Sentilytics - AI Powered Comments Analyzer

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----------Introduction----------

- Sentilytics is an AI-powered sentiment analysis tool designed for real-time analysis of user-generated comments. The system categorizes comments into positive, negative, or neutral sentiments. It supports both single comment analysis and bulk analysis via CSV/Excel uploads. Users can visualize sentiment distribution using bar graphs and word clouds. The project comprises a React.js frontend and a Django backend with a custom sentiment analysis model.

----------Project Description----------

- Our system simplifies sentiment analysis by allowing users to analyze comments individually or in bulk. Users can either input a single comment or upload a CSV file containing multiple comments, and the system will classify them as **positive, negative, or neutral**.
- For guest users, a single comment analysis is available without registration. Registered users, on the other hand, can perform batch analyses, visualize results through **bar graphs and word clouds**, and even correct misclassified sentiments to improve model accuracy.
- Admins have access to an overview of sentiment trends, user activity, and comment classification results. The Sentilytics platform ensures a **user-friendly experience**, helping businesses and individuals understand customer opinions in a structured and efficient manner.

----Development Tools & Technologies Used---

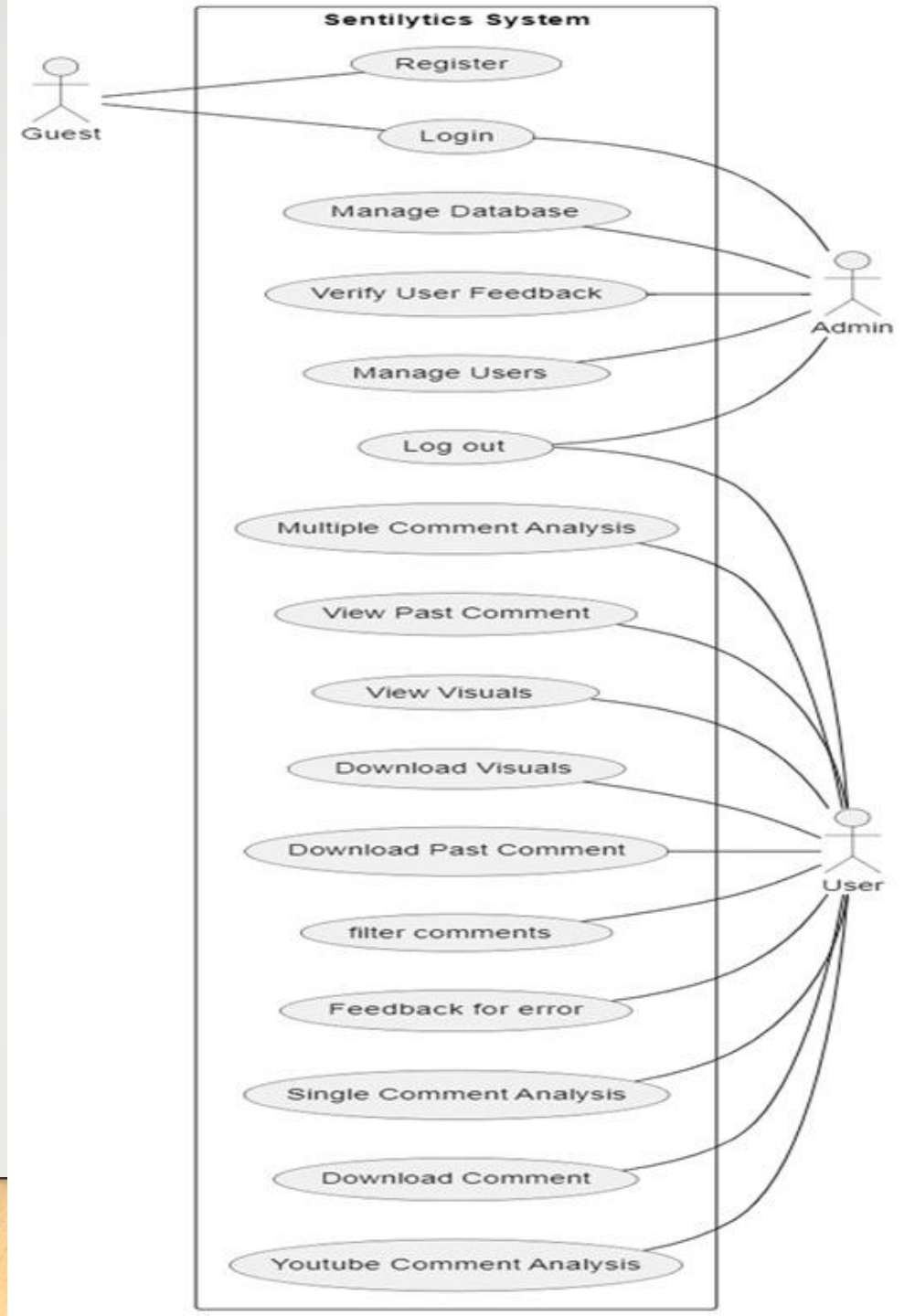
- Frontend: React.js
- Backend: Django (Python)
- Database: PostgreSQL
- Machine Learning Model: Custom-built using Logistic Regression
- Datasets: Sentiment140, Amazon Product Review

----------Modules/Features----------

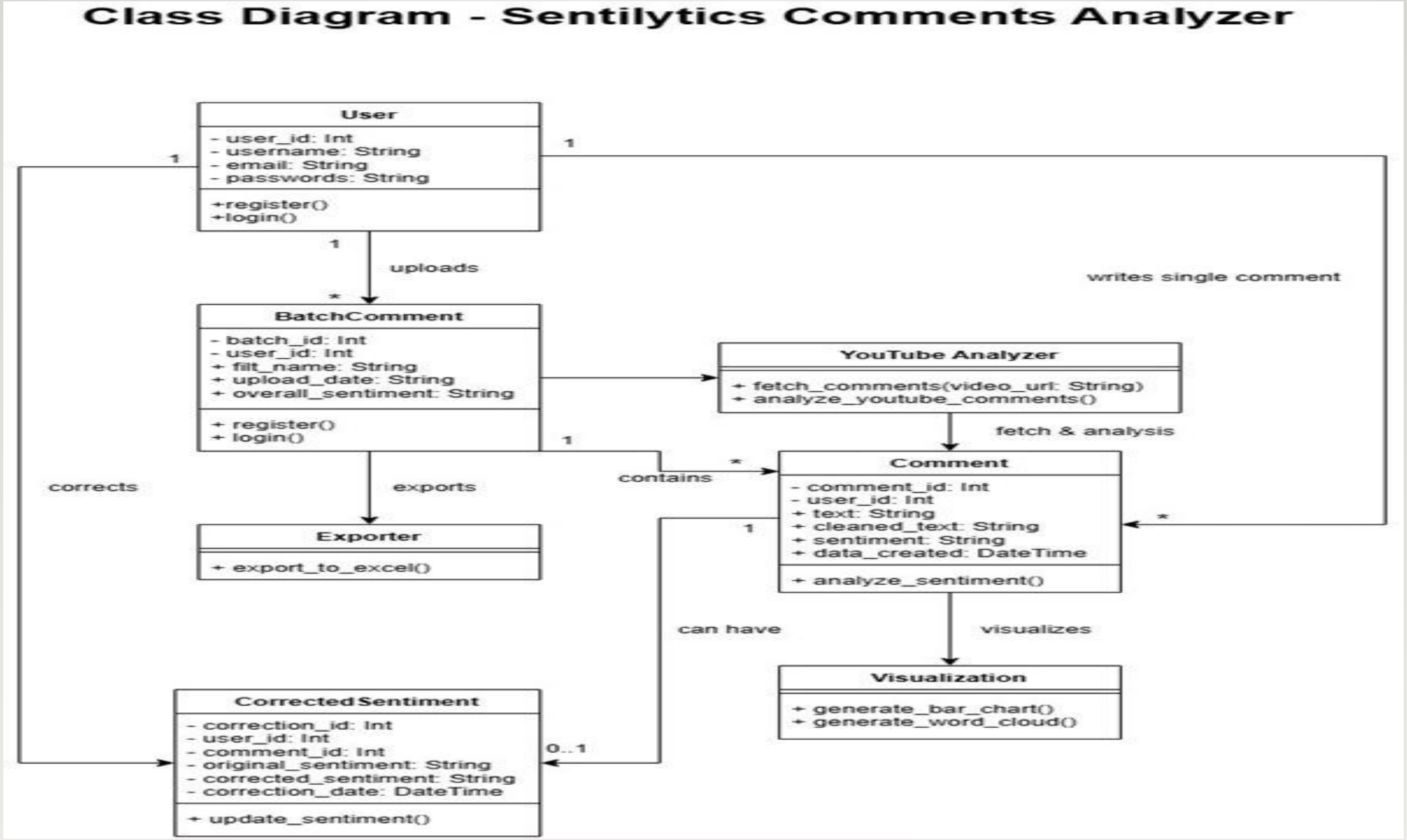
- Single Comment Analysis
- Multiple Comments Analysis
- YouTube Comments Analysis
- Export Results
- Manual Sentiment Editing
- Graphical Representations & Insights
- User Feedback & Model Improvement

