**📖 MedAssist AI – Symptom Checker & Health Advisor**

*A full-stack AI/ML-powered healthcare assistant using Generative AI (Cohere) and supervised ML for intelligent symptom analysis and real-time health suggestions.*

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**📌 Overview**

**MedAssist AI** is an intelligent healthcare tool that helps users analyze symptoms and receive potential diagnoses and health care suggestions. It integrates a **Supervised ML Model** for classification and **Cohere’s LLM API** for generating natural language recommendations.

**❓ Problem Statement**

Many people rely on the internet to self-diagnose, often leading to misinformation or unnecessary anxiety. This project aims to:

* Simplify the symptom-checking process.
* Reduce dependency on unreliable sources.
* Make health guidance more accessible using AI & ML.

**💡 Proposed Solution**

MedAssist AI combines two approaches:

1. **Supervised ML (Random Forest)** for structured symptom classification.
2. **Generative AI (Cohere LLM)** for human-like explanations and care tips.

Users can toggle between AI and ML-based responses for a more personalized and insightful experience.

**🏗️ System Architecture**

[React Frontend]

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[FastAPI Backend]

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|---> [Random Forest Model] - Predicts condition from structured inputs

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|---> [Cohere LLM API] - Generates suggestions and tips

**🛠️ Tech Stack**

| **Layer** | **Technology** |
| --- | --- |
| Frontend | React.js, Material UI, Axios |
| Backend | Python, FastAPI, Uvicorn |
| ML Model | Random Forest (Scikit-learn) |
| AI Model | Cohere LLM API |
| Deployment | Vercel (Frontend), Render (Backend) |
| Data | Public medical symptom dataset |

**⚙️ Installation & Setup**

**🔧 Backend**

cd server

python -m venv venv

source venv/bin/activate

pip install -r requirements.txt

uvicorn main:app --reload

**🌐 Frontend**

cd client

npm install

npm start

**🚀 Deployment**

**Vercel (Frontend)**

* Push client/ directory to GitHub.
* Import to Vercel and configure build as:
  + **Framework**: React
  + **Build Command**: npm run build
  + **Output Directory**: dist or build

**Render (Backend)**

* Push server/ directory to GitHub.
* Create a **Web Service** on Render:
  + **Start Command**: uvicorn main:app --host 0.0.0.0 --port 8000
  + Add PORT=8000 in environment settings.

**🤖 Machine Learning Details**

| **Feature** | **Description** |
| --- | --- |
| Type | Supervised Learning |
| Algorithm | Random Forest Classifier |
| Input | Age, Gender, Symptoms (One-hot) |
| Labels | Disease Categories (Multiclass) |
| Preprocessing | TF-IDF, Label Encoding |

Model is trained using scikit-learn, and serialized using joblib.

**🔌 API Endpoints**

| **Method** | **Endpoint** | **Description** |
| --- | --- | --- |
| POST | /predict-ml | Returns disease prediction |
| POST | /suggest-ai | Returns care tips via Cohere LLM |
| GET | /health | Health check for backend |

**🚀 Future Scope**

* ✅ Add medical condition severity scoring.
* ✅ Integrate with real-time health APIs (WHO, CDC).
* ⏳ Multilingual support for broader accessibility.
* ⏳ Admin dashboard for monitoring model feedback.

**👨‍💻 Contributors**

* [Sreekanth] – Full Stack Developer & AI Integrator

**📚 References**

* [Cohere AI Documentation](https://docs.cohere.com/)
* [Scikit-learn Documentation](https://scikit-learn.org/)
* [FastAPI Docs](https://fastapi.tiangolo.com/)
* Public Symptom Dataset (Kaggle or UCI repository)