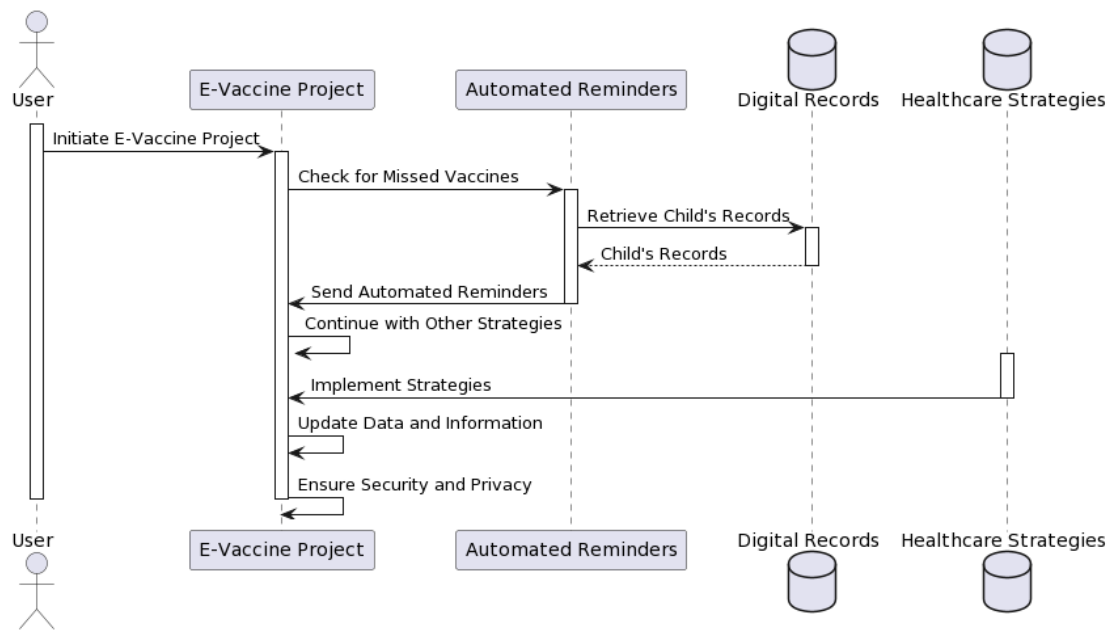*Figure Flowchart 4.6.1*

4.7 Sequence Diagram

Figure Sequence Diagram 4.7.1

CHAPTER 5: IMPLEMENTATION

5.1 User Interface

The user interface for this mobile application is designed to provide parents with easy access to vaccine-related information and support for children aged 1st day to 9 years old. Upon launching the app, users are greeted with a login/registration screen, followed by a home screen serving as the central hub for accessing various features. These features include a comprehensive vaccine information module, pediatrician consultation service, vaccine center locator, baby vaccine records management, vaccination schedule management, and settings/account management. The user interface prioritizes intuitive navigation, visual clarity, and user-friendly interactions, ensuring a personalized and engaging experience for users seeking reliable vaccine resources and support for their children's health.
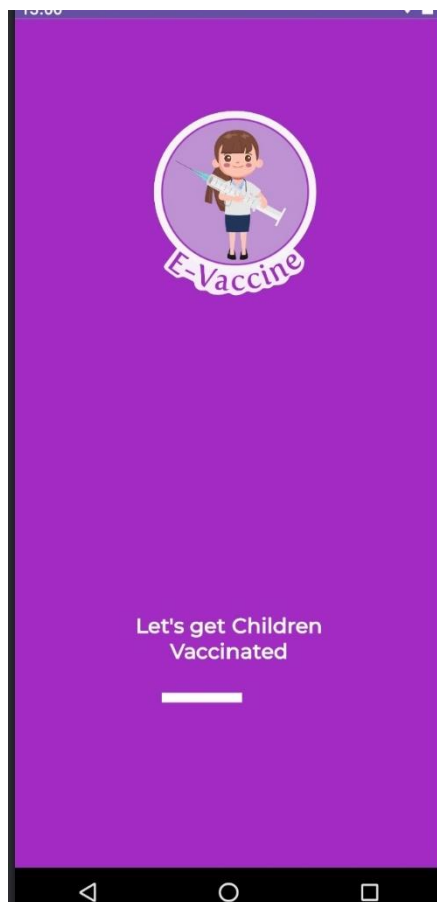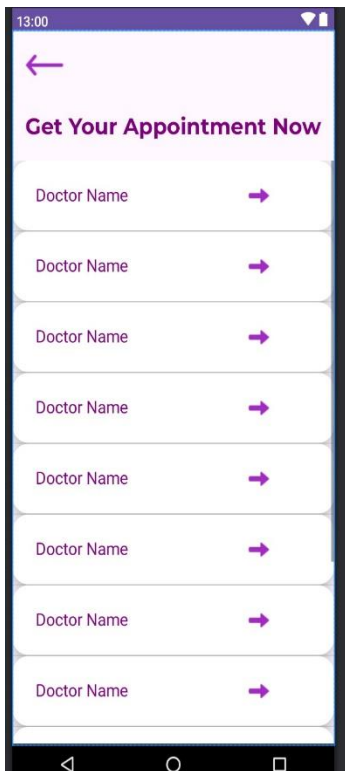