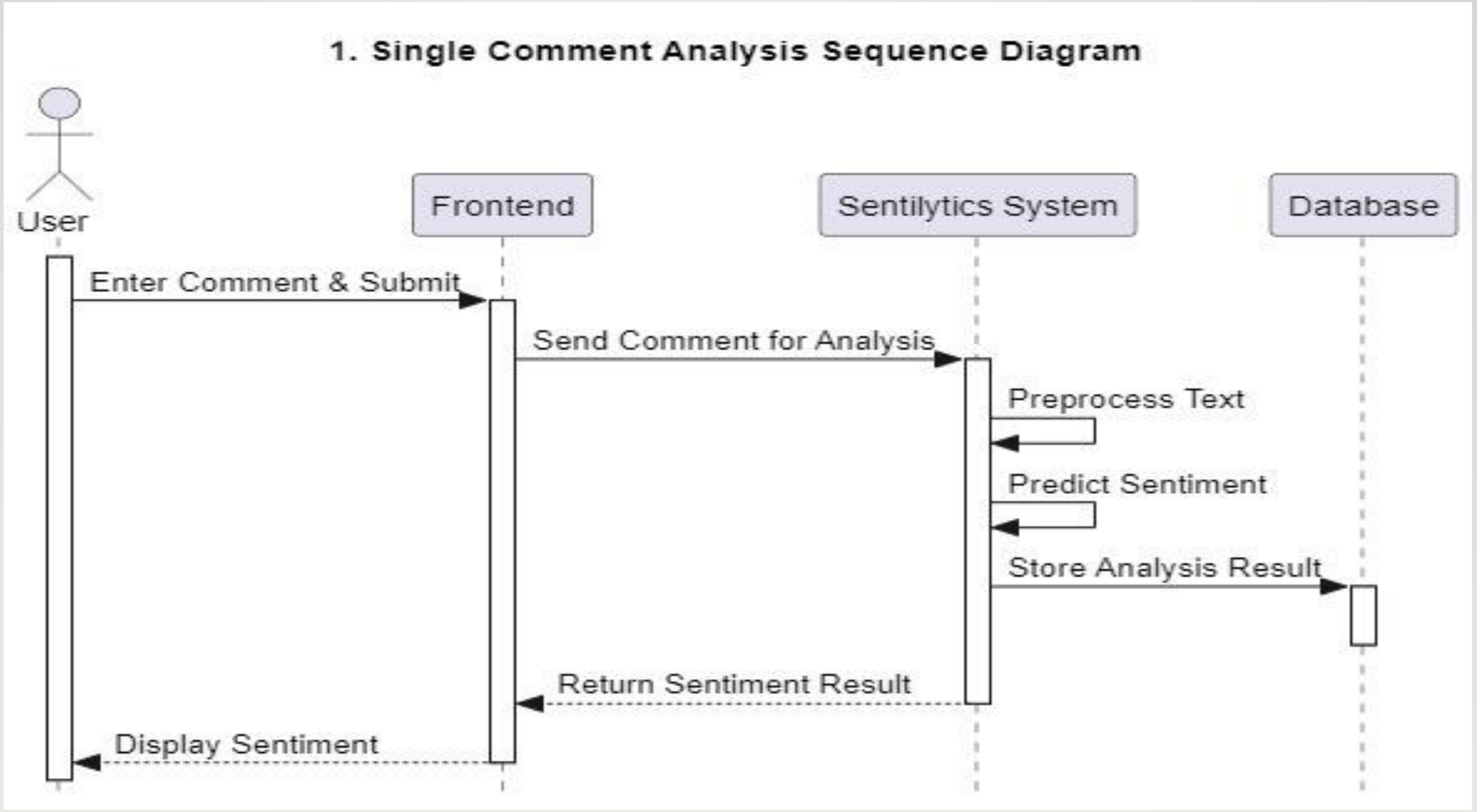
UML

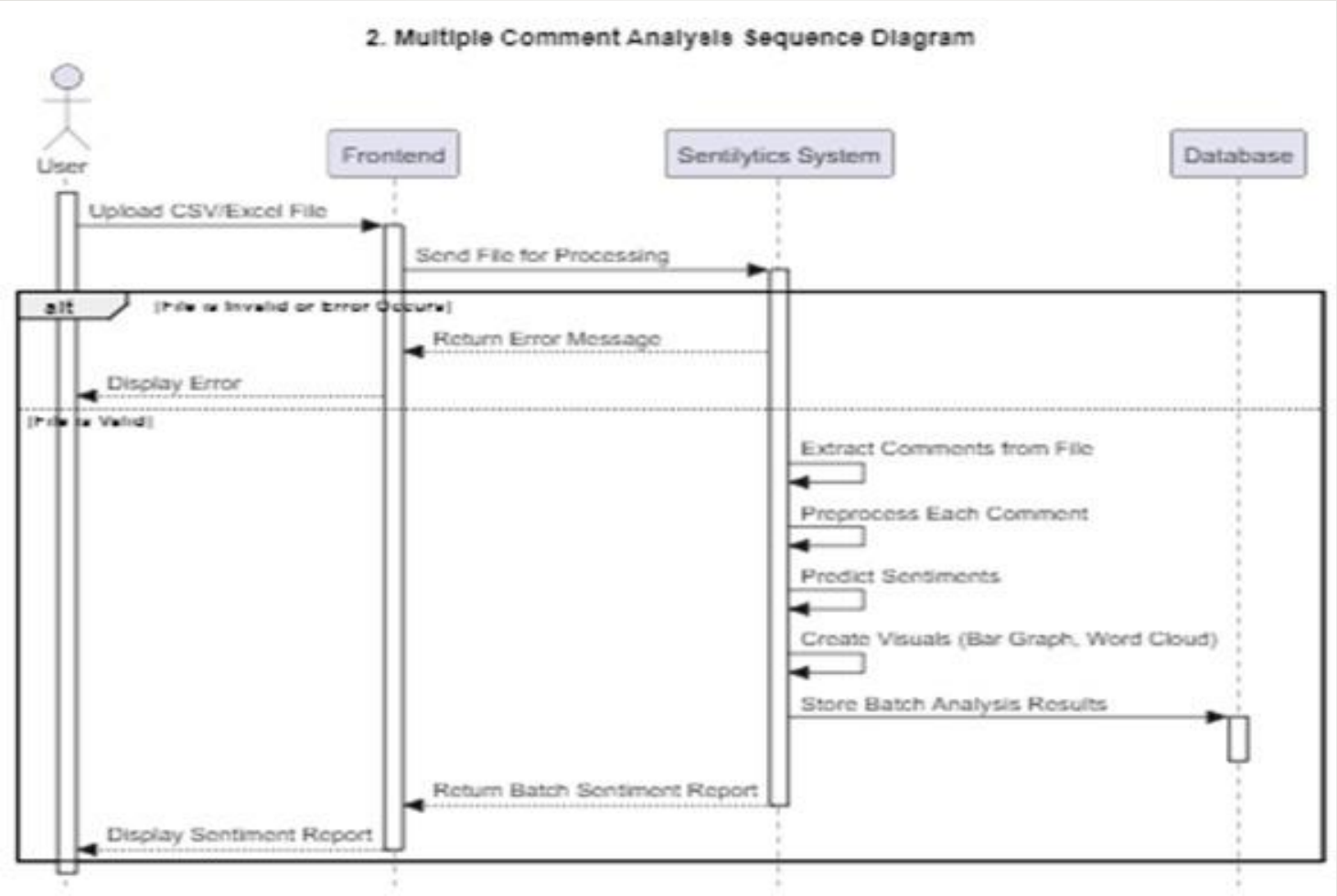
DIAGRAMS

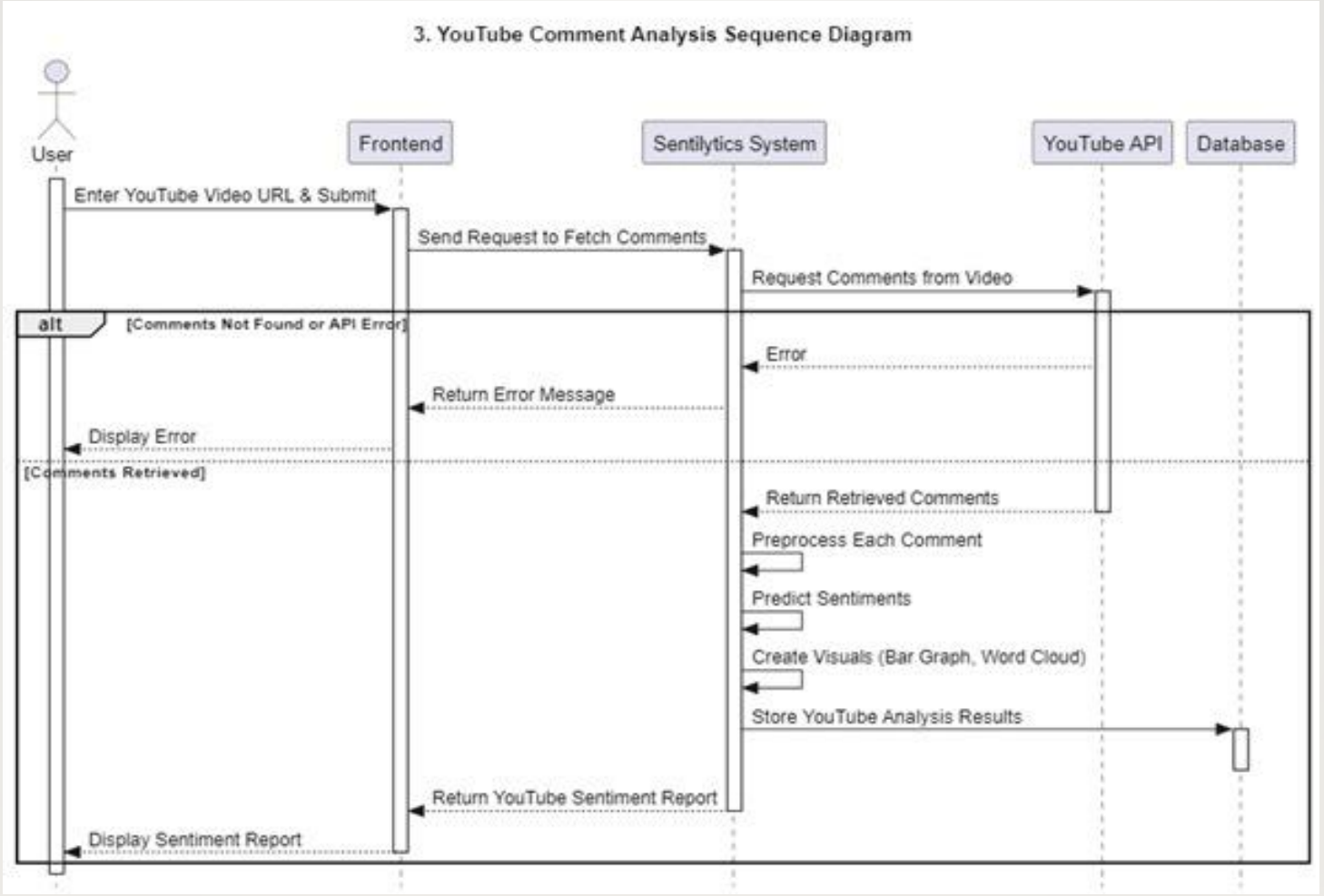

Sentilytics System
Guest
Register
Login
Manage Database
Verify User Feedback
Manage Users
Log out
Admin
Multiple Comment Analysis
View Past Comment
View Visuals
Download Visuals
Download Past Comment
filter comments
Feedback for error
Single Comment Analysis
