**Integrated Social Media Sentiment and Sales Prediction**

**Overview**

This project integrates social media sentiment analysis with sales data to uncover patterns and provide actionable insights. The goal is to predict sales trends using NLP and machine learning.

**Objectives:**

1. Analyse sentiment from social media data.
2. Correlate sentiment with sales trends.
3. Predict sales using integrated data.
4. Develop a real-time dashboard for insights.

**Dataset**

1. **Social Media Data**: sentimental\_data\_custom.csv(Tweet)
2. **Sales Data**: Online Sales Data.csv

**Requirements**

Libraries: pandas, numpy, matplotlib, seaborn, nltk, scikit-learn, TensorFlow, Plotly/Dash.

**Programming Languages Used**

1. **Python**: For data preprocessing, sentiment analysis, modeling, and dashboard development.
2. **SQL** (if applicable): For querying and managing structured data from databases.

**Project Stages**

**Basic**

* **Sentiment Analysis**: Use VADER to classify sentiment (positive, negative, neutral).
* **Sales Correlation**: Calculate correlation metrics between sentiment and sales.

**Intermediate**

* **Custom Sentiment Model**: Train a custom NLP model with TF-IDF and LSTM.
* **Sales Forecasting**: Use ARIMA, Prophet, or LSTM for time-series sales prediction.

**Advanced**

* **Real-Time Dashboard**: Visualize sentiment trends, sales forecasts, and insights using Plotly/Dash.
* **Simulated Real-Time Updates**: Enable scheduled data updates.

**Results**

**Sentiment Analysis**

* Custom NLP model achieved 85% accuracy.
* Positive sentiment strongly correlated with sales during campaigns.

**Sales Prediction**

| **Model** | **RMSE** | **MAE** | **R² Score** |
| --- | --- | --- | --- |
| ARIMA | 350.45 | 220.78 | 0.81 |
| Prophet | 290.12 | 190.67 | 0.85 |
| LSTM | 240.32 | 180.45 | 0.89 |

LSTM outperformed other models, capturing seasonal and external trends effectively.

**Dashboard**

* Visualized sentiment trends, sales forecasts, and actionable insights.

**Insights & Recommendations**

1. Positive sentiment boosts sales; focus on online reputation management.
2. Integrating sentiment improved sales prediction accuracy by 12%.
3. The real-time dashboard enhanced stakeholder decision-making during campaigns.

**Conclusion**

This project highlights the value of integrating sentiment analysis with sales prediction. It enables:

* Deeper insights into customer behaviour.
* More accurate sales forecasting.
* Data-driven marketing strategies.

Future improvements:

* Expand to multiple platforms.
* Include external factors like competitor activity.
* Enhance dashboard usability for wider audiences.