AI-POWERED HEALTH DIAGNOSIS ASSISTANT (AIPHDA)

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We also acknowledge the open-source community for providing frameworks like **Flask**, **OpenCV**, and others including **Kaggle Dataset**, which formed the backbone of our system.
Finally, we thank our families and peers for their encouragement and support during the project development phase.

PROJECT SYNOPSIS

Overview
The AI-Powered Health Diagnosis Assistant is an intelligent medical support system designed to provide users with preliminary health assessments using machine learning and natural language processing. The platform enables individuals to enter symptoms through text or voice, analyzes the input using trained models, and presents likely health conditions along with general recommendations. It aims to bridge healthcare accessibility gaps by offering quick, reliable, and user-friendly self-assessment tools.
Key Features
Multi-Modal Input: Accepts symptoms through text interactions
NLP-Driven Symptom Analysis: Extracts medical keywords for accurate interpretation
ML-Based Prediction: Uses classification models to identify the top probable health conditions
Recommendations Engine: Provides preventive measures, basic care suggestions, and next steps
Feedback Loop: Collects user feedback to continuously improve model performance
Optional Admin Dashboard: Allows management of medical datasets and viewing analytics
Technology Stack
Backend: Python, Flask
AI/ML: scikit-learn, TensorFlow/PyTorch, NLP libraries (NLTK, spaCy)
Frontend: HTML, CSS, Javascript
Database: SQLite
Development Tools: VS Code

Project Scope
This system addresses the challenge of limited healthcare access by offering a fast, reliable, and automated way to assess symptoms. It helps reduce unnecessary hospital visits, supports users with early awareness, and demonstrates responsible use of AI in healthcare. Through this project, learners gain hands-on experience building an end-to-end intelligent diagnosis system integrating machine learning, NLP, and user-centric design—preparing them for real-world AI applications.

PROJECT ANALYSIS

Problem Analysis
Access to timely and dependable health guidance remains a major challenge, especially in areas with limited medical resources or long waiting times. Users often rely on guesswork or misleading internet searches when evaluating their symptoms, which can lead to delayed treatment or unnecessary hospital visits. The absence of an accessible, structured, and reliable self-assessment tool leaves many individuals without early insight into potential health conditions.

Solution Approach
The AI-Powered Health Diagnosis Assistant addresses these issues by automating symptom interpretation and delivering fast, data-driven preliminary assessments. Using NLP for symptom understanding and machine learning models for prediction, the system provides accurate condition suggestions along with general health recommendations. A built-in feedback mechanism helps refine model accuracy over time, while optional admin tools support dataset updates and analytics monitoring.