Download Comment
Youtube Comment Analysis
User

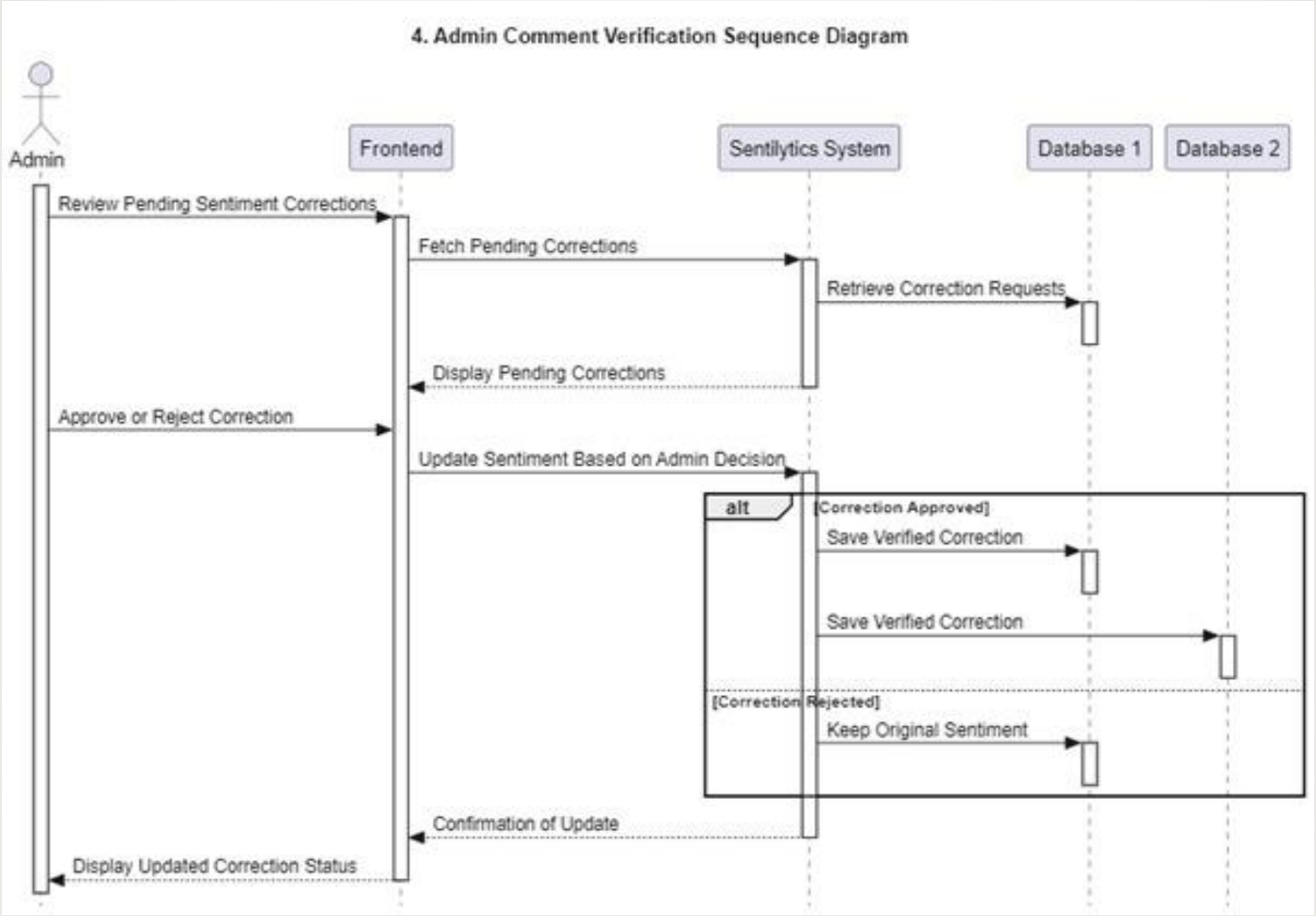
Class Diagram - Sentilytics Comments Analyzer



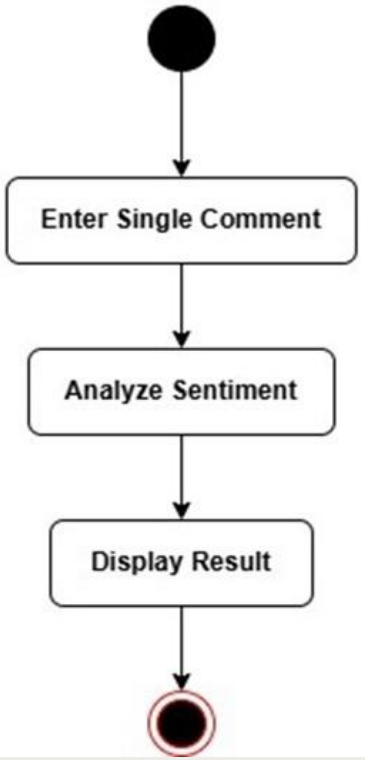

1. Single Comment Analysis Sequence Diagram
User
Frontend
Sentilytics System
Database
Enter Comment & Submit
Send Comment for Analysis
Preprocess Text
Predict Sentiment
Store Analysis Result
Return Sentiment Result
Display Sentiment

