

A PROJECT REPORT

on

VIT BHOPAL SMART HEALTH PORTAL

1. ABSTRACT

The **VIT Bhopal Smart Health Portal** is a web-based healthcare management application designed to digitize and streamline the medical services provided within the university campus. Traditional methods of appointment booking and medical record-keeping are often manual, leading to inefficiencies such as long waiting times, loss of prescription records, and lack of coordination between doctors and pharmacies.

This project addresses these issues by providing a unified platform for **Students**, **Doctors**, and the **Health Centre Pharmacy**. Developed using **Python** and the **Streamlit** framework, the system features gender-based doctor allocation, secure digital prescriptions, an integrated E-Pharmacy with stock management, and a persistent medical history database. The application utilizes **SQLite** for data storage and **FPDF** for generating downloadable PDF tickets and receipts, ensuring a paperless and efficient healthcare ecosystem.

2. INTRODUCTION

2.1 Background

University health centers handle a large volume of students daily. Managing patient flow, maintaining physical files for thousands of students, and manually dispensing medicines can be overwhelming for the limited staff. In the era of digital transformation, a campus health portal is essential to ensure timely medical attention.

2.2 Problem Statement

The existing manual system suffers from:

- **Inefficient Queue Management:** Students often crowd the health centre without prior appointments.
- **Data Loss:** Physical prescription slips are easily lost or damaged.
- **Privacy Concerns:** Lack of a secure channel for sensitive medical advice.
- **Pharmacy Delays:** Manual checking of medicine availability and billing consumes time.

2.3 Objectives

- To develop a user-friendly interface for students to book appointments based on availability.
- To implement a secure console for doctors to manage queues and issue digital prescriptions.
- To create an E-Pharmacy module for checking stock and processing medicine orders digitally.
- To maintain a secure, retrieval history of student health records.

3. SYSTEM ANALYSIS AND REQUIREMENTS

3.1 Software Requirements

- **Operating System:** Windows / Linux / macOS
- **Programming Language:** Python 3.10+
- **Web Framework:** Streamlit
- **Database:** SQLite3 (Embedded)
- **Libraries:** fpdf (PDF Generation), random, datetime, socket, json

3.2 Hardware Requirements

- **Processor:** Intel Core i3 or equivalent
- **RAM:** 4GB or higher
- **Storage:** 500MB free space
- **Network:** Internet connection (for initial library installation)

3.3 Technology Stack Justification

- **Python & Streamlit:** Chosen for rapid development and ease of deploying data-driven web applications without extensive frontend coding (HTML/CSS).
- **SQLite:** A serverless, lightweight database engine perfect for handling local application data without complex configuration.
- **Fpdf:** A lightweight library essential for generating dynamic PDF documents like tickets and invoices on the fly.

4. SYSTEM DESIGN AND MODULES

The project is divided into two primary user roles: **Student** and **Doctor**.

4.1 Student Module

1. Appointment Booking:

- **Logic:** Students select their gender. The system automatically filters the list to show *Male Doctors* for boys and *Female Doctors* for girls.
- **Hostel Mapping:** Automatically suggests relevant hostel blocks (e.g., Boys Block 1-9, Girls Block 1-2) based on gender.
- **Output:** Generates a **PDF Appointment Ticket** containing the slot time, doctor name, and student details.

2. Medical History:

- Students can search their Registration Number to view all past visits.
- **Feature:** Allows downloading of past prescriptions as PDF files.

3. E-Pharmacy:

- A digital catalog of medicines with categories (Emergency, Pain, Allergy, etc.).
- **Cart System:** Allows adding items with quantity adjustments (+ / -).

- **Checkout:** Generates a unique **Order Code** and a downloadable **PDF Receipt** to be shown at the pharmacy counter.

4. Health Tools:

- BMI Calculator for fitness tracking.
- Symptom Checker for basic first-aid advice.

4.2 Doctor Module

1. **Authentication:** Doctors select their specific profile (e.g., Orthopedist, General Physician) to log in.

2. **Live Dashboard:** Displays a list of pending appointments specific to the logged-in doctor.

3. Digital Prescribing:

- Doctors can view the student's reported symptoms, hostel, and room number.
- A text area is provided to write the prescription and advice.
- **Status Update:** Once sent, the status changes from "Pending" to "Prescription Sent".

4. **Patient Management:** Doctors can "Archive" treated patients to clear them from the active queue.

5. TECHNICAL CODE IMPLEMENTATION (Python Concepts)

This section details how core Python programming concepts were utilized to build the application logic.

