**PREDICTIVE ANALYSIS AND VISUALIZATION OF HEALTHCARE MARKET TRENDS**

**User Guidelines**

This guidance provides you with instructions for the both Admin and the Users on how to interact with the Predictive model with web based system built using machine learning models with predictive analysis, React, HTML, CSS, TypeScript and MongoDB. This System is design to provide real-time forecasting the disease and Healthcare access in visualization form and the data explorations related to the healthcare market trends.

**👤 End User Guidelines**

1. **Data Collection – First Step**

* Identify the collection of Data Sources:
* Kaggle
* HealthData.gov
* WHO Database
* CDC Open Data

1. **Load CSV file:**

* Loading the csv file into Excel or other software for checking the datasets for about correct format.
* Now Upload the Datasets in Jupyter Notebook for further Analysis.

1. **Data Cleaning and Preprocessing:**

* Cleaning the datasets for further analysis.
* There are so much extra raw unfiltered datasets or missing and unordered datasets are available in the datasets So, for this reason first clean the Data and do Preprocessing.
* Handle Missing values, duplicates, and inconsistent entries outliers.
* Normalize and Standardize for Modeling.

1. **Perform EDA – Exploratory Data Analysis**

* This is importance part of the Data Analysis Journey where check for the outliers, trends and the data distribution.
* Use Python and withs Libraries (Pandas and NumPy Seaborn and Matplotlib) for further EDA performance and make a Clean and Suitable Datasets.
* After all this upload the SQL or Jupyter Notebook for the Feature Engineering and for the Model Development.

1. **Feature Engineering and Modeling Selection**

* In the Feature Engineering section we will proceed for the identify relevant features using statically analysis and correlations heatmaps.
* After the future engineering go to the model development part.

1. **Model Development:**

* Model Development uses the building the prediction system where we can choosing the Machine learning Models:-
* Using the Linear Regression is used for the (Trend Forecasting)
* Using Random Forest is used for the (Complex Pattern Detection)
* XGBOOST is used for the High Accuracy Forecasting and for the market Segments.
* After all of the model development completed then using the Time Series Analysis where using the ARIMA and LSTM models for the Future Predictions about HealthCare Access and Disease Predictions next 10 years.
* After all of this go for the Train and Test Models.

1. **Train and Test the Models:**

* In the section we proceed for the Split data into Training (80%) and Testing (20%) sets.
* Train Models using Scikit-learn, TensorFlow or XGBOOST.
* Evaluate Models using RMSE, R^2, MAE scores.
* After all of this use the Tune Hyperparameter for Better Accuracy in each models.

1. **Data Visualization and Dashboard Development:**

* In this section presenting the Insights through the Visualization.
* First open the PowerBI or Tableau Application and develop the Interactive Dashboards.
* Includes: -
* Trend Analysis Graph
* Comparative Market Reports
* Heatmap and Forecasting

After all of this we will make a beautiful Dashboard from the help of Predictive Models and Data Analysis part is done with the beautiful Dashboard.

Then Open Vs code for build the Website using React, Tailwind CSS, TypeScript, HTML, .JSON, and MongoDB. Implement and Run the Code with Debug Mode then we will open the local host after clicking the Local Host then we will open the website. After opening the website then we will open the (follow this steps: -

1. **User Registration:**
   1. Navigate to the Signup page.
   2. Enter full name, email, phone number, and desired password.
   3. Choose a subscription plan (Free, Weekly, Monthly, Yearly).
   4. Submit the form.
   5. Wait for Admin approval before you can log in.
2. **Login And Access:**
   1. Once approved by Admin, navigate to the login page.
   2. Enter email and password.
   3. Click “Login” to access the user dashboard.
3. **Navigating the Dashboard:**
   1. Use the navigation bar to select:

* Market Trends
* Disease Analysis
* My Profile
  1. View Chart about Predictions and historical data.

1. **Viewing the healthcare Trends:**
   1. Select Filter (Years, regions, disease)
   2. View Machine Learning Visualizations
   3. Save reports or download PDF.
2. **Logout:**
   1. Click the Logout button in the top right corner of the website.
   2. Select Logout.

**👤 End Admin Guidelines:**

1. **Admin Login**
   1. Navigate to /admin-login.
   2. Enter Admin credentials.
   3. Upon success, you’ll see the Admin Dashboard.
2. **Verifying Users:**
   1. Go to “Pending Verifications”.
   2. Review user data (email, plan, etc.).
   3. Click "Approve" or "Reject".
3. **Access the Admin Dashboard:**
   1. Navigate to:
   2. User Management
   3. Analytics Monitoring
   4. Logs & Activities
   5. Use filters to analyze data usage.
4. **Monitoring Users Activity:**
   1. Navigate to the “Activity Log” page.
   2. See which user accessed what module (e.g., Disease Forecast).
   3. Timestamps and duration are logged.
5. **Approve or Denying Access:**
   1. If a user violates terms, click “Suspend” or “Ban”.
   2. Suspended users cannot log in until Admin re-approves.