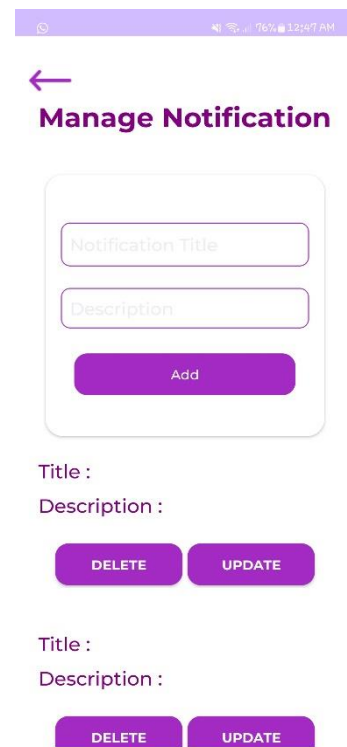*Figure Splash Screen UI 5.1.1*

Figure Appointment UI 5.1.2

Figure Manage Notification UI 5.1.3
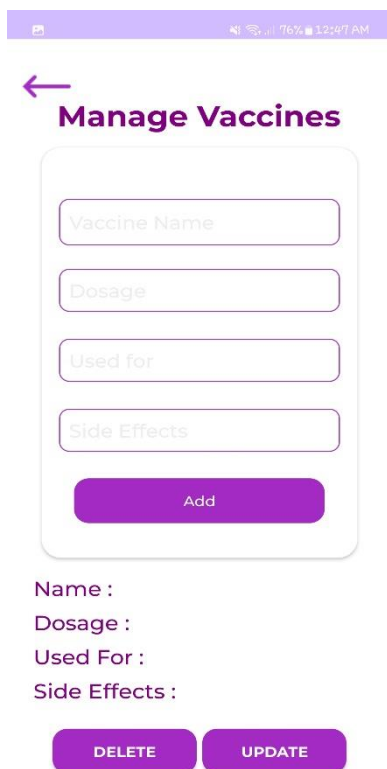
Figure Manage Vaccines UI 5.1.5

Figure User Panel UI 5.1.4

Vaccine Record

Vaccines done

Vaccines to be done
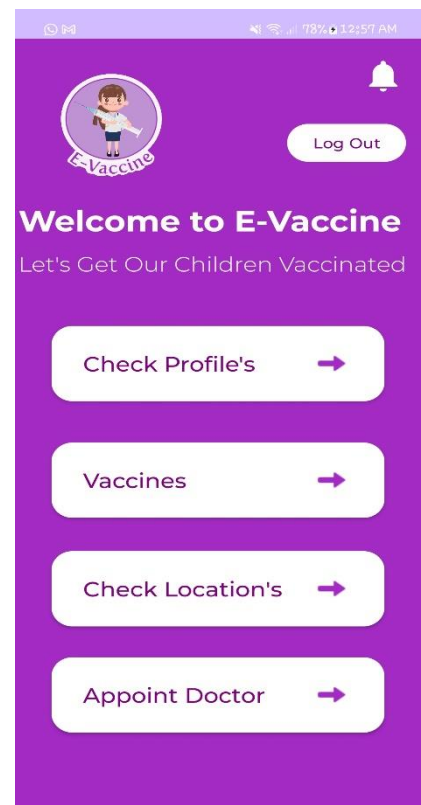
Figure Vaccine Record UI 5.1.7

E-Vaccine

Baby Page

Name

Enter Name

Date of Birth

Enter Date of Birth

B-For

Enter B-Form Number

Vaccination Card

Enter Vaccination Card No.