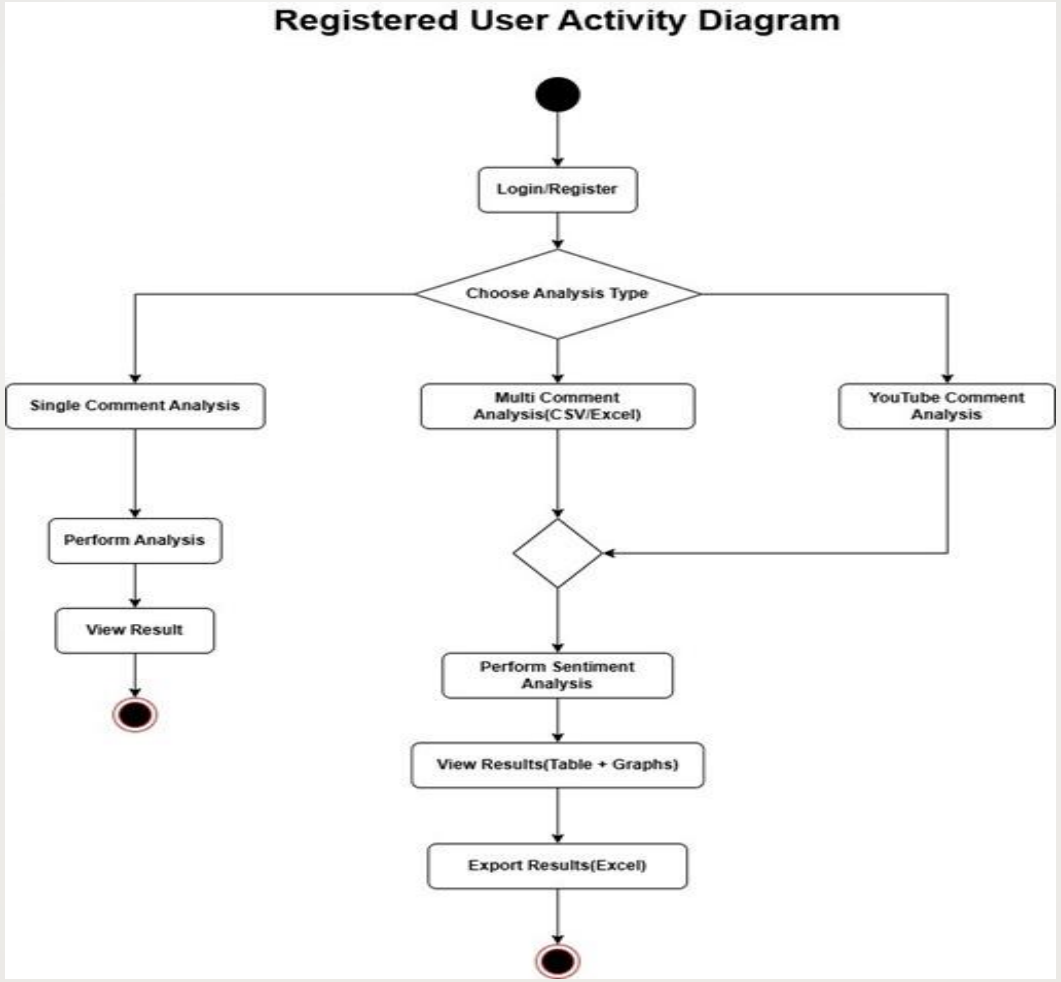

2. Multiple Comment Analysis Sequence Diagram
User
Frontend
Sentilytics System
Database
Upload CSV/Excel File
Send File for Processing
alt
[File is Invalid or Error Occurs]
Return Error Message
Display Error
[File is Valid]
Extract Comments from File
Preprocess Each Comment
Predict Sentiments
Create Visuals (Bar Graph, Word Cloud)
Store Batch Analysis Results
Return Batch Sentiment Report
Display Sentiment Report

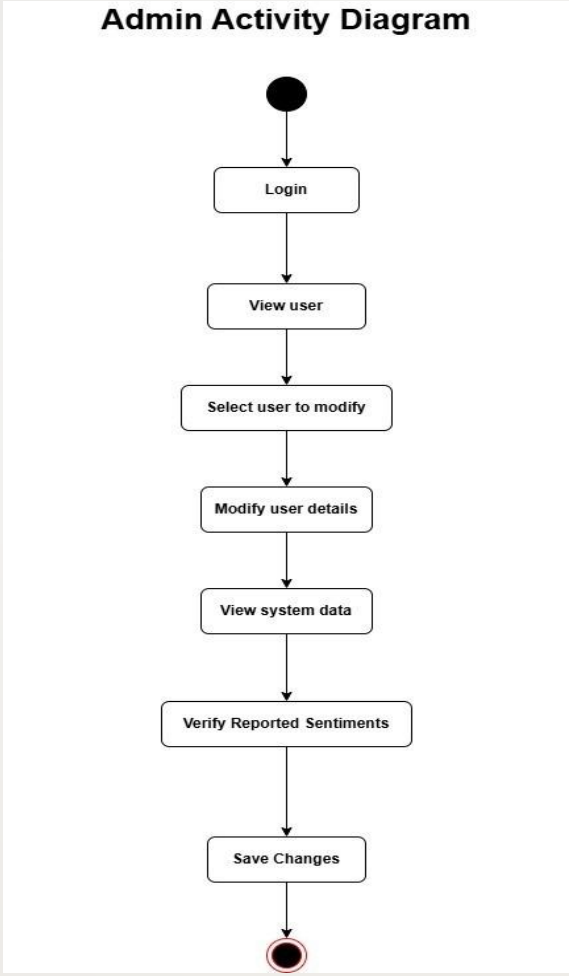

3. YouTube Comment Analysis Sequence Diagram
User
Frontend
Sentilytics System
YouTube API
Database
Enter YouTube Video URL & Submit
Send Request to Fetch Comments
Request Comments from Video
alt
[Comments Not Found or API Error]
Error
Return Error Message
Display Error
[Comments Retrieved]
Return Retrieved Comments
Preprocess Each Comment
Predict Sentiments
Create Visuals (Bar Graph, Word Cloud)
Store YouTube Analysis Results
Return YouTube Sentiment Report
Display Sentiment Report

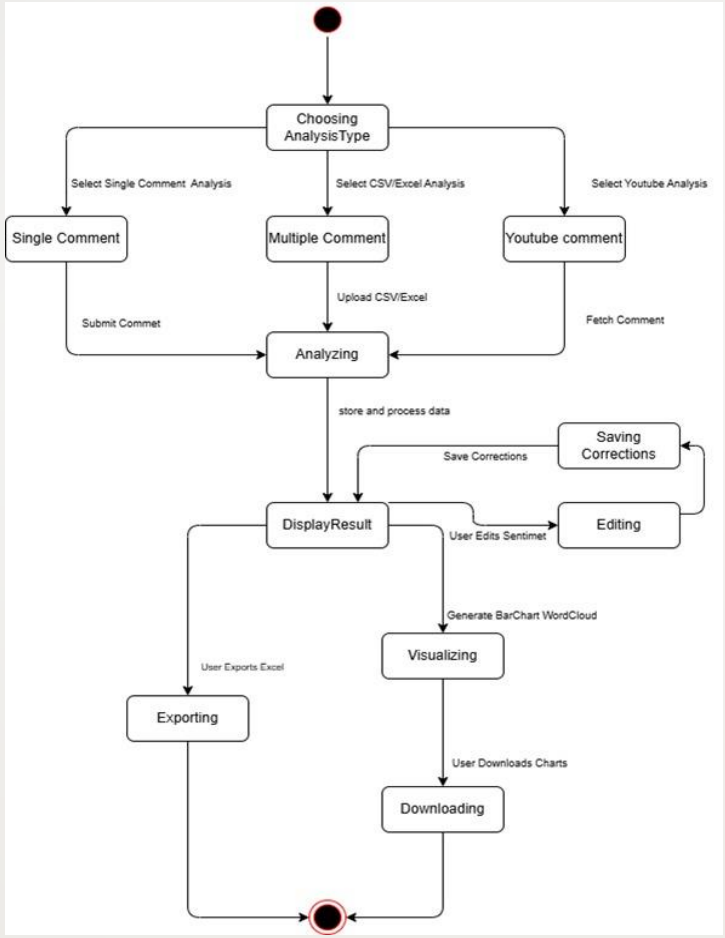

4. Admin Comment Verification Sequence Diagram
Admin
Frontend
Sentilytics System
Database 1
Database 2
Review Pending Sentiment Corrections
Fetch Pending Corrections
Retrieve Correction Requests
Display Pending Corrections
Approve or Reject Correction
Update Sentiment Based on Admin Decision
alt
[Correction Approved]
Save Verified Correction
Save Verified Correction
[Correction Rejected]
Keep Original Sentiment
Confirmation of Update
Display Updated Correction Status

