PrescribeRight

Your AI-Powered Health Assistant
Project Report

GitHub Repo- https://github.com/ritz0502/PrescribeRight.git

Video Link-
https://drive.google.com/drive/folders/1oikkJtFL3Jxx9H1OwG297ukSUE06cWrJ?usp=sharing

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1. Introduction

Healthcare accessibility, timely diagnosis, and personalized recommendations remain key challenges globally. **PrescribeRight** is designed as an AI-powered health assistant to help bridge the gap between patients and preliminary medical insights. By analyzing symptoms, predicting possible conditions, recommending medications, and suggesting lifestyle adjustments, it provides users with actionable health guidance.

⚠ **Disclaimer:** PrescribeRight is for informational purposes only and **does not replace professional medical advice, diagnosis, or treatment**. Always consult a certified healthcare professional for critical decisions.

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2. Project Overview

PrescribeRight is a **full-stack AI-powered web application** providing two primary user interactions:

1. **Guided Consultation:** A structured form-based interface where users can enter symptoms in detail, enabling the system to generate more accurate predictions.
2. **AI Chatbot:** A natural language conversational interface that allows users to input symptoms freely and receive dynamic health insights.

Unique Chatbot Capabilities:

- Natural language interface for symptom entry and results discussion.
- API integration support for electronic medical record (EMR/EHR) systems.
- Continuous learning from anonymized user feedback, improving diagnostic accuracy over time. After each interaction, the model refines its knowledge to give more precise answers in subsequent consultations.

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3. Key Features

- **AI-Powered Symptom Analysis:** Converts user input into structured data and predicts possible medical conditions.
- **Personalized Medication Recommendations:** Suggests appropriate medicines along with correct dosages.
- **Interactive Chatbot:** Conversational interface using NLP and biomedical entity recognition.
- **Guided Consultations Page:** Structured data input for more precise results.
- **Comprehensive Results Display:** Displays disease information, medications, dosage, precautions, diets, and lifestyle guidance.

- **Continuous Learning:** Improves its recommendations with anonymized feedback.
- **Responsive Design:** Fully functional across desktops, tablets, and mobile devices.

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4. Models Used

a. General NLP & Text Processing

- **Model:** google/flan-t5-small
- **Purpose:** Text summarization, keyword extraction, text-to-text transformations.
- **Use Case:** Extracts important details from free-text user inputs before feeding them to biomedical models.

b. Biomedical Named Entity Recognition (NER)

- **Model:** d4data/biomedical-ner-all
- **Purpose:** Detects diseases, symptoms, chemicals, treatments, and durations.
- **Use Case:** Populates structured fields like symptoms, age, and severity to feed predictive models.

c. Model Integration Workflow

1. User input is processed by **flan-t5-small** to extract keywords.
2. Keywords are passed to **biomedical-ner-all** to identify entities.
3. Entities are mapped to the backend predictive model.
4. Backend generates disease predictions, medication suggestions, and lifestyle advice.
5. Chatbot logs feedback and updates internal weights to improve future responses.

d. Custom Predictive Model Pipeline

- **Data Ingestion & Preprocessing:**
  Loads structured datasets (Training.csv, description.csv, diets.csv, precautions_df.csv, workout_df.csv). Prepares one-hot encoded symptom vectors and prognosis labels. Curated treatment_database.json provides medication rules.
- **Model Training (train.py):**
  Trains a Support Vector Classifier (SVC) on symptom-prognosis mappings. Uses LabelEncoder for prognosis labels. Outputs disease_model_final.pkl containing trained model, features, and encoders.
- **Knowledge Base Creation (build_knowledge_base.py):**
  Aggregates disease descriptions, diets, precautions, and workouts into a structured JSON knowledge base for retrieval during consultations.
- **API Server (app.py):**
  Exposes endpoints for symptom input, disease prediction, medication suggestions, and lifestyle guidance. Integrates seamlessly with both chatbot and structured consultation UI.