Gender

◯ Boy   ◯ Girl

Next

Figure Baby Page UI 5.1.6

E-Vaccine

Login Page

Email

Enter Email

Password

Enter Password

LOGIN

Forget Password?

Create Account

You can login now

Figure Login Page UI 5.1.8

User Profile

Name

Email

Parent/guardian

PhoneNumber
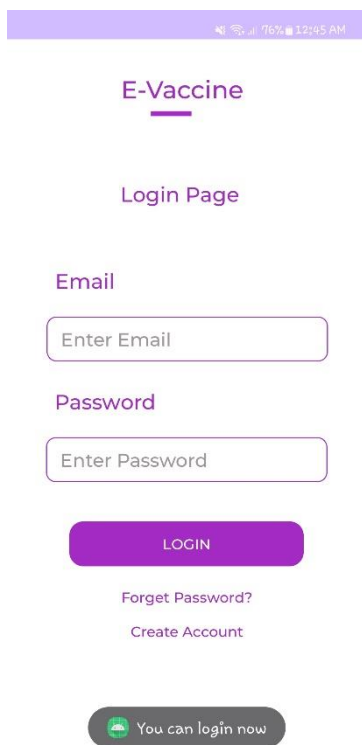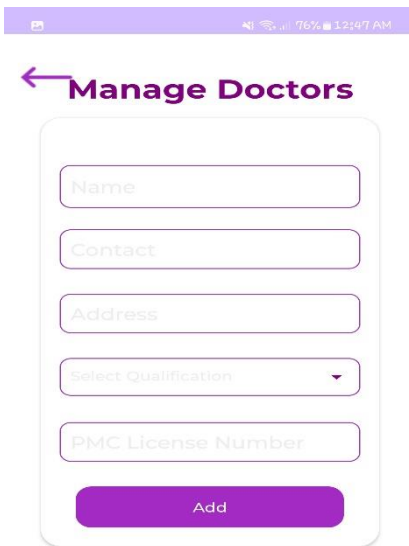
Address

Figure User Profile UI 5.1.9
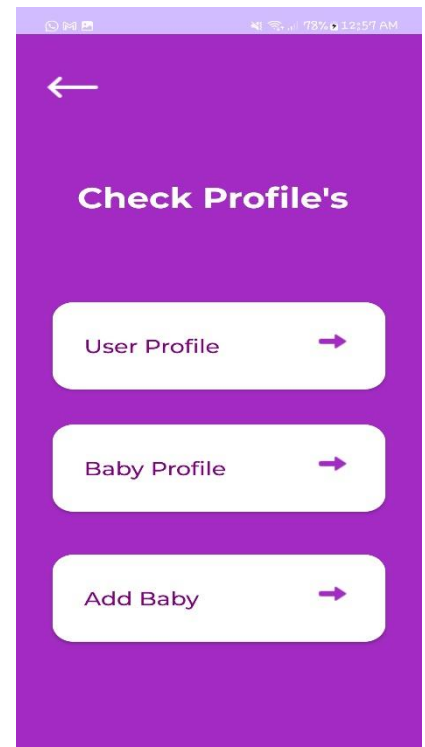
Figure Manage Doctors UI 5.1.10
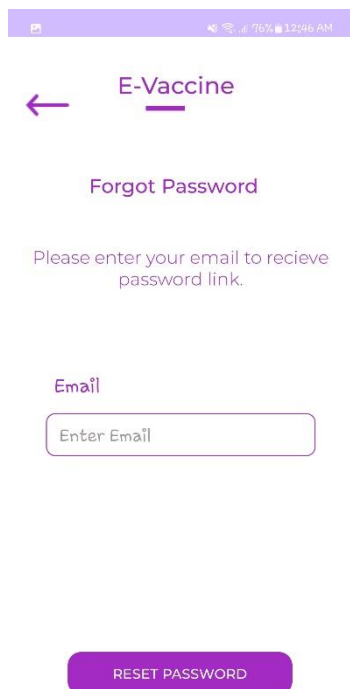
Figure Check Profiles UI 5.1.11

Figure Password Reset UI 5.1.12

Figure Admin Panel UI 5.1.13

CHAPTER 6: SYSTEM TESTING

6.1 Manual Testing

Manual testing in the project E-Vaccine is important to ensure the reliability, functionality, and usability of the proposed system. Manual testing plays a key role in identifying and resolving issues. It also helps in validating the user experience and ensuring that the system meets the specified requirements without any unexpected issues.