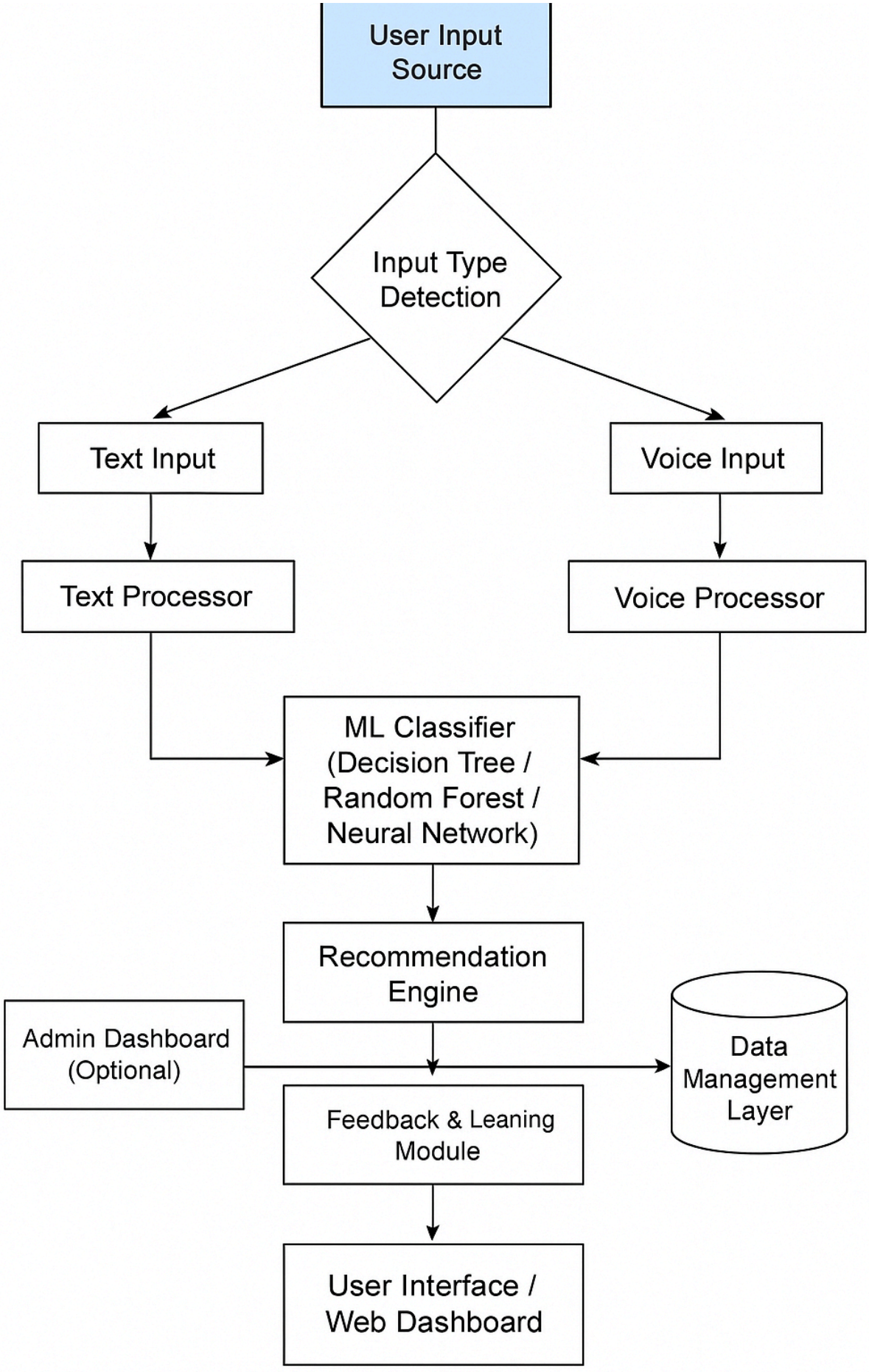
System Capabilities
Input Processing
- Accepts text-based symptom descriptions
- Performs NLP extraction of key medical concepts

Condition Prediction
- Uses ML classifiers to determine the top likely health conditions
- Includes confidence scoring for clearer decision support

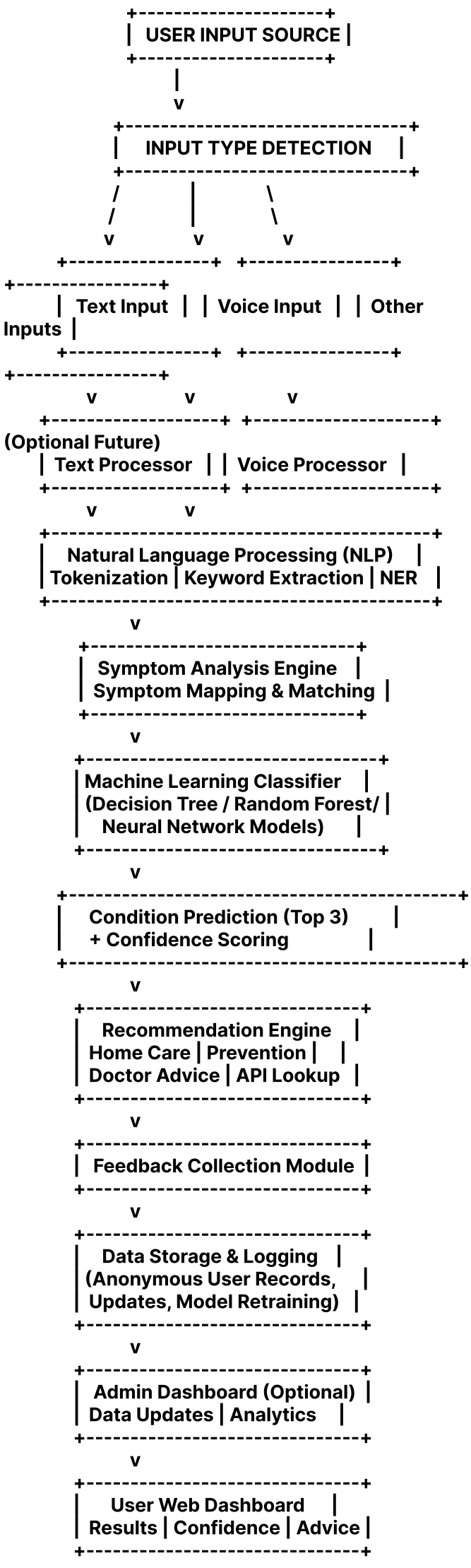
Health Recommendations
- Offers preventive measures, home-care advice, and next-step guidance
- Can optionally integrate location-based clinic or hospital suggestions