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5. System Architecture & Workflow

Workflow Steps:

1. **Model Training (train.py)** – Learns the mapping between symptoms, diseases, and medications.
2. **Knowledge Base Construction (build_knowledge_base.py)** – Builds a structured, queryable database of disease information and recommendations.
3. **Backend APIs (app.py)** – Handles symptom processing, disease prediction, dosage recommendations, and lifestyle advice.

4. **Frontend (React.js)** – Provides user interface for both chatbot and guided consultation.
5. **Continuous Learning** – Chatbot stores anonymized feedback after each session to refine future responses.

Optional Improvements:

- Advanced error handling & logging
- Multi-user session management
- API visualization & analytics
- Enhanced modular architecture for scalability

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6. Technologies Used

- **Frontend:** React.js, React Router, Vite, CSS Modules
- **Backend (Model):** Python, Flask, Pandas, NumPy, Scikit-learn
- **Backend (Chatbot):** Python, Flask

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7. Getting Started

Prerequisites

- Node.js v14+
- Python v3.8+
- pip

Step 1: Clone Repository

git clone https://github.com/ritz0502/PrescribeRight.git

cd PrescribeRight

Step 2: Setup Backend (Model)

```
cd model
python -m venv venv
# Activate venv
pip install -r requirements.txt
python app.py
```

Runs on → http://127.0.0.1:3000

Step 3: Setup Backend (Chatbot)

```
cd chatbot
python -m venv venv
# Activate venv
pip install -r requirements.txt
python app.py
```

Runs on → http://127.0.0.1:3001

Step 4: Run Frontend

```
cd frontend-app
npm install
npm run dev
```

Runs on → http://localhost:5173

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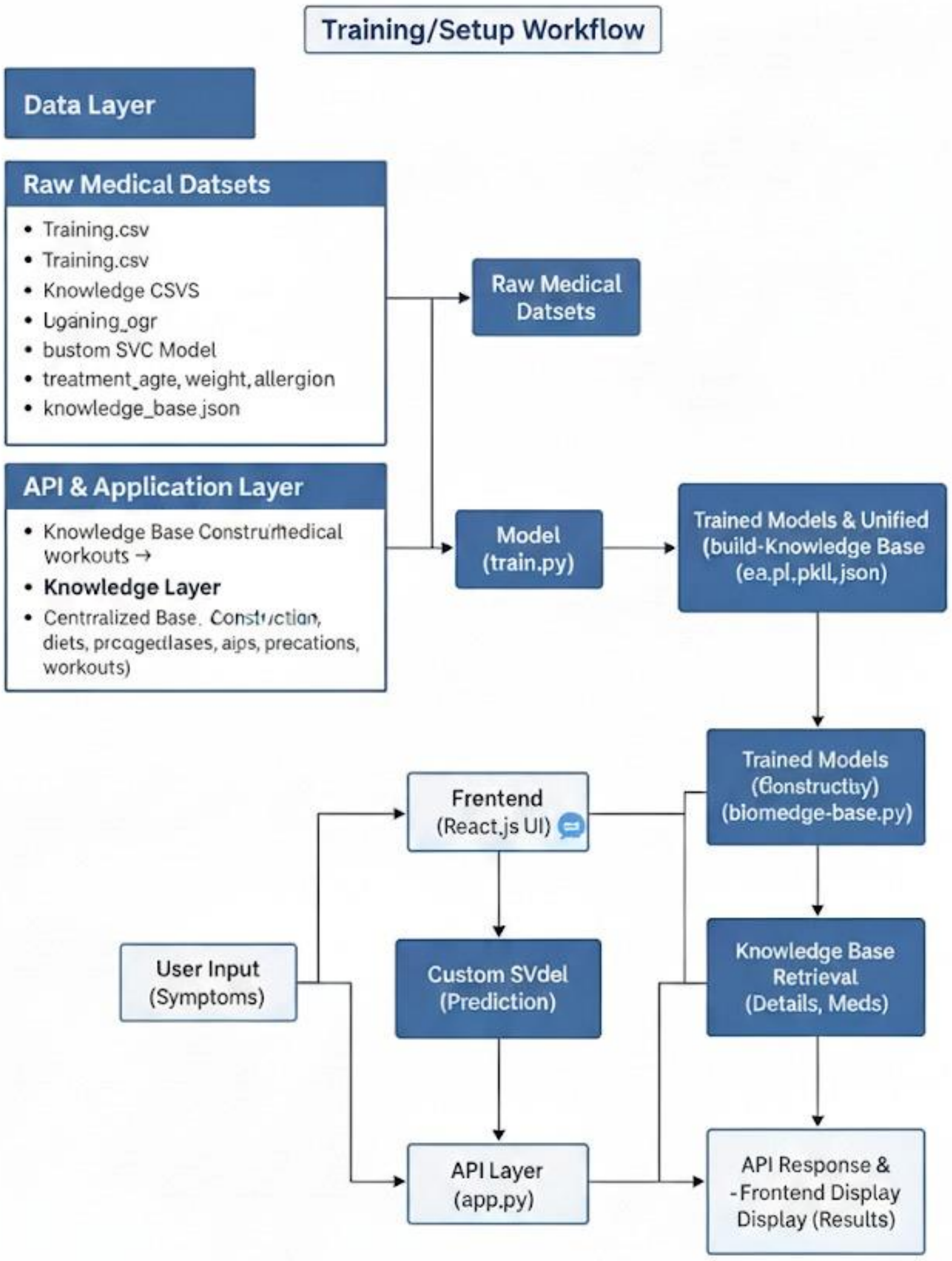
8. Project Structure

