Weather Forecast Application using VB.NET MVC

Problem Statement:

Develop a weather forecasting web application using VB.NET and ASP.NET MVC. The application should allow users to upload a CSV file containing a list of geographic locations, including latitude, longitude, and location name.

Upon upload, the application should parse the CSV file, process each location, and fetch the weather forecast for the upcoming days using an external weather service API.

After processing, the application must display the list of uploaded locations along with their corresponding weather forecasts in a user-friendly interface.

Flowchart:

https://miro.com/app/board/uXjVJc3VFus=/

Technology Stack

Backend: VB.NET, ASP.NET MVC, LINQ

Frontend: HTML5, CSS3, JavaScript, jQuery, Bootstrap, Chart.js

External API: Open-Meteo

Storage: Local SQL Database (used as a 6-hour cache)

Features:

Upload CSV with location data
Users can upload a CSV file containing a list of locations. Each row should include Latitude, Longitude, and Location Name.

Parse and validate CSV
After upload, the application reads the CSV and checks for correctness ensuring all required fields are present and properly formatted. If the file is invalid (missing columns or values), the user is notified with a clear error message.

Fetch weather forecast using external API
For each valid location in the CSV, the app sends a request to the Open-Meteo API to retrieve a 7-day weather forecast. The response includes daily minimum and maximum temperatures.

Display results in a tabular view (showing minimum and maximum temperature for seven days)
The weather data for all locations is presented in a table format, allowing users to compare and view forecasted temperatures at a glance.

Chart view with dropdown to select locations
A dropdown is populated with all the uploaded locations. Users can select a location to view its forecast visually.

Line chart showing min and max temperatures
When a user selects a location from the dropdown, a line chart appears displaying the minimum and maximum temperatures for that location over the next 7 days.

Re-upload CSV from the same page
Users don't need to navigate to a new page to upload a different CSV. The upload feature is available on the same page for convenience and better user experience.

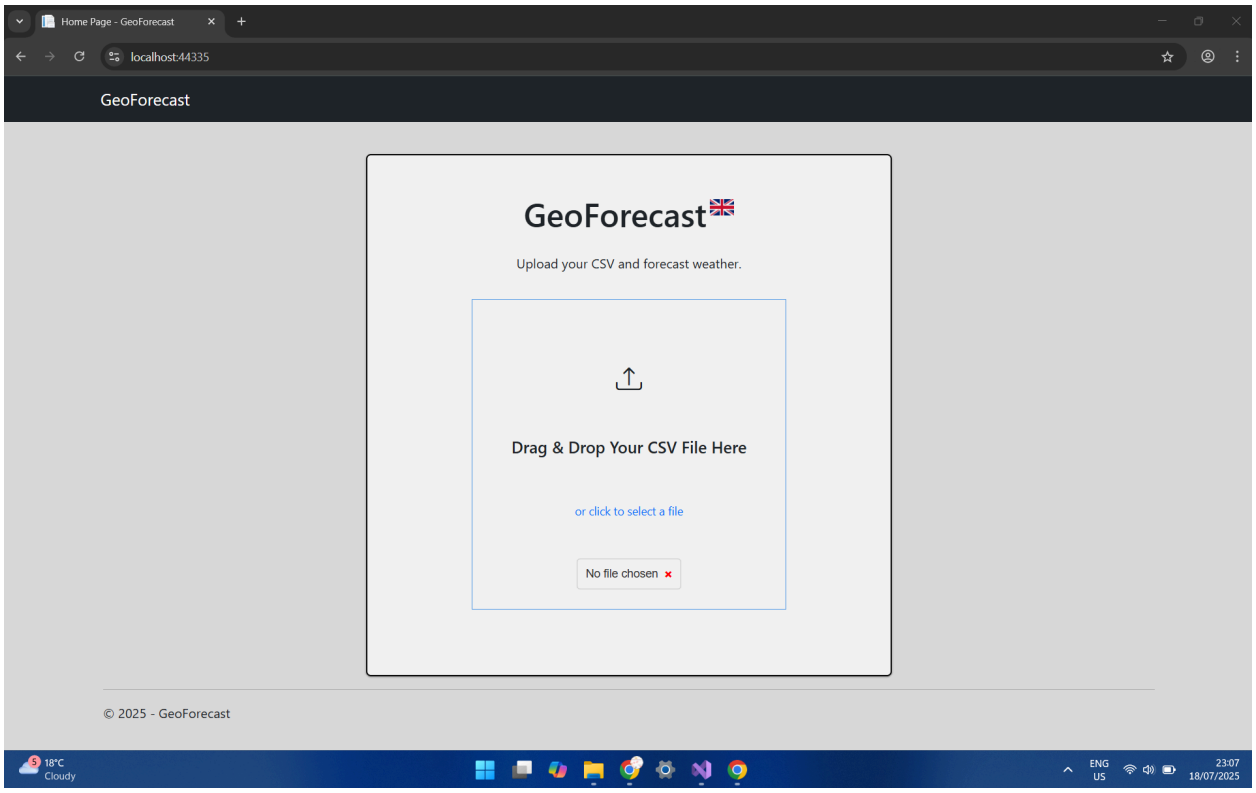
Caching via local DB to reduce API calls
To avoid unnecessary external API calls, the app stores the forecast data in a local database. If data for a location is already fetched in the past 6 hours, the app uses that cached data instead of calling the API again, improving speed and reducing latency.

