Here’s an updated version of the proposal with the additional features incorporated:

**Project Proposal**

**Title:**

**Sentiment Analysis and Custom Reply Generation for Product Reviews with Role-Based Access Using Flask**

**Group Members:**

* **Member 1:** (M.Sohail Amjad)
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**Project Overview:**

This project aims to develop a Flask-based web application for performing sentiment analysis on product reviews. The system will support role-based access, with two user types: Admin and Sentiment User. Admins will have access to dashboards, review statistics, and visualizations, while Sentiment Users can submit reviews for analysis and generate custom replies. Additional functionality includes a **sample review page** to demonstrate sentiment analysis and **bulk sentiment analysis** for processing datasets, making the system versatile for business needs.

**Project Goals:**

1. **Sentiment Analysis:**
   * Build a Flask-based app to analyze sentiments of product reviews.
   * Classify sentiments into Positive, Neutral, or Negative categories.
2. **Role-Based Access:**
   * Implement two types of users: Admin and Sentiment User.
     + **Admin:** Access to dashboards, sentiment statistics, and data visualizations.
     + **Sentiment User:** Submit reviews for sentiment analysis and generate replies.
3. **Custom Reply Generation:**
   * Generate personalized responses to reviews based on sentiment and detected keywords.
4. **Sample Review Page:**
   * Add a page displaying a set of pre-loaded sample comments.
   * Perform real-time sentiment analysis on these comments to visually showcase the system’s capabilities.
5. **Bulk Sentiment Analysis:**
   * Enable users to upload datasets (e.g., CSV files) containing multiple comments.
   * Process and classify sentiments in bulk.
   * Visualize results using charts (e.g., sentiment distributions and trends).

**Proposed Features:**

1. **Sentiment Analysis:**
   * **Description:** Analyze user-entered product reviews, classifying sentiments as Positive, Neutral, or Negative using Natural Language Processing (NLP).
   * **Impact:** Helps businesses understand customer feedback and improve products/services.
2. **Role-Based Access:**
   * **Admin Features:**
     + View dashboards with:
       - Sentiment trends over time (e.g., line charts).
       - Sentiment distributions (e.g., pie charts).
       - Word clouds of common keywords in reviews.
     + Access complete review history with sentiment classifications and replies.
   * **Sentiment User Features:**
     + Submit reviews for sentiment analysis.
     + Generate custom replies based on sentiment and keywords.
3. **Custom Reply Generation:**
   * **Description:** Generate automated, relevant responses for reviews based on sentiment and keywords.
   * **Impact:** Provides personalized and interactive responses, enhancing customer engagement.
4. **Sample Review Page:**
   * **Description:** A dedicated page displaying a pre-defined list of reviews. Perform sentiment analysis on these comments dynamically to demonstrate the system’s working.
   * **Impact:** Provides a hands-on demonstration of sentiment analysis to users and admins.
5. **Bulk Sentiment Analysis:**
   * **Description:** Users can upload files (e.g., CSV) containing multiple reviews for bulk sentiment analysis. Results are presented with visualizations, such as:
     + Sentiment distributions (e.g., pie charts).
     + Trends across datasets (e.g., line or bar charts).
   * **Impact:** Offers a scalable and efficient way for businesses to analyze large volumes of feedback.
6. **Data Visualization:**
   * **Description:** Provide rich visualizations for sentiment insights, such as:
     + Pie charts for sentiment distribution.
     + Line charts for sentiment trends.
     + Word clouds for common keywords.
   * **Impact:** Empowers admins with actionable insights derived from review data.

**Tools and Technologies:**

* **Backend:** Flask, Python
* **Database:** SQLite or PostgreSQL
* **Machine Learning:** Pre-trained NLP models (e.g., BERT) for sentiment analysis and keyword detection
* **Frontend:** HTML/CSS, Bootstrap, JavaScript
* **Additional Libraries:**
  + Flask-RBAC for role-based access
  + SQLAlchemy for database management
  + Matplotlib, Seaborn for visualizations

**Expected Outcomes:**

1. A Flask-based web application that:
   * Analyzes sentiments of individual reviews.
   * Provides an Admin dashboard with sentiment visualizations and statistics.
   * Features a sample review page for dynamic analysis demonstration.
   * Supports bulk sentiment analysis with file uploads and visualized results.
2. Role-based access ensures distinct functionalities for Admin and Sentiment User roles.
3. Custom replies generated for user reviews enhance customer interaction.

**Conclusion:**

This project combines sentiment analysis, role-based access control, and interactive functionalities to deliver a robust solution for understanding and responding to customer feedback. The addition of a **sample review page** and **bulk sentiment analysis** enhances the usability and scalability of the system, making it a valuable tool for businesses seeking to analyze and engage with their customers effectively