GUEST USE ACTIVITY DIAGRAM




Registered User Activity Diagram
Login/Register
Choose Analysis Type
Single Comment Analysis
Multi Comment Analysis(CSV/Excel)
YouTube Comment Analysis
Perform Analysis
View Result
Perform Sentiment Analysis
View Results(Table + Graphs)
Export Results(Excel)


Admin Activity Diagram
Login
View user
Select user to modify
Modify user details
View system data
Verify Reported Sentiments
Save Changes


Choosing AnalysisType
Select Single Comment Analysis
Select CSV/Excel Analysis
Select Youtube Analysis
Single Comment
Multiple Comment
Youtube comment
Upload CSV/Excel
Submit Commet
Fetch Comment
Analyzing
store and process data
Saving Corrections
Save Corrections
DisplayResult
User Edits Sentimet
Editing
Generate BarChart WordCloud
Visualizing
User Exports Excel
Exporting
User Downloads Charts
Downloading

Data Dictionary

----------User Table----------

Field Name	Data Type	Constraints	Description
Id	Integer(auto)	Primary key	Unique user ID
Username	Varchar(150)	Unique,Required	Username for authentication
Email	Varchar(254)	Unique,Required	User's email
Password	Varchar(128)	Required,non-Nullable	Encrypted user password
Is_staff	Boolean	Default=False,Non Nullable	Determines if user has admin access
Is_superuser	Boolean	Default=False,Non Nullable	Determines if user has full access

----------Token Table----------

Field Name	Data Type	Constraints	Description
Key	Char(40)	Primary Key	Authentication token for API access
User_id	Integer	Foreign Key (auth_user.id), Non-Nullable	Links token to a user
Created	DateTime	Auto Timestamp, Non-Nullable	Timestamp when the token was created

----------Comment Table----------

Field Name	Data Type	Constraints	Description
id	Integer (Auto)	Primary Key, Non-Nullable	Unique comment ID
user_id	Integer	Foreign Key (auth_user.id), Non-Nullable	User who analyzed the comment
batch_id	Integer	Foreign Key (analysis_batchcomment.id), Default=None,Nullable	Links to batch analysis (if applicable)
comment	Text	Required, Non-Nullable	Original comment text
cleaned_text	Text	Auto-generated, Non-Nullable	Processed text after cleaning
sentiment	Varchar(20)	Required, Non-Nullable	Predicted sentiment
score	Float	Auto-generated, Non-Nullable	Sentiment score
date_created	DateTime	Auto Timestamp, Non-Nullable	Timestamp when the comment was analyzed
updated_at	DateTime	Auto Timestamp	Timestamp when the comment was last updated
is_updated	Boolean	Default=False, Non-Nullable	Indicates if sentiment was manually corrected
comment_type	Varchar(50)	Required,Default='single',Choices=(single,batch)	Shows type of comment (Single,Batch)

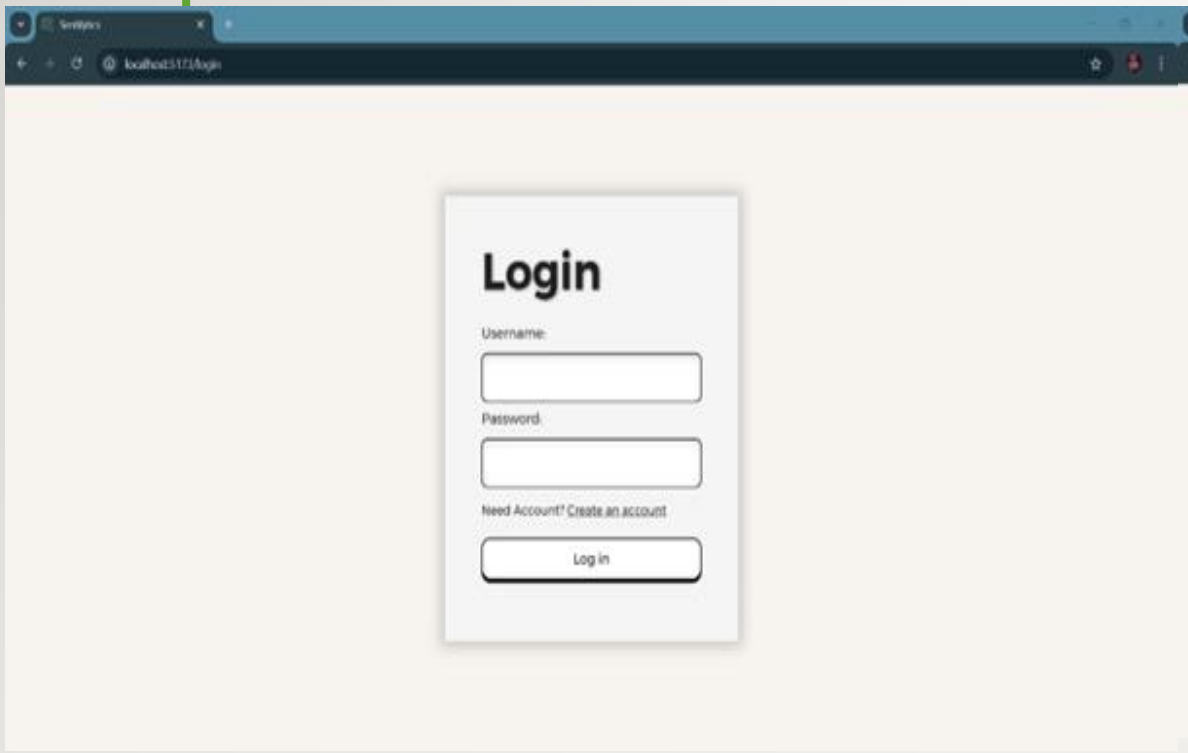
----------Batch Comment Table----------

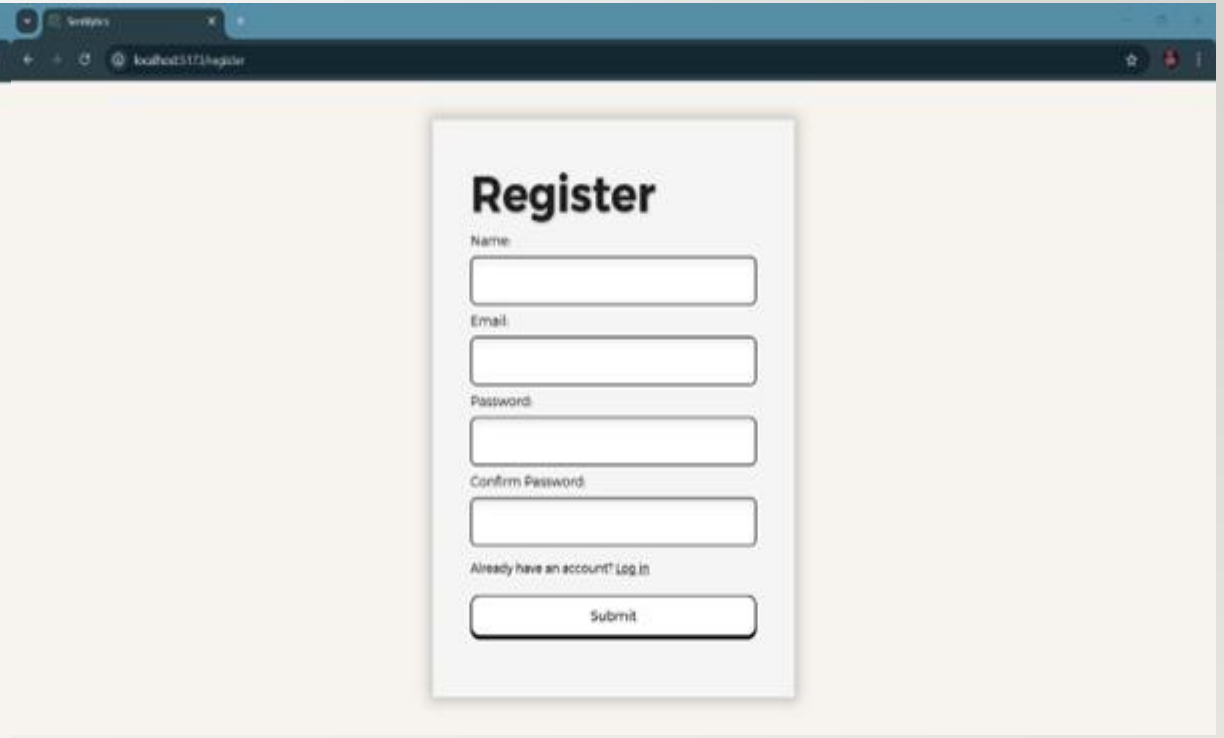
Field Name	Data Type	Constraints	Description
Id	Integer (Auto)	Primary Key, Non-Nullable	Unique batch ID
user_id	Integer	Foreign Key (auth_user.id), Non-Nullable	User who performed batch analysis
comment_type	Varchar(20)	Required, Non-Nullable	Source type (CSV File, Excel File, YouTube)
overall_sentiment	Varchar(20)	Auto-generated, Non-Nullable,Choices(positive,negative,neutral)	Aggregated sentiment for batch
date_created	DateTime	Auto Timestamp, Non-Nullable	Timestamp when batch analysis was performed

