Problem Definition & Design Thinking

Title: Market Trend Analysis

Problem Statement:

In today's dynamic economy, businesses struggle to comprehend market behavior and anticipate future movements. Technological innovations, shifting consumer habits, and global disruptions contribute to unpredictable demand and supply patterns, complicating decision-making for stakeholders.
The core challenge is to deliver precise, data-backed insights on market trends, enabling businesses to take proactive and strategic actions at the right time.

Target Audience:

- Small and medium businesses seeking to interpret market behavior
- Marketing and sales teams looking for insights into customer patterns
- Financial analysts monitoring industry performance
- Investors analyzing market movements for better investment choices

Objectives:

- To examine historical and live market data to uncover trends
- To deliver visualized insights and predictive analytics for better strategy formulation
- To assist users in recognizing trends, seasonal effects, and outliers in market activity
- To build an interactive dashboard offering easy access to market insights

Design Thinking Approach:

Empathize:

Many companies and professionals face difficulties in making sense of raw datasets. Manual interpretation is not only tedious but also often unreliable, especially in fast-changing markets. Users prefer intuitive, trustworthy tools that don't demand advanced technical knowledge.

Key User Concerns:

- Challenges in understanding complex data formats
- Demand for both real-time and forward-looking insights
- Desire for user-friendly tools with minimal learning curve

Define:

The ideal solution should enable users to upload or link datasets (e.g., sales figures, stock data, customer behavior), visualize market activities, and produce reports on identified trends, forecasts, and anomalies.

Key Features Required:

- Capability to ingest structured and unstructured market data
- Machine learning models for trend detection and time-series analysis
- Forecasting mechanisms using ARIMA, LSTM, or similar methods
- Visualization elements such as line graphs, dashboards, and heatmaps

Ideate:

Possible solutions may involve:

- An AI-integrated dashboard for analytics and future trend prediction
- Natural language support for queries like "Display sales trends for Q1 2023"
- Notifications for unexpected changes in data
- Integration with APIs like Google Trends or financial data platforms

Brainstorming Results:

- A dashboard with support for multiple data formats and trend visualization
- Option to export findings as PDF or Excel for stakeholder communication
- A suggestion engine that recommends models based on input data type

Prototype:

The first version will be a web platform allowing users to:

- Upload files (CSV, Excel)
- Choose relevant columns for trend analysis
- View interactive visualizations (e.g., line charts, moving averages)
- Receive AI-based trend summaries and forecasts

Key Components of Prototype:

- Backend processing with Python, Pandas, and Scikit-learn
- Visuals generated using Plotly, Matplotlib, or Seaborn
- Predictive functions through ARIMA or LSTM models
- Frontend built using Flask/Django for server-side and React for user interface

Test:

The prototype will be evaluated by business users, startup founders, and academic participants to ensure it delivers accurate insights and a smooth user experience.

Testing Goals:

- Ensure accessibility for users with limited technical expertise
- Assess the practicality of generated insights and forecasts
- Collect feedback on dashboard usability and data visualization quality