Feedback & Learning
- Collects user accuracy ratings to improve future predictions
- Supports continuous dataset expansion and model retraining

PROJECT DESIGN SYSTEM ARCHITECTURE



Data Flow Diagram (DFD)
Level 0 DFD - ASCII FLOWCHART



SOURCE CODE WITH COMMENTS

1. Main Application (app.py)
python
Import required libraries

```
import os
from flask import Flask, send_from_directory
from backend.routes.predict import predict_bp
from backend.routes.feedback import feedback_bp
from backend.routes.admin import admin_bp
from flask_cors import CORS

def create_app():
    app = Flask(__name__, static_folder=None)
    CORS(app)

    @app.route('/')
    def index():
        return send_from_directory('frontend', 'index.html')

    @app.route('/<path:path>')
    def serve_static(path):
        return send_from_directory('frontend', path)

    app.register_blueprint(predict_bp, url_prefix="/api")
    app.register_blueprint(feedback_bp, url_prefix="/api")
    app.register_blueprint(admin_bp, url_prefix="/api/admin")

    return app

app = create_app()

if __name__ == "__main__":
    app.run(debug=True, use_reloader=False)
```

SOURCE CODE WITH COMMENTS

2. ML Service (ml_service.py)
python

```
import joblib
import json
from ml.preprocess.merger.vector_builder import VectorBuilder
from database.db import get_connection

MODEL_PATH = "ml/model/rf_model.joblib"
FEATURES_PATH = "ml/data/processed/features.json"

class MLService:
    def __init__(self):
        print("Loading model and features...")
        model_obj = joblib.load(MODEL_PATH)

        self.model = model_obj["model"]
        self.label_encoder = model_obj["label_encoder"]

        with open(FEATURES_PATH, "r") as f:
            feature_index = json.load(f)

        self.features = feature_index
        self.vector_builder = VectorBuilder(feature_index)
        print("ML service ready.")

    def predict(self, symptoms_list):
        """
        symptoms_list: ["fever", "cough"]
        """
        vector = self.vector_builder.build_vector(symptoms_list).reshape(1, -1)
        proba = self.model.predict_proba(vector)[0]

        # top 3
        top3_idx = proba.argsort()[::-1][:3]
        conditions = self.label_encoder.inverse_transform(top3_idx)

        return [
            {
                "condition": cond,
                "probability": float(proba[i])
            }
            for i, cond in zip(top3_idx, conditions)
        ]

# Global Singleton
ml_service = MLService()
```

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Check symptoms quickly — get suggested conditions & advice

Type or speak your symptoms and send it and our AI will suggest the top possible conditions and preventive measures. Make sure to reload the browser to input other symptoms. Disclaimer: Please note that this tool is informational and not a replacement for medical professionals.

Input your symptoms (e.g. fever, sore throat, headache)

Send

Prediction activity

Total predictions

3

How it works

1. Enter symptoms

Type or speak your symptoms into the input box, then press Send.

2. AI analysis

Our system extracts keywords and matches them against medical datasets to predict likely conditions.

3. Results & advice

Get the top 3 possible conditions plus preventive measures. Use feedback buttons to help improve accuracy.