PrescribeRight System Architecture & Workflow



Training/Setup Workflow
Data Layer
Raw Medical Datsets
• Training.csv
• Training.csv
• Knowledge CSVS
• Lganing_ogr
• bustom SVC Model
• treatment_agte, weight, allergion
• knowledge_base.json
API & Application Layer
• Knowledge Base Construmedical workouts →
• Knowledge Layer
• Centrralized Base. Constuction, diets, prcogedlases, aips, precations, workouts)
Raw Medical Datsets
Model (train.py)
Trained Models & Unified (build-Knowledge Base (ea.pl,pkll,json)
Trained Models (Constructby) (biomedge-base.py)
Frentend (React.js UI)
User Input (Symptoms)
Custom SVdel (Prediction)
Knowledge Base Retrieval (Details, Meds)
API Layer (app.py)
API Response & -Frontend Display Display (Results)

Project Report Diagram - PrescribeRight

9. Detailed Analysis

Strengths

- AI-driven predictions and recommendations.
- Combines structured consultation with conversational AI.
- Continuous learning from user feedback improves future accuracy.
- Scalable, modular architecture.
- Responsive, user-friendly interface.

Weaknesses

- Heavy reliance on pretrained models, may lack domain-specific nuance.
- Limited without continuous dataset updates.
- Cannot replace certified medical advice.

Opportunities

- Integration with EMR/EHR systems for healthcare providers.
- Telemedicine and real-time virtual consultations.
- Multilingual support for wider adoption.
- Expanding dataset for more accurate predictions.

Threats

- Ethical liability for incorrect predictions.
- Sensitive data privacy and security concerns.
- Dependency on third-party models (Hugging Face availability).

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10. Conclusion

PrescribeRight demonstrates the potential of AI in healthcare support. By combining **NLP, biomedical NER, structured consultation**, and **self-learning chatbots**, it delivers meaningful health insights and preliminary guidance. The system is designed to **learn continuously from anonymized user interactions**, improving prediction accuracy and relevance over time.

While it **cannot replace professional healthcare consultation**, it serves as a valuable tool for increasing healthcare awareness, preliminary diagnostics, and lifestyle guidance.