5.1 Input and Output Operations

- **Implementation:** The application extensively uses I/O operations to interact with the user and the file system.
- **Input:** We utilize `st.text_input()` to capture the Registration Number, `st.number_input()` for Age/Weight, and `st.selectbox()` for selecting Doctors and Hostel Blocks.
- **Output:** The system displays data dynamically using `st.write()` and `st.success()`. Additionally, it performs file output operations using the `fpdf` library to generate and save binary PDF files (`Ticket.pdf`, `Invoice.pdf`) locally or for download.

5.2 Module 5: Precedence & Associativity

- **Implementation:** Used in the **Health Tools (BMI Calculator)** module.
- **Explanation:** The formula $bmi = \text{weight} / (\text{height_m} ** 2)$ relies on Python's operator precedence. The exponentiation operator (`**`) has higher precedence than division (`/`). Python correctly associates the height squaring operation first, ensuring the mathematical accuracy of the health metric calculation.

5.3 Module 6: Type Conversion

- **Implementation:** Data handling between the UI, logic, and database.

- **Explanation:**

- **Implicit:** Python handles float conversions automatically when calculating the total price in the pharmacy cart.
- **Explicit:** We use `str(date)` to convert datetime objects into strings for SQLite storage. We also use `int(time.time())` to seed random number generators.

5.4 Module 7: Core Data Structures

- **Lists:** The medicine catalog `MEDICINES_DB` is a List of Dictionaries. This allows us to store an ordered, mutable collection of medicine items.
- **Dictionaries:** Used for `SYMPTOM_ADVICE` to map specific symptoms (keys) to medical advice (values), providing efficient $O(1)$ lookup time.
- **Tuples:** `CLINIC_TIMINGS` is stored as a Tuple to ensure that the clinic hours remain immutable and cannot be accidentally modified during runtime.

5.5 Module 8: Control Flow Statements

- **Implementation:** Governing the application logic.
- **Explanation:**
 - **Conditional (if-else):** Critical for the dynamic filtering logic (`if gender == "Male": available_docs = DOCTORS_MALE`). It directs the program flow to show appropriate data based on user input.

- **Iterative (for loops):** Used to iterate through the MEDICINES_DB list to render the pharmacy catalog cards and to traverse the database cursor results when displaying appointment history.

5.6 Module 9: Functions

- **Implementation:** Modular programming architecture.
- **Explanation:** The code is broken down into reusable functions such as book_appointment_db(), generate_ticket_file(), and get_local_ip(). This encapsulates specific logic blocks, reducing code redundancy and making the application easier to debug and maintain.

5.7 Module 10: Modules & Packages

- **Implementation:** extending Python's capabilities.
- **Explanation:** The project imports standard modules like sqlite3 (database), os (file operations), random (code generation), and json (data parsing). It also utilizes external packages like streamlit for the web interface and fpdf for document generation.

5.8 Module 11: Array Data Structure

- **Implementation:** Shopping Cart Management.
- **Explanation:** While Python uses Lists, they function as dynamic arrays in this project. The st.session_state.cart list is used to store selected

medicines. We use list methods like `append()` to add items and `pop()` to remove items by index, simulating array-based stack operations.

5.9 Module 12: Object Oriented Programming (OOP)

- **Implementation:** User Data Modeling.
- **Explanation:**
 - **Classes & Objects:** A base class `Person` is defined to hold common attributes like name and `reg_no`.
 - **Inheritance:** The `Student` class inherits from `Person` and extends it with specific attributes like age and gender. This demonstrates the concept of inheritance to promote code reuse and structured data modeling.

6. IMPLEMENTATION DETAILS (Database)

6.1 Database Schema (`vit_health_v6.db`)

The system uses a relational database with two main tables:

Table: appointments

Column	Type	Description
---	---	---
<code>id</code>	INTEGER	Primary Key
<code>reg_no</code>	TEXT	Student Registration ID
<code>doctor</code>	TEXT	Assigned Doctor

| advice | TEXT | Doctor's prescription |

| doctor_visible | INTEGER | Flag for archiving (1=Visible, 0=Archived) |

Table: orders

| Column | Type | Description |

| :--- | :--- | :--- |

| id | INTEGER | Primary Key |

| reg_no | TEXT | Buyer ID |

| items | TEXT | JSON string of purchased items |

| order_code | TEXT | Unique pickup code |

6.2 Key Algorithms

- **Dynamic Filtering:** The if gender == "Male": logic dynamically swaps the available_docs list, ensuring students only see appropriate doctors.
- **PDF Generation:** The FPDF library allows pixel-perfect placement of the University Logo and text to create professional-looking documents.
- **Session State Management:** Streamlit's st.session_state is used to persist the shopping cart data even when the user switches between tabs (e.g., checking history while shopping).