----------corrected_sentiment Table----------

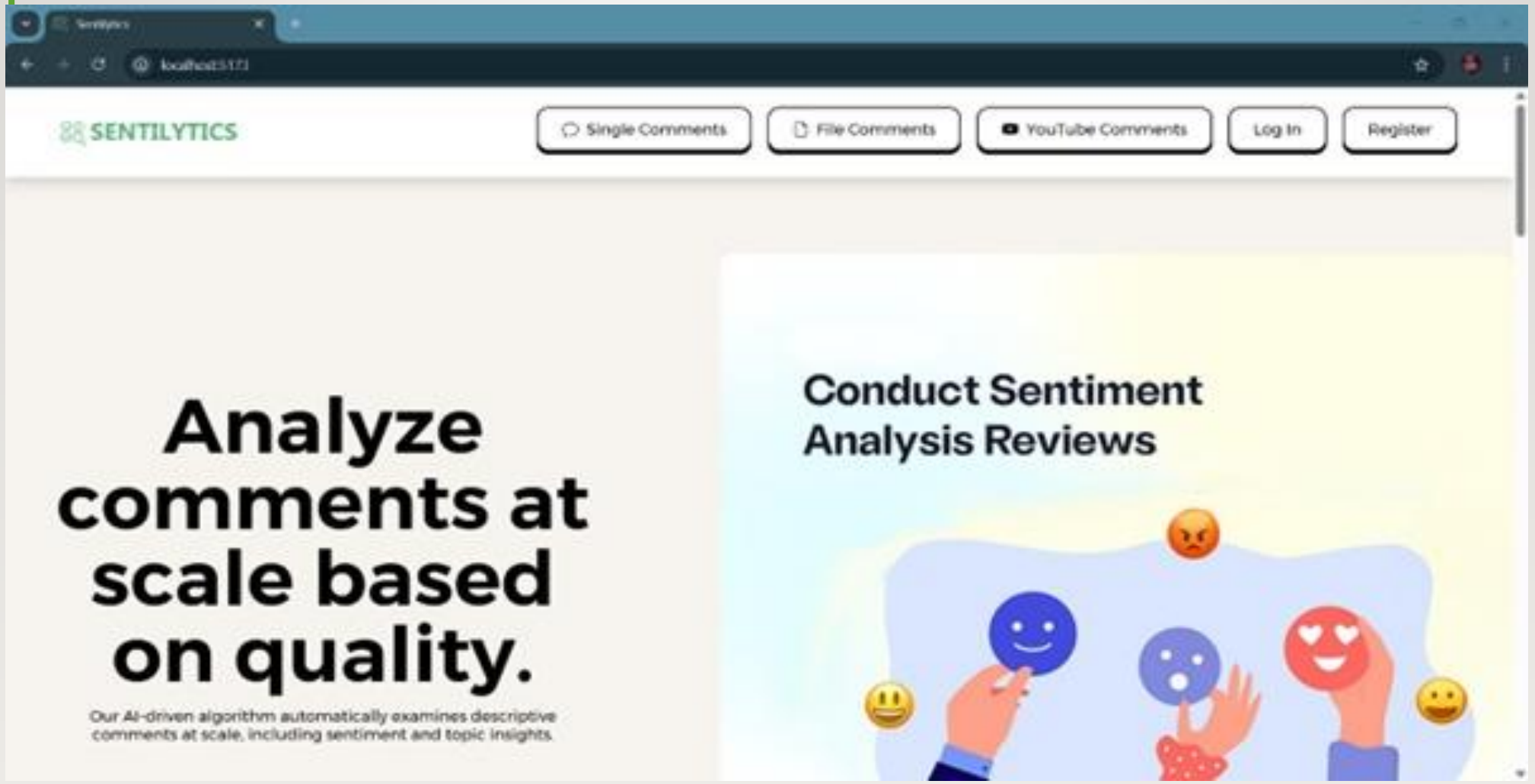
Field Name	Data Type	Constraints	Description
Id	Integer (Auto)	Primary Key, Non-Nullable	Unique correction ID
comment_id	Integer	Foreign Key (analysis_comment.id), Non-Nullable	Links to the corrected comment
comment_text	Varchar	Required, Non-Nullable	Original comment text
User_id	Integer	Foreign Key (auth_user.id), Non-Nullable	User who corrected the sentiment
predicted_sentiment	Varchar(20)	Required, Non-Nullable	model predicted sentiment value
corrected_sentiment	Varchar(20)	Required, Non-Nullable	Corrected sentiment value
feedback_verified	Boolean	Default=False, Nullable	Indicates if admin verified correction(True=valid correct,False=Invalid,Null =pending)
date_corrected	DateTime	Auto Timestamp, Non-Nullable	Timestamp when sentiment was corrected

