**Nykaa Sentiment Analysis Project**

**📌 Project Overview**

This project analyzes **Nykaa product reviews** to extract sentiment insights using:

✅ **Traditional Machine Learning Models** (Logistic Regression, SVM, Random Forest, XGBoost).  
✅ **Fine-Tuned BERT for Sentiment Analysis**.  
✅ **Aspect-Based Sentiment Analysis (ASBA)** to evaluate **Price, Quality, Fragrance, Packaging**.

**📊 Project Workflow**

1️. **Data Preprocessing & Cleaning**

* Removed duplicates, handled missing values.
* Cleaned text using regular expressions.
* Assigned sentiment labels based on review ratings.

2️. **Traditional Machine Learning Approach**

* Converted text into numerical form using **TF-IDF Vectorization**.
* Trained models: **Logistic Regression, SVM, Random Forest, XGBoost**.
* Evaluated models using **Accuracy, Precision, Recall, F1-score**.

3️. **BERT-Based Sentiment Analysis**

* Used **Hugging Face Transformers** to fine-tune bert-base-uncased on Nykaa reviews.
* Achieved **higher accuracy (77.7%)** than traditional ML models.
* Visualized **BERT's attention mechanism** for word importance.

4️. **Aspect-Based Sentiment Analysis (ASBA)**

* Extracted product aspects: **Price, Quality, Fragrance, Packaging**.
* Analyzed sentiment distribution across aspects.
* **Price & Quality were the most discussed aspects** in reviews.

**📈 Model Performance Comparison**

| **Model** | **Accuracy** | **F1-Score** |
| --- | --- | --- |
| **Logistic Regression** | 74.6% | 74.5% |
| **SVM** | 74.0% | 74.0% |
| **Random Forest** | 69.2% | 69.0% |
| **XGBoost** | 69.7% | 68.5% |
| **BERT** | **77.7%** | **77.8%** |

✅ **BERT outperformed all traditional ML models** due to its superior contextual understanding.

✅ **Aspect-Based Sentiment Analysis (ASBA) provided deep insights into customer concerns.**

**📂 Project Structure**

📁 Nykaa-Sentiment-Analysis

│── 📜 Nykaa Sentiment Analysis.ipynb # Code for ML & BERT models

│── 📜 Nykaa Project Report.docx # Detailed project report

│── 📜 nyka\_top\_brands\_reviews.csv # Processed dataset

│── 📜 README.md # Project documentation

**🚀 How to Run the Project**

1️⃣ Clone this repository:

git clone https://github.com/dinedev-24/Nykaa-Sentiment-Analysis.git

2️⃣ Install dependencies:

pip install -r requirements.txt

3️⃣ Run Jupyter Notebook:

jupyter notebook Nykaa\_Sentiment\_Analysis.ipynb

**📌 Next Steps & Improvements**

✅ **Deploy as a Web App:** Create a UI dashboard to visualize sentiment insights.  
✅ **Real-Time Review Analysis:** Integrate live review fetching & prediction.  
✅ **Enhance ASBA:** Expand aspect categories for deeper analysis.

**🛠 Contributors**

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📌 **GitHub:** [Nykaa-Sentiment-Analysis](https://github.com/dinedev-24/Nykaa-Sentiment-Analysis)

🎯 **This project provides valuable insights into Nykaa product sentiment and can help businesses optimize customer experience.** 🚀