WeatherWise: AI Powered Inventory Scheduling App Using Weather Data to Predict Supply Surplus and Deficits

ITS120 - BM1- Group 4

Business Objectives

1. **To develop an application that integrates AI-powered weather forecasting.**

   One of the main objectives of WeatherWise is to ensure that it will be able to integrate AI-based weather forecasting. The constant shift in weather conditions can notably determine consumer behavior, logistics, and supply chain operations. In incorporating advanced forecasting models, WeatherWise seeks to anticipate weather-related disruptions and trends, allowing business to make informed decisions and improve operational efficiency. Utilizing weather insights to predict inventory surpluses and deficits can help accomodate for smarter inventory scheduling, improving product availability, and guaranteeing supply alignment with consumer needs.

2. **To provide personalized product recommendations for customers according to real-time weather.**

   Another important goal of this project is to make the shopping experience more personal and engaging for customers by offering product recommendations based on the current weather. People's needs and buying habits often change depending on the weather. Analyzing weather data in the customer's area can

help suggest appropriate products at the right time, while also helping the business increase in sales. As a result, businesses can increase conversion rates, augment customer satisfaction, and fortify brand loyalty through meaningful interactions.

3. **To ensure data security in inventory records through encryption and role-based access control.**

   The security of inventory data constitutes one of the primary objectives of the project. Pricing schemes, supplier-related sensitive data, and operational processes are subject to risk in these inventory systems. The application will, therefore, easily apply robust encryption techniques to secure this information from unauthorized access and data breaches. Role-based access control will also be applied to ensure that people can access only specific information and features that are relevant to their job functions. These security precautions do not only protect extremely important capital investments but maintain the integrity and confidentiality of the system as a whole.

User Requirements

1. **AI-Powered Weather Forecasting**
   - The **Inventory Manager/retail store manager** should view AI-enchanced weather forecasts to predict disruptions in the supply chain and make corresponding adjustments to stock levels.

- The **Business Analyst** would generate demand reports based on the weather to facilitate better procurement and logistics decisions.
- The **Business Analyst** should generate reports in order to analyze inventory performance, waste, and weather impacts.

2. **Inventory Management**

- The **Inventory Manager/retail store manager** should log in to access inventory data securely.
- The **Inventory Manager/retail store manager** should search and filter inventory items to quickly locate products by name, category, or supplier.
- The **Inventory Manager/retail store manager** should configure inventory thresholds in order to set minimum and maximum stock levels for each product.

3. **Personalized Product Recommendations**

- Each **customer** will receive a personalized product recommendation based on the current and future weather in order to enhance their shopping experience.
- The **Sales Manager** will track performance of recommended products to see which products perform well based on weather.

4. **System Management**

- The **System Administrator** should configure weather data sources to enable accurate, local-level forecasts to be integrated into the app.
- The **System Administrator** should maintain servers, databases, APIs, and third-party integrations.

○ The **System Administrator** should monitor performance metrics and optimize system efficiency.

5. **Data Security**

○ The **System Administrator** will assign user roles and access rights to ensure employees can view and change restricted views only on the information for which they are responsible.

○ The **Inventory Manager** will update inventory in a safe manner so customers will always have accurate and up to date information while protecting against unauthorized changes.

○ The **Auditor** will access the encrypted logs of the system in order to validate protection compliance and to investigate potential breaches.

Functional Requirements

1. **User Profile Creation**

● A function that can help people enter and use the system with their new account.

● Allows new users (even store owners, staff, and admins) to register with:

○ Valid Email Address

○ Password

○ Confirmed Password

○ Full Name (Last Name, First Name, Middle Initial, Suffix)

- Birthday
- Contact Number
- Allows administrators to create accounts for targeted staff and suppliers using their details, such as:
  - Valid Email Address
  - Password
  - Confirmed Password
  - Full Name (Last Name, First Name, Middle Initial, Suffix)
  - Birthday
  - Contact Number
  - Role (Admin, Retail Owner, Staff, and Supplier)
  - Role ID
  - Starting Date
- A great feature of this function is that it validates user accounts to prevent duplicate and unauthorized user profiles.

2. **User Login & Authentication**
   - After account creation, users can enter the system using their created email/username and password.
   - Automation in role detection (admin, retail owner, staff, and supplier) and sends them to the correct dashboard.
   - In case of lost or forgotten accounts, password recovery is possible through email automated messages.

3. **User Information Management**

- Enables users to edit their social preferences like:

  - Contact Number

  - Email Address

  - Business Information

- For the admins, they have full control (such as activation/deactivation and update) over the employee, owner, and supplier's accounts.

- Has a recorded log on all changes from the user for secured accountability.

4. **User Dashboard, Alerts, and Reminders**

- Each user role will be directed to a customized dashboard after login.

- Dashboards display key performance indicators (KPIs), real-time weather forecasts, inventory alerts, and task lists relevant to the role.

- System sends automated alerts and reminders for:

- Low stock levels or surplus warnings

- Weather disruptions that may impact supply chain

- Pending tasks such as purchase orders, deliveries, or stock transfers

- Alerts can be sent via in-app notifications and email

5. **System's Inventory Management**

- Users with permissions can perform the following inventory management operations:

  - Add, edit, and remove items.

  - Search, filter, and sort inventory by product name, category, supplier, or scheduled date.

- ○ Threshold settings allow users to define minimum and maximum stock levels
- ○ Trigger automatic alerts when thresholds are reached or exceeded
- ○ Manages inventory categorization

6. **System's AI-based Scheduling**

- Generates smart replenishment plans with recommended order quantities and timing.
- Retail and inventory managers can approve, adjust, or override AI-generated schedules.
- AI engine predicts optimal restock schedules based on:
    - ○ Real-time and forecasted weather data
    - ○ Historical sales data and demand patterns
    - ○ Supplier lead times and delivery reliability
- AI scheduling takes into account:
    - ○ Weather-induced demand spikes
    - ○ Public holidays or events

7. **System's AI Forecasting & Weather Informations**

- Real time weather data integration predicts shift in demand.
- Customizable forecasting reports (daily, weekly, monthly).
- Highlights potential supply chain disruptions due to extreme weather.

8. **System's Smart Reports and Analytics**

- Advanced reporting tools that transform raw data into actionable insights such as:

- ○ Supply vs Demand Comparisons

- ○ Weather Impact on Sales

- ○ Cost and Waste Tracking

- Offers visual analysis through graphs and charts.

- Custom report generation by date, product, category, or location.

9. **Security and Access Control**

- Ensures the protection of sensitive data and regulates user access based on roles. (System Administrator, Business Analyst, Inventory Manager, etc.)

- System Admins can manage user roles, set permissions, and restrict access to sensitive modules.

- Logs all user activities for accountability and auditing.