Login Page And Register Page



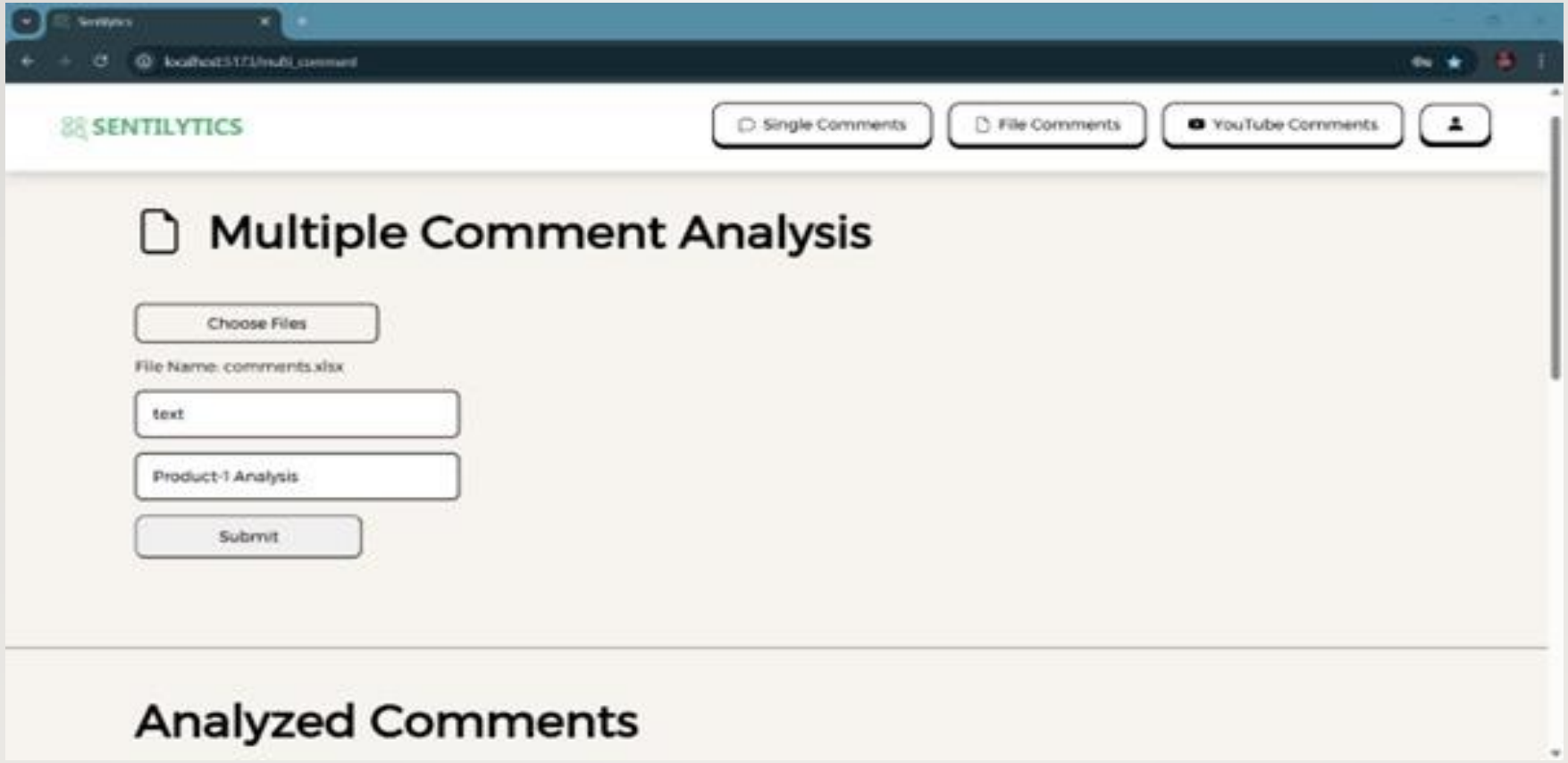


Home Page

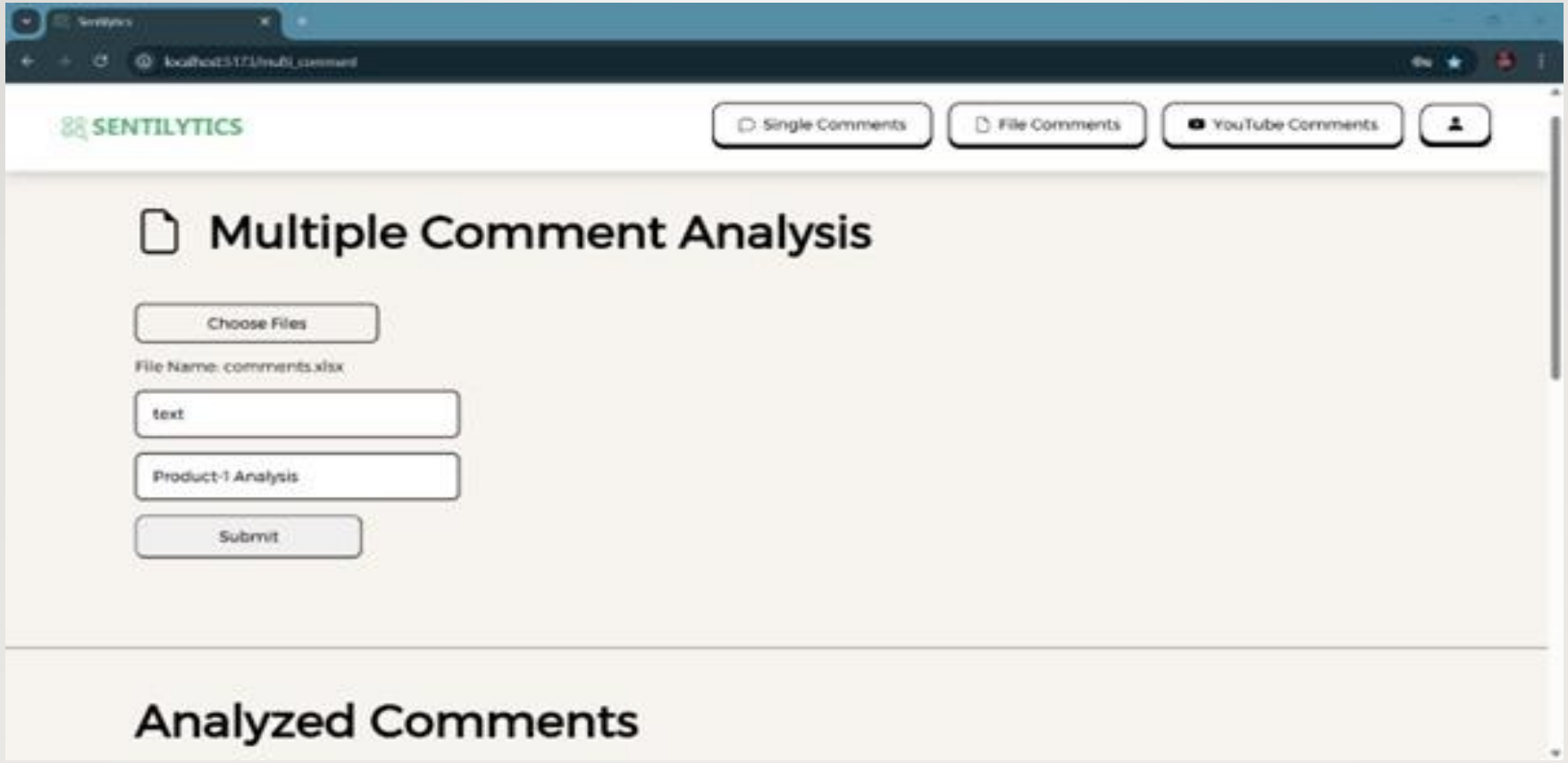

SENTILYTICS
Single Comments
File Comments
YouTube Comments
Log In
Register
Analyze comments at scale based on quality.
Our AI-driven algorithm automatically examines descriptive comments at scale, including sentiment and topic insights.
Conduct Sentiment Analysis Reviews