6.2 Unit Testing

6.2.1 Login/Signup

Table Login/Signup Testing 6.2.1

ID	Test Case Name	Description	Test Steps	Expected Results	Actual Results	Status
01	Correct Details	Allow user to login or register with correct user details. Unit testing of login, register was simply done by checking database table that the data becomes in database or not.	Provide Accurate Details to System	Login/signup Successful	Login/signup Successful	Pass
02	Invalid Details	Allow user to login or register with invalid user details	Provide Incorrect Details to System	Login/Signup Failed	Login/Signup Successful	Pass

6.2.2 Forms

ID	Test Case Names	Description	Test Steps	Expected Results	Actual Results	Status
03	Parent Form	Name, address, phone number, gender, Parent/Guardian, Email, CNIC	Fill each field with correct data.	Person gets registered as a parent/guardian of the child.	Successful registration	Pass
04	Baby form	Name, age, DOB, Gender, vaccine card, Form-B	Fill each data with correct data.	Child gets registered in the system against his/her parent or guardian.	Successful registration.	Pass

6.2.3 UI Testing

Table UI testing 6.2.3

ID	Test Cases name	Description	Test Steps	Expected Results	Actual Results	Status
05	Login/Signup screen	Upon opening the app login/signup page should appear	Open app.	Login/signup page should be displayed.	Login/signup page displayed.	Pass
06	Parent form screen	After login parent form should appear	Open parent form.	Parent form should be displayed	Parent form displayed.	Pass
07	Baby form screen	After scrolling through parent form baby form should be displayed	Open baby form.	Baby form should be displayed.	Baby form displayed.	Pass
08	Vaccination information screen	Vaccination screen providing vaccine information	Open vaccine information.	Vaccination information should be displayed.	Vaccine data has to be received yet.	Pending
09	User Main Activity	Main Activity should display all its components and working.	Open Main Activity	Components should be displayed and on work.	Components are displaying and working.	Pass
10	Admin Login	Specific email and password should login to admin dashboard	Enter login credentials.	If specific login credentials are right it should open admin dashboard	Credentials are right and admin dashboard is working	Pass
11	CRUD operation	All CRUD operation in admin dashboard should be working.	CRUD operation are to be applied	CRUD should work.	Only Create from CRUD is working because other's are to be implemented.	Pending

6.3 Tool Used

Tools used for the development of this app are Figma, Android Studio, Firebase, Mockups, and Adobe Illustrator.

CHAPTER 7: CONCLUSION

7.1 Problems Faced and Lessons Learned

The main problem faced in developing this project earlier was connecting activities with each other but later that problem was found. On that moment now the problem we are facing is retrieving the data from database and soon we will find that issue and will resolve that issue.

7.2 Conclusion

In the conclusion this may affect the vaccination rate and may lead to more immunization coverages so many children get immunizations in time and stay healthy and safe. Our project is just a simple prototype that how can technology effects the immunization. Using Immunizations chart, Food and Nutrition charts and different vaccines related information so parents shouldn't let their child unimmunized for longer periods.

7.3 Future Work

In future work we will try to cover all the problems we are facing. We will try to remove maximum defects we can. In future we are aiming to start from Faisalabad and will try to spread that awareness and campaign for our application to go nationwide. We will add more pediatricians and Vaccination Centers and Children Hospital. Will try to make our User Interface better and easier to use. Will remove language barriers.