About AIPHDA

AIPHDA (AI-Powered Health Diagnostic Assistant) is a smart medical support tool designed to help users understand their symptoms instantly. It provides AI-generated predictions of possible medical conditions along with basic preventive advice.

This system was created to bridge the gap between symptom occurrence and early medical awareness. While not a replacement for professional doctors, it helps users take informed steps quickly.

User Guide — How AIPHDA Works

AIPHDA allows users to type or speak their symptoms, after which the AI system processes them using NLP (Natural Language Processing). The symptoms are compared against a trained medical dataset to generate the most likely conditions.

Your privacy is protected: • No user identity is stored • Symptoms are logged anonymously only to improve model accuracy • No personal data is saved

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Developer Guide

AIPHDA is built using a combination of NLP pipelines, RandomForest classification models, audio-to-text processing, dataset management workflows, and feedback-driven retraining.

The system features:

- Custom dataset merging and preprocessing
- Keyword-based symptom extraction
- RandomForest model training & evaluation
- Admin dashboard for dataset uploads and retraining
- Speech recognition support
- REST API (Flask backend)

Developers can contribute by improving dataset coverage, optimizing ML models, enhancing UX, or expanding analytics. See CONTRIBUTING.md for details.

Credits & Contributors

Development Team

Project designed and developed by the AIPHDA team as a final-year project initiative

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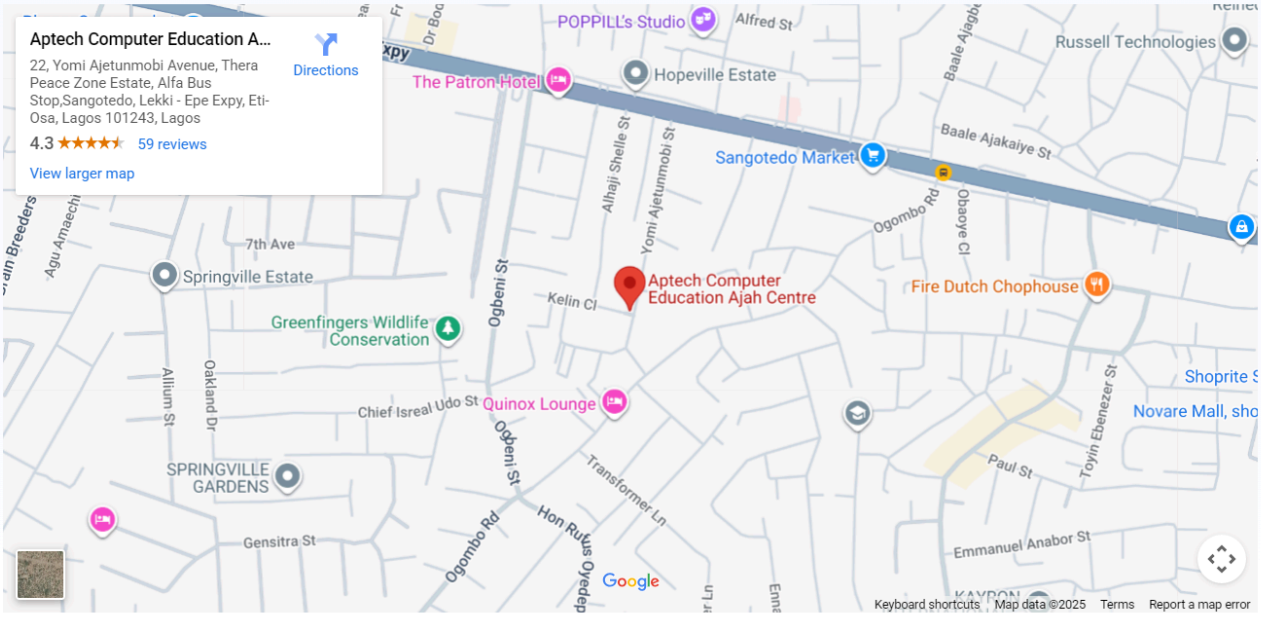
Contact Us

Have questions, feedback, or need support? Reach out using the information below or send us a message directly.



