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Analysing Emotional Content in Tweets for Intelligent Music Curation Using Logistic Regression

Shilpa R[1], Sahana Kumari B[2], and G C Divya[3]

[1, 2]Assistant Professor, Department of Computer Science & Engineering, SDM Institute of Technology, Ujire, India
[3]Assistant Professor, Department of Computer Science & Engineering, Jain Institute of Technology, Davangere, India

Correspondence should be addressed to Shilpa R; shilparayee@gmail.com

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ABSTRACT- With the growing influence of social media, understanding user sentiments has become very important for various applications. The aim of this paper is to analyze sentiments in social media posts to detect whether they are positive, negative, or neutral and to provide a unique solution by suggesting music that aligns with the identified sentiment. The proposed system leverages Natural Language Processing (NLP) techniques and Logistic Regression for sentiment classification. The data is obtained from Twitter, where the posts are processed to extract meaningful insights. A web application has been developed using Python, HTML, and CSS to demonstrate the functionality of the model. The application not only predicts the sentiment of the given text but also suggests songs that suit the emotional state of the user, thereby improving the user experience. This paper demonstrates how sentiment analysis can be creatively integrated in daily life to make interactions more engaging and personalized.

KEYWORDS- Logistic Regression, Natural Language Processing (NLP), Sentimental analysis, social media.

I. INTRODUCTION

In today's advanced scene, social media has risen as a effective stage for people to precise their feelings, share their contemplations, and archive their individual encounters. Posts extending from Instagram captions to Twitter upgrades regularly carry enthusiastic suggestions that reflect people's real-time sentiments [1]. Music, being a widespread dialect of feeling, serves as a perfect medium to complement and reverberate with these expressions. Despite this common collaboration, there's a recognizable need of frameworks that successfully bridge the crevice between passionate social media substance and personalized music suggestions [2].

This investigate looks for to address this hole by developing an imaginative framework able of analyzing the feelings passed on in social media posts and prescribing music that adjusts with the recognized passionate tone [3]. By leveraging progressed machine learning and normal dialect preparing (NLP) strategies, the framework will classify social media posts into one of three assumption categories: positive, negative or unbiased [4]. Based on the classification, clients will get a curated playlist that gives a personalized and candidly locks in tuning in encounter.

The extend will start by collecting freely accessible content information from well-known social media stages such as Facebook, Instagram, and Twitter. To guarantee the quality and pertinence of the information, it'll experience thorough preprocessing steps to remove noise, such as insignificant characters, URLs and images. For case, posts with positive estimations might trigger proposals of cheery and lively tracks, whereas negative opinions seem lead to recommendations of alleviating or melancholic music. Impartial estimations may result in flexible playlists that offer relaxing or genre-neutral tunes.

This groundbreaking integration of estimation examination with music proposal frameworks guarantees to convey a profoundly personalized and mood-enhancing involvement for clients. Past person benefits, the framework has potential applications in areas like showcasing, mental wellbeing, and amusement, giving more profound bits of knowledge into group of onlookers' feelings and empowering modern openings for client engagement.

II. LITERATURE REVIEW

The rise of social media platforms like Twitter has significantly contributed to the proliferation of user-generated textual content. This paper by Abd El-Jawad et al. (2018) addresses the critical challenge of analyzing sentiments embedded within massive volumes of social media posts. The primary focus is on evaluating the effectiveness of various machine learning and deep learning techniques in classifying sentiments—particularly positive and negative emotions—within tweets [5].

The researchers employed a large-scale dataset comprising over 1 million English tweets categorized across five distinct domains. The dataset was split in a 75:25 ratio for training and testing purposes. Various algorithms were tested, including traditional machine learning techniques like Decision Trees and Naïve Bayes, as well as deep learning models such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs).

To enhance performance, the authors proposed a hybrid sentiment analysis model that integrates text mining techniques with neural networks. This model leverages both feature extraction (from machine learning) and contextual understanding (from deep learning). The hybrid approach was found to be superior to individual models, achieving a

notable accuracy of 83.6%, sensitivity of 87.1%, and specificity of 79.3%.

The results underline the hybrid model's robustness and generalizability, particularly in dealing with large, diverse datasets. The integration of sequential processing and contextual interpretation with classical feature-based methods significantly improved sentiment classification outcomes.

Overall, this study presents a valuable contribution to the field of sentiment analysis by demonstrating the advantages of combining multiple learning paradigms. The research also emphasizes the importance of using extensive and diverse datasets to train more accurate and reliable sentiment analysis systems, especially for real-world applications like social media monitoring, market analysis, and consumer feedback assessment [6].

The study presents a machine learning-based framework for classifying and detecting frequent social issues through the analysis of Facebook posts and comments in Bangladesh. As social media becomes a dominant channel for expressing public opinions, especially in developing countries, the authors leverage Facebook data to identify key social concerns with socio-economic relevance.

The research proposes a classification system that categorizes public concerns into 12 major classes. The dataset is composed of manually labeled public Facebook posts and comments. After preprocessing the data, Term Entropy-Inverse Document Entropy (TE-IDE) weighting is used to generate feature vectors. Chi-square feature selection further enhances the relevance of selected attributes.