7. RESULTS AND DISCUSSION

The implementation successfully achieved the desired objectives.

- **User Experience:** The Glassmorphism UI (Dark Mode) provides a modern aesthetic and reduces eye strain.
- **Efficiency:** The PDF ticket generation takes less than 1 second, significantly faster than manual pass writing.
- **Accuracy:** The database accurately retrieves history based on Registration Numbers, eliminating record mismatch errors.

8. CONCLUSION AND FUTURE SCOPE

8.1 Conclusion

The **VIT Bhopal Health Portal** demonstrates how web technologies can transform campus services. By automating appointments and record-keeping, it allows medical staff to focus more on patient care rather than administrative tasks. The inclusion of features like PDF downloads and Order History ensures that the system is not just a prototype but a practical tool for daily use.

8.2 Future Scope

- **Payment Gateway:** Integration with UPI or Payment APIs for real-time pharmacy payments.
- **Email Notifications:** Using SMTP to email the PDF ticket directly to the student.
- **Admin Dashboard:** A master control panel to add new medicines or doctors without modifying the code.

- **Mobile App:** Wrapping the web interface into a native Android/iOS app for better accessibility.

9. REFERENCES

1. Streamlit Documentation: <https://docs.streamlit.io/>
2. Python SQLite3 Documentation:
<https://docs.python.org/3/library/sqlite3.html>
3. FPDF Library for Python:
<https://pyfpdf.readthedocs.io/>

VIT Bhopal Health Portal Not secure 172.25.168.106:8501



VIT Bhopal University Health Centre

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Book Your Slot

Personal Information

Select Gender

Male Female

Registration Number: 21BCE1001

Full Name:

Age: 19

Select Doctor: General Physician (Male)

Hostel Block: Boys Block 1

Room Number: e.g., B110, A234

Navigation

Login Mode

Student Portal

Daily Health Tip

Sanitary hygiene is crucial to prevent UTIs.

Connect via Mobile

17°C Mostly clear

Search

Windows Start

Cloud

Gears

Folder

Google Chrome

Visual Studio Code

File Explorer

PowerShell

Task View

System

Network

17°C ENG IN 00:23 24-11-2025

VIT Bhopal Health Portal - Streamlit App

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School

Navigation

Login Mode

Student Portal

Daily Health Tip

Walking outside for 20 minutes can boost your Vitamin D levels.

Connect via Mobile

VIT BHOPAL

VIT Bhopal University Health Centre

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Book Your Slot

Personal Information

Select Gender

Male Female

Registration Number: 21BCE1001

Full Name

Age: 19

Select Doctor: General Physician (Male)

Hostel Block: Boys Block 1

Room Number: e.g., B110, A234

Show desktop

5 21°C Sunny

Search File Settings Folder Chrome VS Code

ENG IN

10:30 24-11-2025

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share

21BCE1001

Age: 19 Select Doctor: General Physician (Male)

Hostel Block: Boys Block 1 Room Number: e.g., B110, A234

Contact Number: +91 9876543210

Date of Visit: 2025/11/24 Preferred Time: 09:00 AM

Symptoms Selection

Choose options

Additional Details (Optional)
E.g. High fever since last night...

Confirm Appointment

Manage app

Navigation

Login Mode

Student Portal

Daily Health Tip

Walking outside for 20 minutes can boost your Vitamin D levels.

Connect via Mobile

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share

Hostel Block: Boys Block 1

Room Number: e.g., B110, A234

Contact Number: +91 9876543210

Date of Visit: 2025/11/24

Preferred Time: 09:00 AM

Symptoms Selection

Choose options

Additional Details (Optional)
E.g. High fever since last night...

Confirm Appointment

Navigation

Login Mode

Student Portal

Daily Health Tip

Walking outside for 20 minutes can boost your Vitamin D levels.

Connect via Mobile

Manage app

VIT Bhopal Health Portal - Streamlit App

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School



VIT Bhopal University Health Centre

Student Dashboard

Navigation

Login Mode

Student Portal

Daily Health Tip

Walking outside for 20 minutes can boost your Vitamin D levels.

Connect via Mobile

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Medical History

Enter Reg No to search records

21BCE1001

Search

Manage app

4 22°C Sunny

Search Windows Start File Explorer Google Chrome Microsoft Edge Control Panel Task View Microsoft Word Microsoft Excel

ENG IN 10:32 24-11-2025

VIT Bhopal Health Portal - Streamlit App

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School



VIT Bhopal University Health Centre

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Buy Medicines

Enter Registration ID to Access Pharmacy

Registration ID

Enter Pharmacy

Navigation

Login Mode

Student Portal

Daily Health Tip

Walking outside for 20 minutes can boost your Vitamin D levels.