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Last Name

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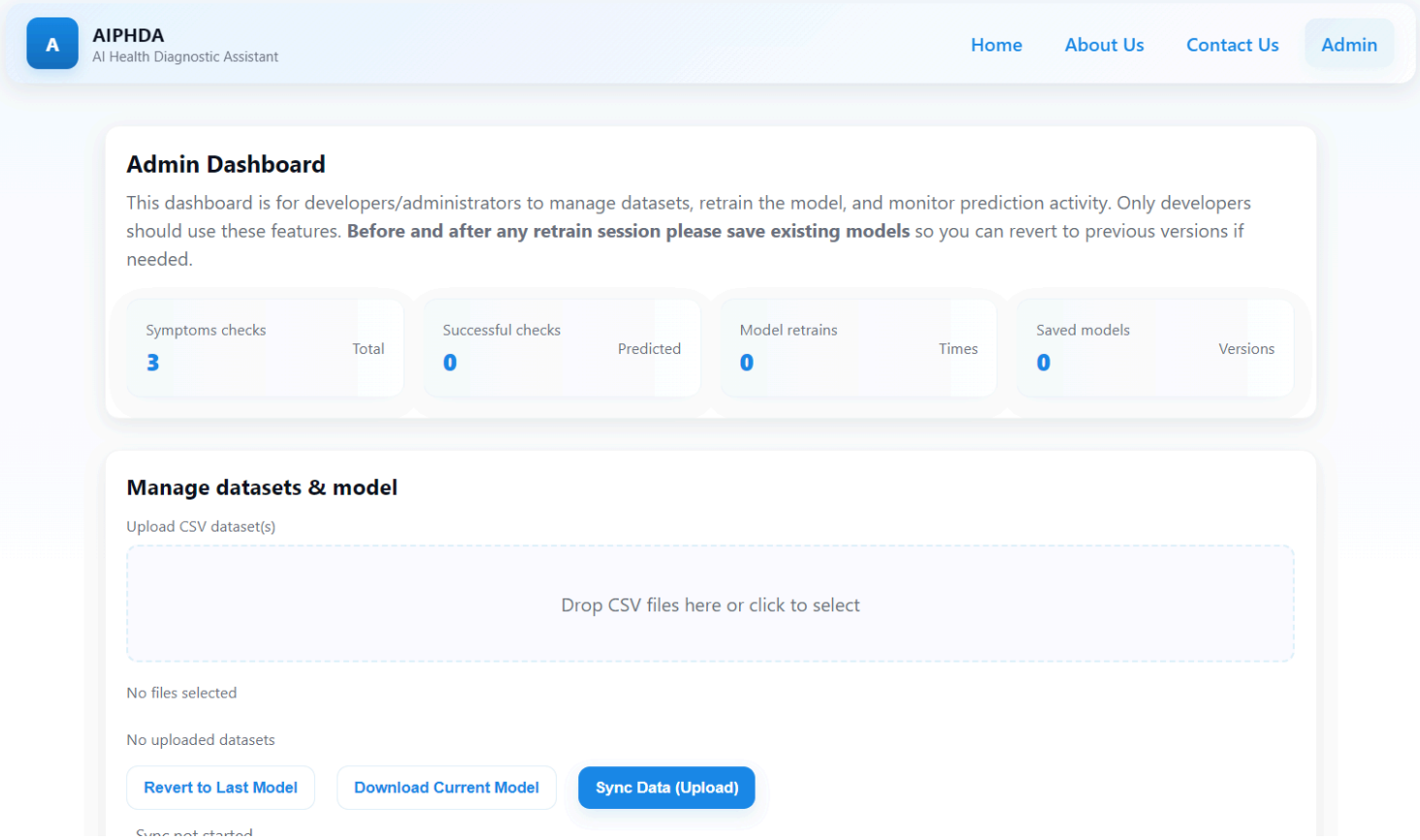
Description

