**Project Overview: Viral Food Trend Analysis**

**Problem Statement:**

**The goal of this project is to analyze the growing viral food trends across social media, sales, and recipe data to uncover insights and patterns that can be used by restaurants, food influencers, and businesses to make informed decisions. This analysis involves aggregating data from various sources like social media posts, restaurant sales, and recipe data, followed by cleaning, transforming, and performing exploratory data analysis (EDA). The final step will be presenting insights in a user-friendly dashboard for key stakeholders such as marketers, restaurant owners, and food influencers.**

**Data Sources:**

1. **Social Media Data:**
   * **Social media platform engagement metrics (likes, comments, shares).**
   * **Influencer metrics (followers, engagement rates).**
   * **Hashtags and post types (image, video, etc.).**
2. **Sales Data:**
   * **Sales volume for dishes by restaurant.**
   * **Sales by location and date.**
   * **Dish prices and restaurant details.**
3. **Recipe Data:**
   * **Ingredients, preparation times, and cuisine types.**
   * **Dietary restrictions and calories for dishes.**

**Steps for the Project:**

**1. Data Collection & Integration:**

* **Social Media: Data from platforms like Instagram, TikTok, etc., using hashtags and influencers to gather post data, engagement metrics, and content types.**
* **Sales: Aggregate restaurant sales data based on dish names, locations, and date ranges.**
* **Recipe Data: Collect data on ingredients, cuisine type, dietary restrictions, and nutritional information.**

**2. Data Cleaning:**

* **Handling Missing Data: Replace or impute missing values (e.g., engagement metrics, sales volume).**
* **Outliers: Identify and handle outliers in sales volume and social media engagement.**
* **Data Type Corrections: Ensure that numeric columns are properly typed (e.g., sales volume, engagement metrics).**
* **Consistency: Ensure consistency in dish names and restaurant names (e.g., "Vegan Burger" vs. "Vegan Burger Deluxe").**

**3. Data Transformation:**

* **Foreign Keys: Assign unique IDs for dishes, restaurants, and influencers, and ensure these are used as foreign keys in the combined dataset.**
* **Time Series Aggregation: Aggregate sales data by month/week to identify seasonality and trends over time.**
* **Categorization: Convert categorical columns like Cuisine Type and Dietary Restrictions to factors for easier analysis.**

**4. Exploratory Data Analysis (EDA):**

* **Social Media Trends:**
  + **Which hashtags and dishes are seeing the most engagement?**
  + **Is there a correlation between influencer follower count and post engagement?**
  + **Identify trends in social media content (e.g., image vs. video content) and engagement rates.**
* **Sales Insights:**
  + **Which dishes are performing well in terms of sales across different locations?**
  + **What is the relationship between dish prices and sales volume?**
  + **Seasonal trends in dish sales and how they correlate with social media engagement.**
* **Recipe & Dietary Analysis:**
  + **Are vegan and gluten-free dishes more likely to go viral?**
  + **Identify which cuisines are trending on social media and their sales performance.**
* **Data Correlations:**
  + **Correlation between social media engagement and sales volume for specific dishes.**
  + **Impact of influencer posts on dish sales over time.**

**5. Data Visualization:**

* **Key Visualizations:**
  + **Time series line charts to show trends in social media engagement, sales volume, and recipe popularity.**
  + **Bar charts for dish performance in sales and engagement.**
  + **Heatmaps to visualize the correlation between social media trends and sales.**
  + **Pie charts to show distribution of cuisine types and dietary restrictions.**

**6. Dashboard Creation:**

**The final product will be an interactive dashboard where the user can:**

* **Filter by time period (e.g., month, quarter).**
* **Filter by dish type, restaurant, or influencer.**
* **View key KPIs like engagement rates, sales volume, and dish popularity.**
* **Visualize trends over time using interactive charts.**
* **See correlations between social media activity and sales metrics.**

**The dashboard can be created using Power BI, Tableau, or Excel PivotTables for non-technical users. Alternatively, Python libraries like Dash, Streamlit, or Plotly can be used for a web-based interactive dashboard.**

**Key Data Analysis Questions:**

1. **Social Media Insights:**
   * **Which dishes have the highest engagement on social media in the past 6 months?**
   * **Are certain influencers contributing more to viral food trends? What is the correlation between influencer follower count and engagement rate?**
   * **Which content types (image, video, story) get the most engagement for each platform?**
2. **Sales Performance:**
   * **Which dishes show the highest sales volume, and how does that correlate with social media trends?**
   * **Are there certain locations (cities, regions) where specific dishes are more popular?**
   * **How does the price of a dish impact its sales performance? Is there a sweet spot for pricing?**
3. **Recipe and Dietary Preferences:**
   * **What are the most popular dishes based on cuisine types and dietary restrictions (e.g., vegan, gluten-free)?**
   * **How do dish ingredients correlate with social media engagement and sales? Are some ingredients more likely to go viral?**
4. **Trend Analysis:**
   * **Can we predict future viral dishes based on past social media trends and sales data?**
   * **How can restaurants optimize their marketing based on food trends?**
   * **What are the upcoming food trends based on emerging hashtags, ingredients, or cuisines?**

**Possible Tools for Data Analysis and Dashboard Creation:**

1. **Python:**
   * **Pandas: For data manipulation and cleaning.**
   * **NumPy: For numerical operations.**
   * **Matplotlib/Seaborn: For data visualization (line charts, bar charts, heatmaps).**
   * **Scikit-learn: For machine learning (e.g., trend prediction).**
   * **Plotly/Dash/Streamlit: For interactive dashboards.**
2. **SQL:**
   * **Use SQL queries to extract, aggregate, and join data from different tables (social media, sales, recipe).**
   * **Aggregate data to identify trends by month/quarter or by dish/restaurant.**
3. **Excel:**
   * **PivotTables: For summarizing and aggregating data.**
   * **Charts: For visualizing trends.**
   * **Power Query: For data cleaning and transformation.**
   * **VLOOKUP and INDEX-MATCH: For merging datasets based on dish, restaurant, or influencer IDs.**
4. **Power BI or Tableau:**
   * **Create interactive dashboards with drag-and-drop functionality.**
   * **Use DAX in Power BI to calculate KPIs and perform trend analysis.**
   * **Connect Power BI/Tableau to databases (SQL or Excel) for real-time updates.**

**Final Deliverables:**

1. **Data Cleaning Scripts (Python or SQL).**
2. **Interactive Dashboard showcasing:**
   * **Social media engagement metrics over time.**
   * **Sales performance across different dishes, restaurants, and locations.**
   * **Recipe data insights like cuisine and dietary preferences.**
   * **Correlation between social media activity and sales.**
3. **Key Insights Report:**
   * **What trends are emerging?**
   * **Which dishes are likely to go viral based on past data?**
   * **What recommendations can be made for restaurants and influencers?**

**This project could be highly useful for food marketing teams, restaurant owners, and influencers to track trends, adjust menus, and optimize marketing strategies.**

**Would you like me to provide more specific guidance on how to execute any of these tasks? Let me know!**