
ACROPOLISINSTITUTE OF TECHNOLOGY AND RESEARCH

Department of Information Technology Synopsis on Sentiment Analysis Of Student Feedback Forms

1. INTRODUCTION

1.1. Overview

The project aims to develop an automated system that can intake student feedback in textual form and analyze it for sentiment to support academic decision-making. The key challenge is that while institutions collect abundant feedback on teaching, infrastructure, and curriculum, manual analysis processes are inefficient, subjective, and prone to missing important insights.

1.2. Purpose

The purpose of the project "Sentiment Analysis of Student Feedback Forms" is to automatically analyze and extract meaningful insights from qualitative student feedback data that is commonly underutilized in educational institutions. Specifically, the project aims to:

- Extract the overall sentiment (positive, neutral, negative) from open-ended student feedback to assess the perceived teaching quality, infrastructure, and curriculum.
- Identify key themes and frequent concerns mentioned by students to highlight areas that need improvement.
- Provide summarized, anonymized reports for faculty, departments, and courses, including sentiment breakdowns and trends over time.
- Support educational decision-makers by offering objective, scalable, and actionable insights from a large volume of feedback.
- Promote continuous improvement in teaching and learning by enabling timely and effective evaluation of student opinions while ensuring student anonymity and data security.

2. LITERATURE SURVEY

This literature survey synthesizes findings from four relevant studies on sentiment analysis (SA) of student feedback and educational text (Dervenis et al., 2024; Dalipi et al., 2021; Shaik et al., 2023; ACM conference paper, 2024). The goal is to highlight methods, datasets, strengths, and limitations that inform the design of a robust Sentiment Analysis of Student Feedback Forms system.

2.1.Existing Problems

Student feedback analysis is often manual, subjective, and limited to overall polarity, missing specific aspects like teaching or infrastructure. Existing systems face issues such as loss of nuance in translation, data imbalance, and poor domain adaptation. They also lack standard benchmarks, explainability, and privacy safeguards, with little evidence of real improvements in teaching outcomes.

2.1.1. Manual and Time-Consuming Review

Student feedback is often analyzed manually, making the process subjective, slow, and inconsistent.

2.1.2. Loss of Context and Nuance

Translating feedback into English or applying generic sentiment lexicons can distort the true meaning and emotional tone.

2.1.3. Focus on Overall Polarity Only

Many systems stop at classifying feedback as positive/negative but fail to identify which aspect (teaching, assessment, infrastructure, empathy, etc.) the comment is about.

- **Data Imbalance and Scarcity**

Most datasets contain many positive comments but very few negative or aspect-specific ones, which weakens model performance.

- **Domain Adaptation Issues**

Models trained on product reviews or social media data often perform poorly when applied to education-specific feedback.

- **Inability to Handle Mixed Sentiments**

A single feedback may include both positive and negative opinions, which simple classifiers cannot represent accurately.

- **Lack of Standard Benchmarks**

There are no widely-accepted, domain-specific benchmark datasets for student feedback, making fair comparison of models difficult.

- **Explainability Gap**

Black-box outputs (e.g., only labels or scores) are difficult for faculty and administrators to trust without interpretable explanations.

- **Privacy Concerns**

Raw feedback may contain sensitive references to students or faculty, raising confidentiality issues if not anonymized properly.

- **No Closed-Loop Validation**

Most systems stop after classification and do not demonstrate how insights lead to real improvements in teaching quality or student outcomes.

2.2. Proposed Solution

The proposed solution is to design and develop a Sentiment Analysis System for Student Feedback Forms that is institution-centric, automated, and secure. Unlike manual reviews or generic sentiment tools, this system will specifically cater to the academic environment by automatically classifying feedback as positive, negative, or neutral, identifying recurring themes, and generating summarized reports for each faculty member, department, or course. The platform will ensure student anonymity, objective insights, and comparative analysis across semesters, thereby supporting data-driven decision-making to improve teaching quality, curriculum, and infrastructure.

The platform will include the following features:

2.2.1. User Registration & Authentication:

- Secure login system for faculty, administrators, and authorized staff.
- Faculty and staff can register using institutional credentials.
- Access rights managed to ensure privacy and controlled data access.

2.2.2. Feedback Submission & Management:

- Students can submit feedback for courses, faculty, and infrastructure.
- Feedback stored securely and linked anonymously to courses/departments.
- Option to edit or update feedback before submission deadline.

2.2.3. Automated Sentiment Analysis:

- System classifies feedback as positive, neutral, or negative automatically.
- Supports detection of mixed sentiments within a single comment.

- Highlights recurring themes and areas of concern for each course or faculty.

2.2.4. Reporting & Dashboard:

- Summarized reports for faculty, courses, and departments with sentiment breakdown.
- Visual dashboards including charts, heatmaps, and keyword trends.
- Comparative insights across semesters to track improvements or recurring issues.