References

References to any book, journal paper, or website should properly be acknowledged, For example:

[1]   https://epi.gov.pk/immunization-schedule/ **(Website)**

[2]
   https://www.sciencedirect.com/science/article/pii/S266699192200207X
(Paper on web)

[3]   https://publications.aap.org/pediatrics/article-abstract/114/1/187/64736/Children-Who-Have-Received-No-Vaccines-Who-Are
(Paper on web)

[4]   https://immunizationdata.who.int/pages/schedule-by-country/pak.html
(website)

Pseudo Code

START E-Vaccine Mobile Application Development

Initialize Project Variables:

  - TargetAge: 1st day to 9 years

  - Purpose: Improve immunization coverage and access to healthcare

  - Objectives: Enhance overall health and well-being of children

  - Technologies: Mobile app development tools, databases, APIs

DEFINE Function Main():

  - DisplayWelcomeMessage()

  - PromptUserToStart()

  - IF UserChoosesToStart THEN

    DisplayProjectOverview()

    DisplayDevelopmentSteps()

    DisplayImplementationPlan()

  - ELSE

    DisplayExitMessage()

  - ENDIF

DEFINE Function DisplayWelcomeMessage():

  - Display "Welcome to E-Vaccine Mobile Application Development!"

  - Display "This project aims to improve immunization coverage and access to healthcare for children aged 1st day to 9 years."

  - Display "Let's work together to make a significant impact on childhood vaccination rates."

DEFINE Function PromptUserToStart():

  - Display "Would you like to start the project?"

  - Prompt user for input (Y/N)

DEFINE Function DisplayProjectOverview():

  - Display "Project Overview:"

  - Display "The E-Vaccine mobile application will provide comprehensive vaccination tracking and reminders for children aged 1st day to 9 years."

- Display "Key features include vaccination schedule, personalized reminders, access to vaccination records, and educational resources."

DEFINE Function DisplayDevelopmentSteps():

  - Display "Development Steps:"

  - Display "1. Conduct research on vaccination schedules and requirements for children aged 1st day to 9 years."

  - Display "2. Design user interface (UI) for the mobile application."

  - Display "3. Develop backend database to store vaccination records securely."

  - Display "4. Implement vaccination tracking functionality and reminder system."

  - Display "5. Integrate external APIs for real-time vaccination information and resources."

  - Display "6. Conduct thorough testing and debugging."

  - Display "7. Prepare for app deployment on relevant platforms (App Store, Play Store)."

DEFINE Function DisplayImplementationPlan():

  - Display "Implementation Plan:"

  - Display "1. Assemble development team with expertise in mobile app development, UI/UX design, and healthcare."

  - Display "2. Assign roles and responsibilities to team members."

  - Display "3. Set timeline and milestones for each development phase."

  - Display "4. Regularly review progress and adjust plans as needed."

  - Display "5. Collaborate with healthcare professionals and community stakeholders for feedback and support."

  - Display "6. Launch pilot testing with target users to gather feedback and iterate on improvements."

  - Display "7. Prepare for full-scale deployment and marketing strategies."

DEFINE Function DisplayExitMessage():

  - Display "Thank you for considering the E-Vaccine Mobile Application Development project. Goodbye!"
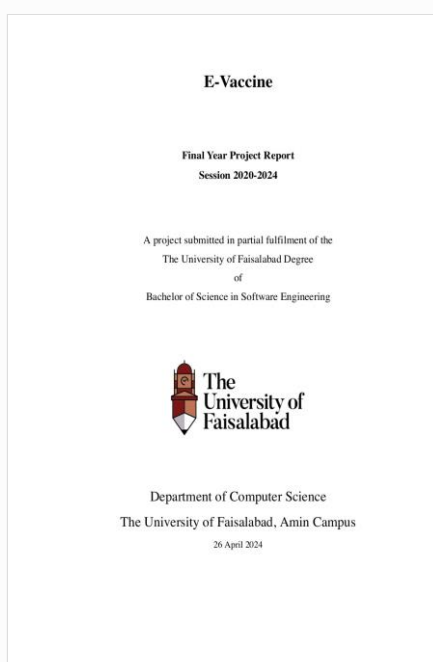
CALL Function Main()

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E-Vaccine

Final Year Project Report
Session 2020-2024

A project submitted in partial fulfilment of the
The University of Faisalabad Degree
of
Bachelor of Science in Software Engineering

The
University of
Faisalabad

Department of Computer Science
The University of Faisalabad, Amin Campus
26 April 2024