Send Issue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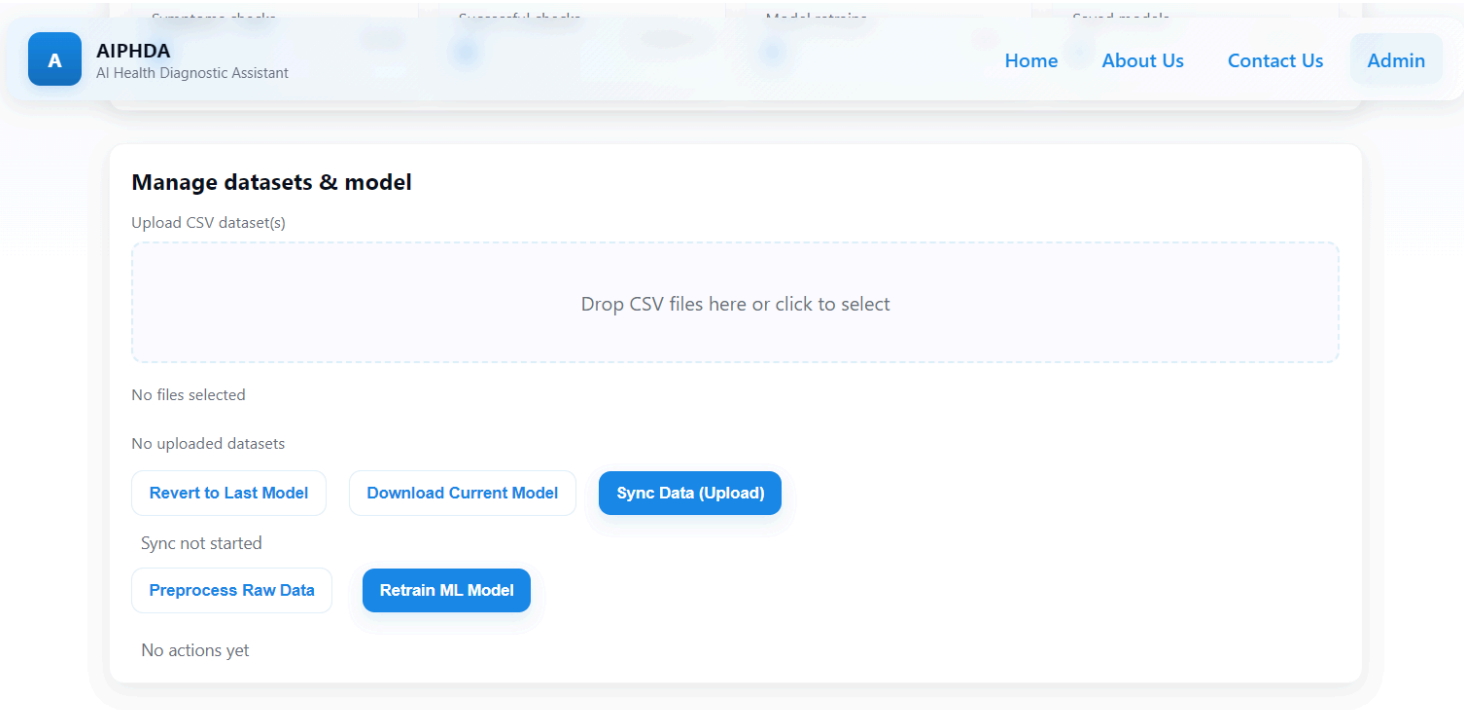
Admin Dashboard
This dashboard is for developers/administrators to manage datasets, retrain the model, and monitor prediction activity. Only developers should use these features. Before and after any retrain session please save existing models so you can revert to previous versions if needed.
Symptoms checks
3
Total
Successful checks
0
Predicted
Model retrains
0
Times
Saved models
0
Versions
Manage datasets & model
Upload CSV dataset(s)
Drop CSV files here or click to select
No files selected
No uploaded datasets
Revert to Last Model
Download Current Model
Sync Data (Upload)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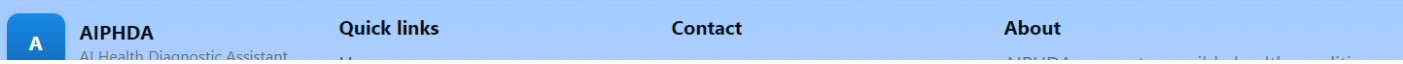
Manage datasets & model
Upload CSV dataset(s)
Drop CSV files here or click to select
No files selected
No uploaded datasets
Revert to Last Model
Download Current Model
Sync Data (Upload)
Sync not started
Preprocess Raw Data
Retrain ML Model
No actions yet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