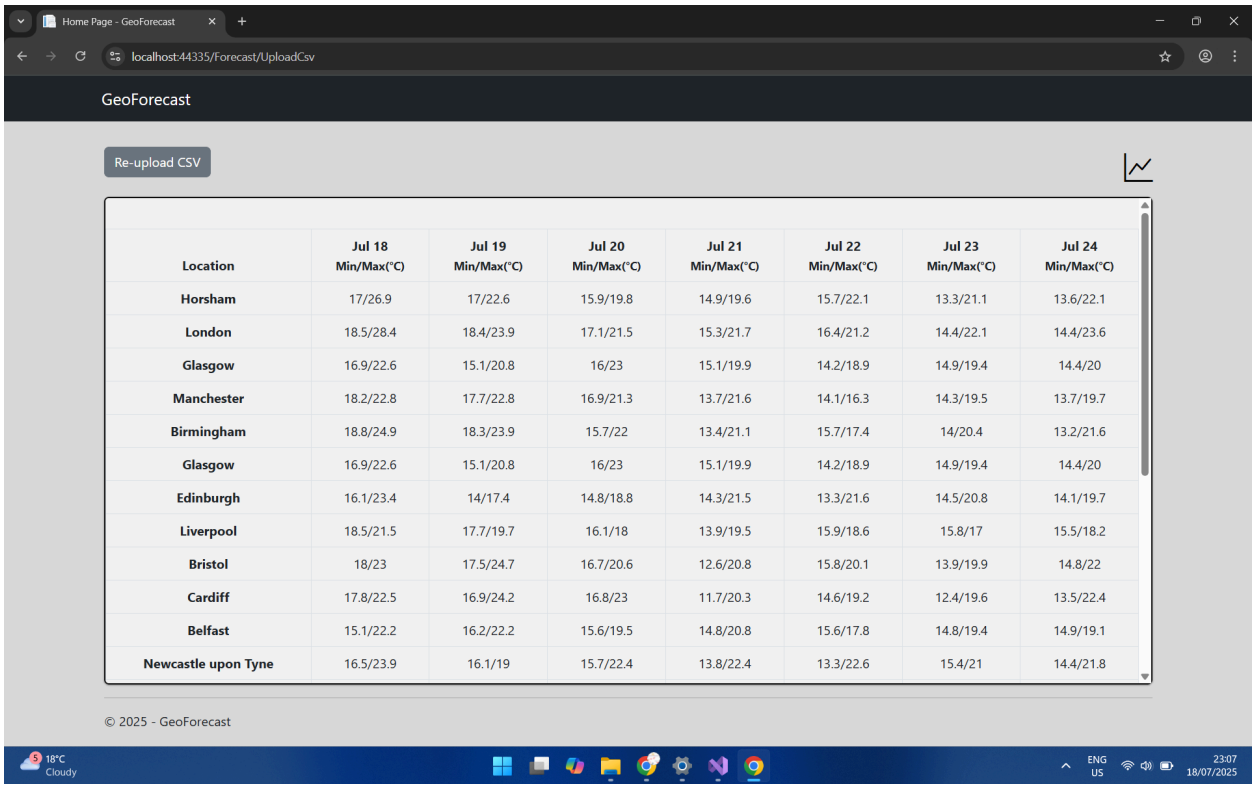
Error handling
The application includes proper error handling whether it's a malformed CSV, API failure, or unexpected system issue and provides clear feedback to the user.

Project Structure:

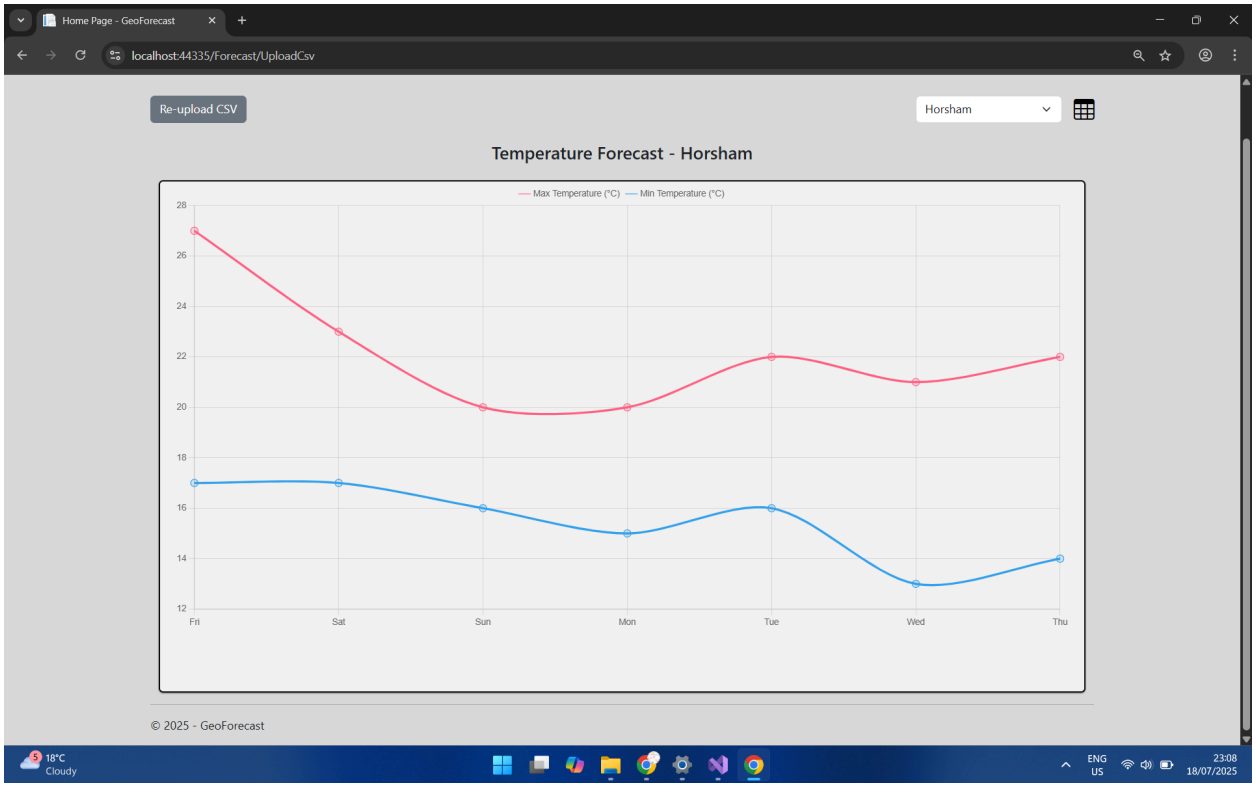
/Controllers → Handles HTTP requests (ForecastController)
/Models → Classes for data (LocationViewModel, ForecastData)
/Views → UI templates (Index.vbhtml, PartialViews to upload, render chart/table views)
/Services → Business logic (LocationCSVParserService, ForeCastService)
/Helpers → Utility classes (CSVValidator, ChartHelper)
/Repository → Handles all database-related operations(ForecastRepository)
/Exceptions → Handles all custom exceptions(CsvParsingException)
/Web.config → Configuration settings (API keys, DB connection)

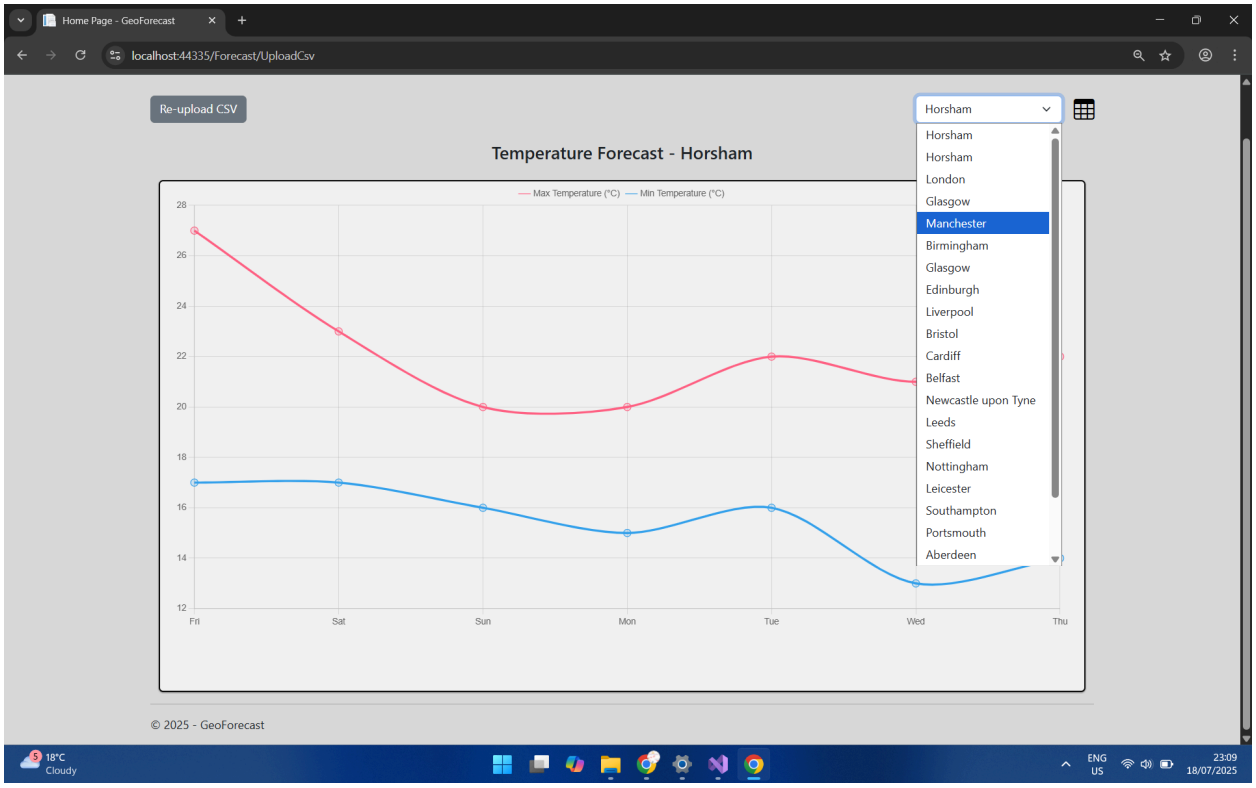
Screenshots:





Location	Jul 18 Min/Max(°C)	Jul 19 Min/Max(°C)	Jul 20 Min/Max(°C)	Jul 21 Min/Max(°C)	Jul 22 Min/Max(°C)	Jul 23 Min/Max(°C)	Jul 24 Min/Max(°C)
Horsham	17/26.9	17/22.6	15.9/19.8	14.9/19.6	15.7/22.1	13.3/21.1	13.6/22.1
London	18.5/28.4	18.4/23.9	17.1/21.5	15.3/21.7	16.4/21.2	14.4/22.1	14.4/23.6
Glasgow	16.9/22.6	15.1/20.8	16/23	15.1/19.9	14.2/18.9	14.9/19.4	14.4/20
Manchester	18.2/22.8	17.7/22.8	16.9/21.3	13.7/21.6	14.1/16.3	14.3/19.5	13.7/19.7
Birmingham	18.8/24.9	18.3/23.9	15.7/22	13.4/21.1	15.7/17.4	14/20.4	13.2/21.6
Glasgow	16.9/22.6	15.1/20.8	16/23	15.1/19.9	14.2/18.9	14.9/19.4	14.4/20
Edinburgh	16.1/23.4	14/17.4	14.8/18.8	14.3/21.5	13.3/21.6	14.5/20.8	14.1/19.7
Liverpool	18.5/21.5	17.7/19.7	16.1/18	13.9/19.5	15.9/18.6	15.8/17	15.5/18.2
Bristol	18/23	17.5/24.7	16.7/20.6	12.6/20.8	15.8/20.1	13.9/19.9	14.8/22
Cardiff	17.8/22.5	16.9/24.2	16.8/23	11.7/20.3	14.6/19.2	12.4/19.6	13.5/22.4
Belfast	15.1/22.2	16.2/22.2	15.6/19.5	14.8/20.8	15.6/17.8	14.8/19.4	14.9/19.1
Newcastle upon Tyne	16.5/23.9	16.1/19	15.7/22.4	13.8/22.4	13.3/22.6	15.4/21	14.4/21.8


Home Page - GeoForecast
localhost:44335/Forecast/UploadCsv
Re-upload CSV
Horsham
Temperature Forecast - Horsham
Max Temperature (°C)
Min Temperature (°C)
28
26
24
22
20
18
16
14
12
Fri
Sat
Sun
Mon
Tue
Wed
Thu
© 2025 - GeoForecast
18°C
Cloudy
ENG
US
23:08
18/07/2025


Home Page - GeoForecast
localhost:44335/Forecast/UploadCsv
Re-upload CSV
Horsham
Horsham
Horsham
London
Glasgow
Manchester
Birmingham
Glasgow
Edinburgh
Liverpool
Bristol
Cardiff
Belfast
Newcastle upon Tyne
Leeds
Sheffield
Nottingham
Leicester
Southampton
Portsmouth
Aberdeen
Temperature Forecast - Horsham
Max Temperature (°C)
Min Temperature (°C)
28
26
24
22
20
18
16
14
12
Fri
Sat
Sun
Mon
Tue
Wed
Thu
© 2025 - GeoForecast
18°C
Cloudy
ENG
US
23:09
18/07/2025