Connect via Mobile

Manage app

4 22°C Sunny

Search

ENG IN 10:32 24-11-2025

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share

School

Navigation

Login Mode

Student Portal

Daily Health Tip

Sleep deprivation can lower your immune system.

Connect via Mobile

Buy Medicines

Shop Medicines Order History

Medicine Catalog

Item	Description	Price	Quantity	Add
Stayfree/Whisper Pads	(Sanitary)	₹45	1	Add
Meftal-Spas	(Pain/Period)	₹5	1	Add
V-Wash	(Sanitary)	₹180	1	Add
Cranberry Sachet	(UTI)	₹40	1	Add
Oxygen Gas	(Emergency)	₹0	1	Add
Lignocaine 5%	(Anesthetic)	₹35	1	Add
Adrenaline	(Emergency)	₹25	1	Add

Your Cart

Your cart is empty.

Select items from the catalog to get started.

Manage app

4 22°C Sunny

Search

Windows Start

File Explorer

Google Chrome

Microsoft Edge

PowerShell

Google Sheets

Google Slides

10:32 24-11-2025

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School

VIT Bhopal University Health Centre

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Health Tools

Select Tool

BMI Calculator First Aid Helper

Weight (kg)

30.00 - +

Height (cm)

100.00 - +

Calculate BMI

Connect via Mobile

Manage app

4 22°C Sunny

Search

Windows Start

File Explorer

Google Chrome

Microsoft Edge

PowerShell

Google Sheets

Google Slides

System tray icons: battery, volume, signal strength, date/time.



Navigation

Login Mode

Student Portal

Daily Health Tip

Dehydration can negatively affect your mood and energy levels.

Connect via Mobile



VIT Bhopal University Health Centre

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Health Tools

Select Tool

BMI Calculator First Aid Helper

First Aid Helper

Select Symptom

stomach pain

Get Advice

Suggestion: Avoid spicy food. Drink warm water. Take Ranitidine.

Share

Manage app

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School

Navigation

Login Mode

Doctor Console

Select Profile

General Physician (Male)

Access Dashboard

Daily Health Tip

Dehydration can negatively affect your mood and energy levels.

Connect via Mobile

Manage app

Air: Poor Tomorrow

Search

ENG IN 10:33 24-11-2025

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School



VIT Bhopal University Health Centre

Doctor's Workspace

Navigation

Login Mode

Doctor Console 

Select Profile

General Physician (Male) 

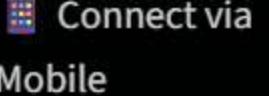
Access Dashboard

Welcome back, General Physician (Male)!

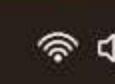
No pending appointments.

Daily Health Tip

Your heart beats around 100,000 times a day.

Connect via Mobile 

Manage app 

Air: Poor Tomorrow  ENG IN  10:33 24-11-2025

Search

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share School

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

VIT Bhopal University Health Centre

Book Your Slot

Personal Information

Select Gender

Male Female

Registration Number: 21BCE1001

Age: 19

Hostel Block: Boys Block 1

Contact Number: +91 9876543210

Date of Visit: 2025/11/24

Full Name:

Select Doctor: General Physician (Male)

Room Number: e.g., B110, A234

Preferred Time: 09:00 AM

Symptoms Selection

Choose options

Additional Details (Optional): E.g. High fever since last night...

Confirm Appointment

Air: Poor Tomorrow

Manage app

ENG IN

10:33 24-11-2025

VIT Bhopal Health Portal - Streamlit

New Tab

vit-health-app-doraemonshinchan.streamlit.app

Share

School

Navigation

Login Mode

Student Portal

Daily Health Tip

Walking outside for 20 minutes can boost your Vitamin D levels.

Connect via Mobile

10.12.188.31

VIT Bhopal University Health Centre

Student Dashboard

Book Appointment Medical Records Pharmacy (Buy) Health Tools

Book Your Slot

Personal Information

Select Gender:

Male Female

Registration Number: 21BCE1001

Full Name:

Age: 19

Select Doctor: General Physician (Male)

Hostel Block: Boys Block 1

Room Number: e.g., B110, A234

Contact Number: +91 9876543210

Date of Visit: 2025/11/24

Preferred Time: 09:00 AM

Symptoms Selection

Choose options:

Additional Details (Optional): E.g. High fever since last night...

Confirm Appointment

Air: Poor Tomorrow

Search

Manage app

ENG IN

10:33

24-11-2025