2.2.5. Explainable Insights & Keyword Highlighting:

- Representative student comments shown for each theme or aspect.
- Keywords and sentiment indicators highlighted for easy interpretation.
- Helps faculty and administrators make actionable decisions.

2.2.6. Data Privacy & Security:

- Anonymizes student identities to maintain confidentiality.
- Secured storage of all feedback and reports.
- Role-based access ensures only authorized personnel can view sensitive data.

2.2.7. Trend Analysis & Alerts:

- Detects changes in sentiment trends over time.
- Sends alerts for recurring negative feedback or critical issues.
- Supports long-term evaluation of teaching quality and infrastructure improvement

2. THEORETICAL ANALYSIS

Block Diagram

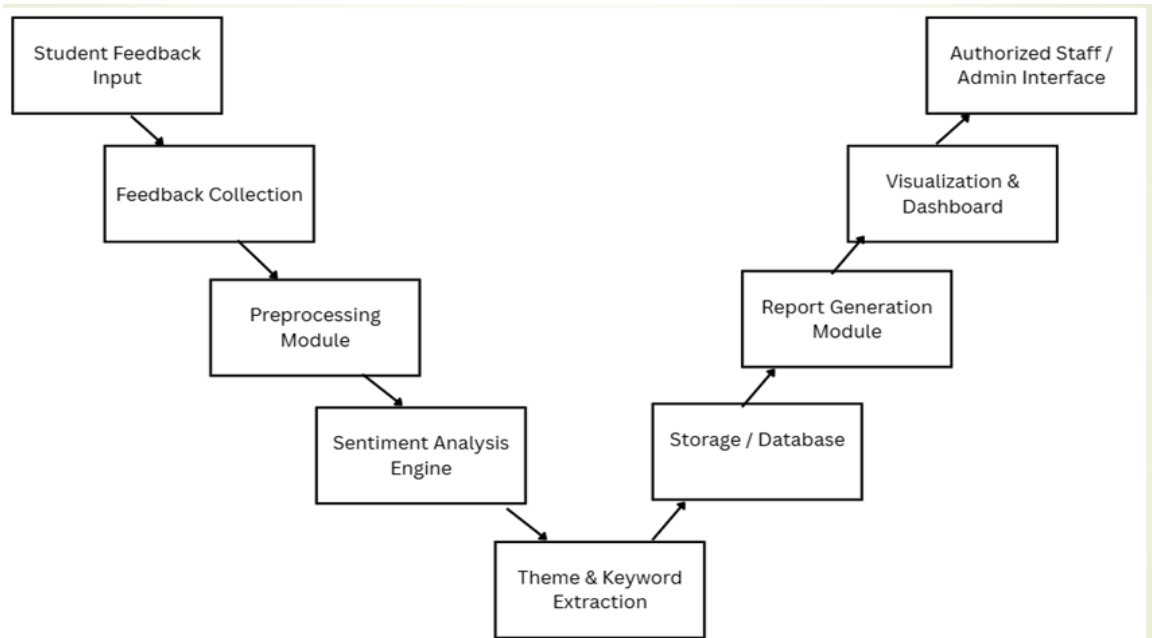


Fig.1 Block Diagram

4. Hardware / Software Designing

Hardware Requirements	Software Requirements
Processor: Intel i3	Operating System: Windows
RAM: Minimum 4 GB (8 GB recommended for faster processing) Hard Disk: 250 GB or more (SSD preferred for better performance)	Frontend: HTML, CSS, React JS Backend: Python 3.13.1 Libraries/Frameworks: <ol style="list-style-type: none">1. VADER (Valence Aware Dictionary for Sentiment Reasoning)(for NLP)2. PyTorch (for ML)3. Pandas, NumPy (for data processing)4. Matplotlib (for visualization & charts) Report Generation Tools: Matplotlib, Plotly
Input Devices: Keyboard, Mouse	Database: MySQL (to store feedback data)
Output Devices: Monitor/Display	IDE: VS Code

5. APPLICATIONS

- **Institutional Feedback Management**

Provides colleges and universities with a centralized system to collect, store, and analyze student feedback efficiently.

- **Faculty and Course Performance Evaluation**

Helps evaluate teaching quality, curriculum effectiveness, and infrastructure performance using automated sentiment analysis.

- **Theme and Trend Identification**

Helps evaluate teaching quality, curriculum effectiveness, and infrastructure performance using automated sentiment analysis.

- **Data-Driven Reporting**

Generates summarized reports and visual dashboards that highlight key insights and actionable points for faculty and administrators.

- **Enhanced Student-Anonymity and Privacy**

Ensures student feedback remains confidential while providing meaningful insights to decision-makers.

- **Support for Continuous Improvement**

Enables institutions to track improvements over time, respond to concerns, and enhance overall academic and infrastructural quality.

6. REFERENCES

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