Single Comment Analysis

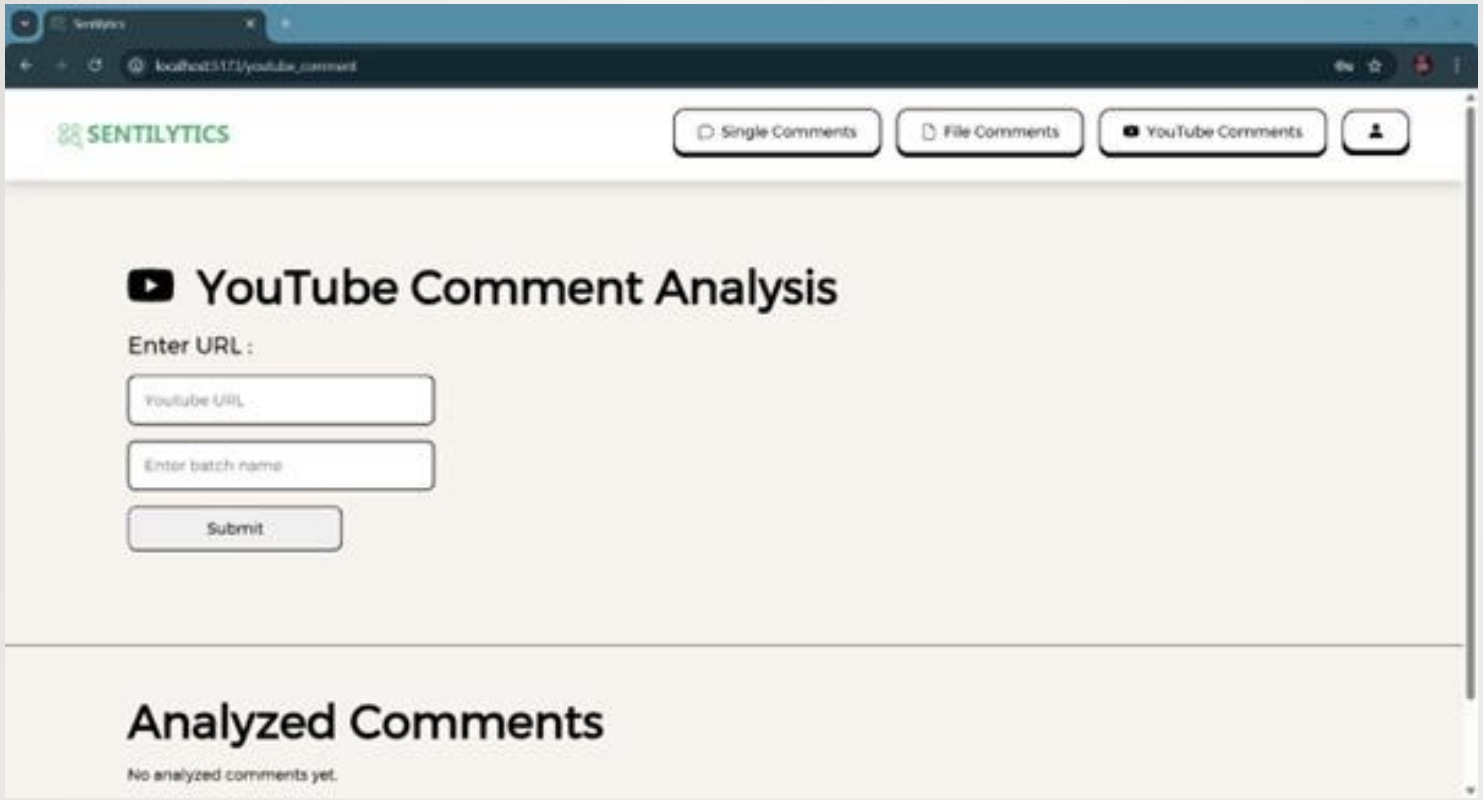
Multiple/Youtube Comment Analysis



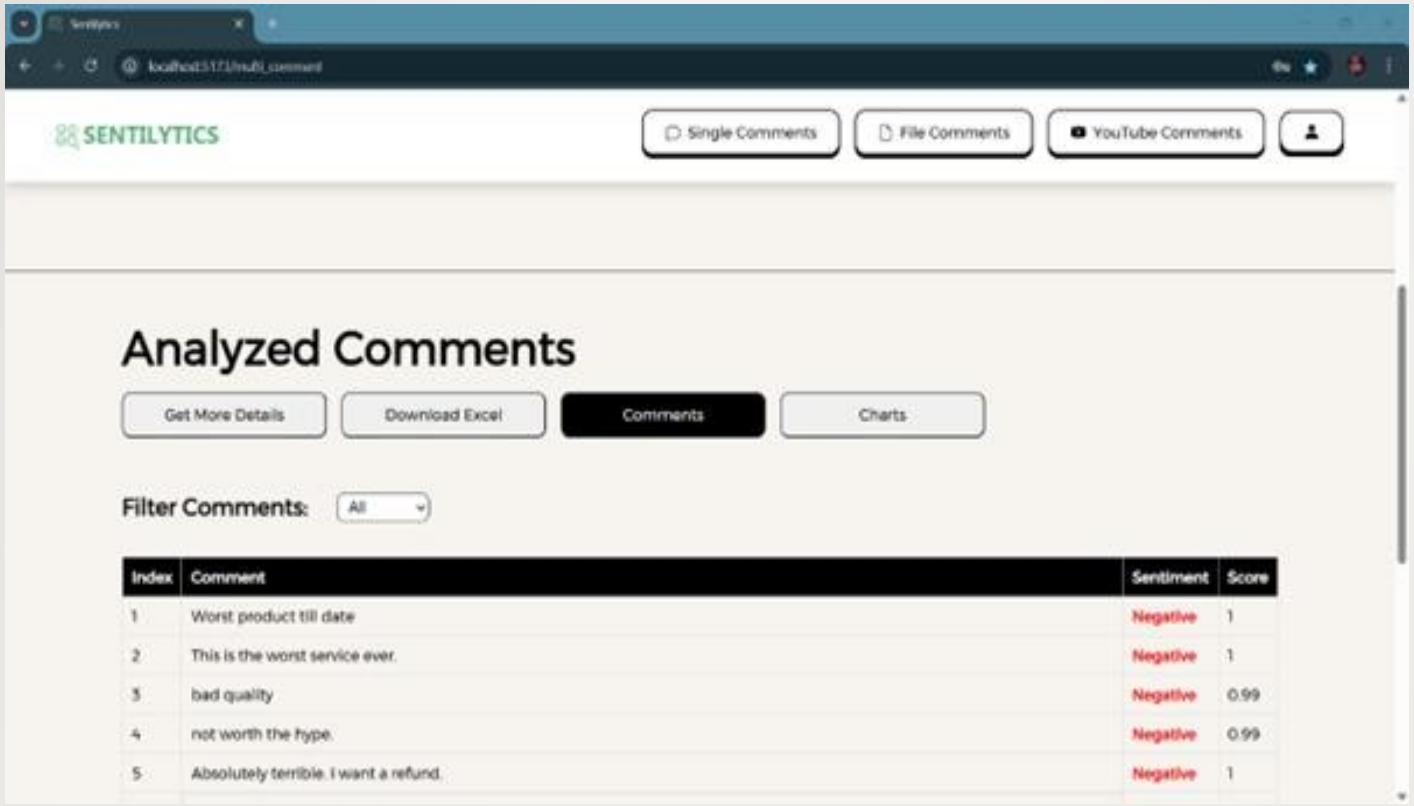
Multiple/Youtube Comment Analysis



Multiple/Youtube Comment Analysis

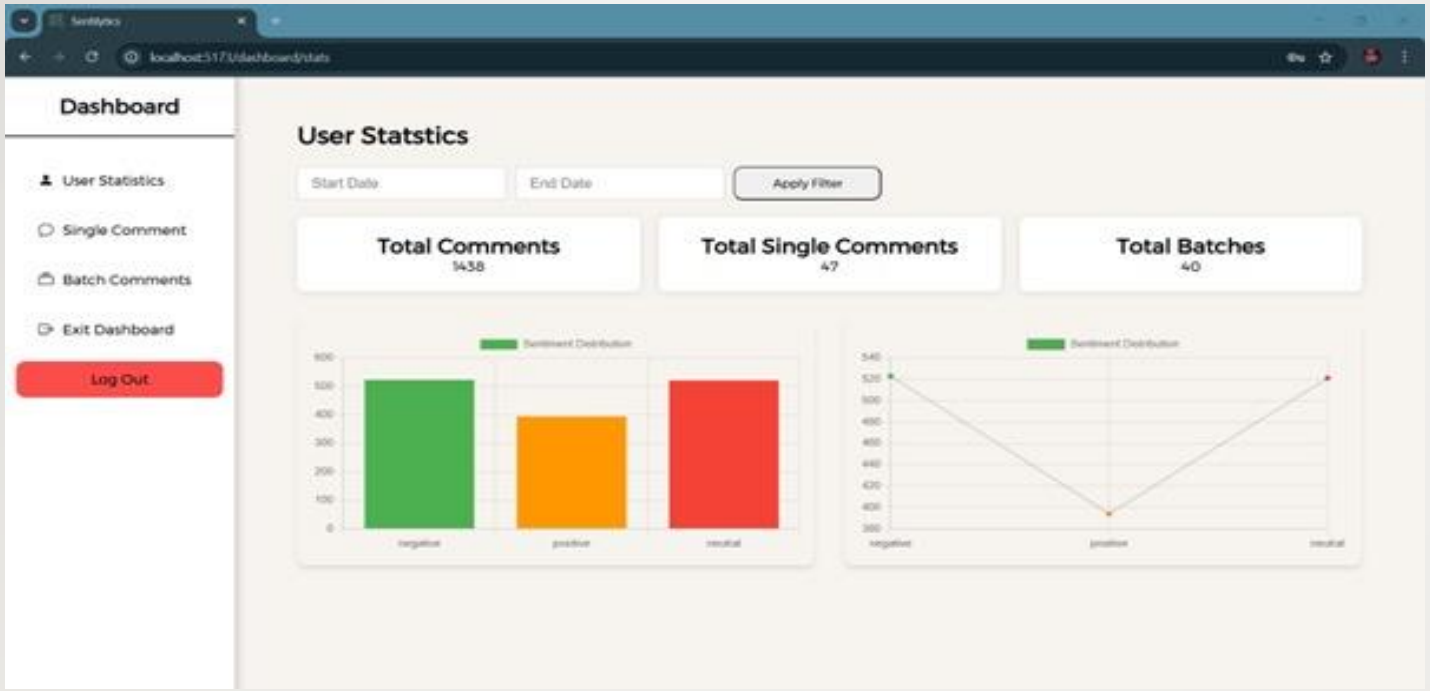


Multiple/Youtube Comment Analysis



Multiple/Youtube Comment Analysis

Multiple/Youtube Comment Analysis



------Graphical Representations & Insights-----

- 1. Bar Graphs showing sentiment distribution
- 2. Word Cloud for positive comments
- 3. Filtering options by sentiment, date, and comment type.

------User Feedback & Model Improvement----

- Users can correct misclassified sentiments, which updates the database and can be used to improve the model’s accuracy.

----------References----------

- Django Documentation, Python Libraries, Google API, React Documentation, PostgreSQL Documentation.