To perform sentiment and issue classification, the study employs four supervised machine learning algorithms: Logistic Regression, Support Vector Machine (SVM), Multinomial Naive Bayes, and Random Forest. Hyperparameter optimization is done using Grid Search, and model validation is carried out using 10-fold cross-validation. Among all, Logistic Regression achieved the highest classification accuracy of over 93%, proving its effectiveness in identifying prevalent societal issues.

The paper highlights the strength of systematic preprocessing, feature engineering, and model tuning to improve accuracy and reliability. The classification report generated by the model not only outlines accuracy metrics but also provides insightful data on the evolution and frequency of reported social problems over time.

Looking toward future enhancements, the authors emphasize the importance of enriching the sentiment lexicon to better interpret local languages, dialects, and cultural expressions. This would allow for better contextual understanding in a multilingual and diverse setting like Bangladesh. Moreover, expanding the system to analyze interlinked social issues could reveal hidden patterns and relationships among different societal challenges.

In conclusion, this work offers a valuable contribution to the domain of social issue analysis through text mining and machine learning. The proposed system provides a scalable and adaptable model for real-time social monitoring, with significant implications for policymakers, NGOs, and researchers aiming to address pressing social concerns based on public sentiment and discourse [7].

The study investigates the challenges and limitations associated with sentiment analysis on Twitter, focusing particularly on the lack of granularity in existing datasets. Most traditional sentiment analysis approaches evaluate sentiment at the tweet level, which may overlook entity-specific sentiments embedded within a single post. For example, a tweet like *"I love my iPhone but I despise my iPad"* is typically assigned a mixed sentiment, even though the sentiments toward *iPhone* and *iPad* differ distinctly.

To overcome these limitations, the authors introduce STS-Gold, a novel sentiment analysis dataset that provides entity-level annotations in addition to tweet-level sentiment labels. This approach enhances the model's ability to identify and classify sentiments directed at individual entities within a single tweet, enabling more accurate and actionable insights for applications like brand monitoring, product analysis, and political opinion mining [8].

The paper compares eight publicly available and manually annotated Twitter datasets, analyzing their properties such as post volume, vocabulary size, and linguistic sparsity. The authors explore the correlation between these dataset characteristics and the performance of sentiment classifiers. In their experimental evaluation, five machine learning classifiers were tested, with Bagging ensemble classifiers achieving the best results—94.2% accuracy on the GASP dataset and 91.3% on STS-Gold. These findings demonstrate the importance of both data quality and model choice in improving sentiment classification outcomes.

Moreover, the study emphasizes the need for improved annotation methodologies. While manual labeling is often effective, it is labor-intensive, prone to subjectivity, and difficult to scale. The authors advocate for the development of semi-automated or fully automated annotation techniques using NLP and machine learning to enhance efficiency and reliability.

In conclusion, the introduction of STS-Gold marks a significant advancement in sentiment analysis by allowing dual-layer classification—tweet-level and entity-level. The research highlights the critical role of high-quality, richly annotated datasets in training robust sentiment models and lays a foundation for future work in fine-grained sentiment analysis that captures the complexity of modern digital communication [9].

This research focuses on applying sentiment analysis techniques across major social media platforms—Twitter, Facebook, and Instagram—to gauge public opinion and emotional tone. With the exponential growth of user-generated content, particularly on social platforms, sentiment analysis emerges as a crucial tool for understanding consumer perspectives. Businesses leverage these insights to improve product offerings, target advertising more effectively, and enhance customer engagement.

The study evaluates the performance of multiple machines learning algorithms, including Recurrent Neural Network (RNN), Support Vector Machine (SVM), Random Forest (RF), Naive Bayes, Convolutional Neural Network (CNN), and Logistic Regression. These models were applied to text data collected from the three mentioned platforms. Performance was measured using accuracy scores to determine the most suitable algorithm for each platform.

Among all tested algorithms, SVM consistently outperformed others, achieving:

- 85.9% accuracy on Twitter,
- 94.4% on Facebook, and
- 84% on Instagram.

The study reveals that each platform presents unique challenges in sentiment classification. For instance:

- Twitter's short and slang-rich content demands models that can parse brevity and informal language.
- Facebook's structured, longer posts provide a clearer context for sentiment detection.
- Instagram's minimal text (mainly in captions or comments) creates difficulty in sentiment extraction, but SVM still performed reliably.

The research highlights the robustness and adaptability of SVM in handling varied textual formats and complexities across platforms. It also emphasizes the practical applications of sentiment analysis in areas such as brand monitoring, customer satisfaction, advertising, and market trend analysis.

In conclusion, this study demonstrates the power of machine learning—especially SVM—in sentiment analysis for different social media environments. The findings support the use of sentiment analysis as a strategic tool in digital marketing, enabling businesses to respond promptly to public opinion and adapt strategies accordingly. As consumer data continues to expand, tools like sentiment analysis will become increasingly important for maintaining competitive advantage and fostering meaningful customer relationships [10].

This study explores the use of real-time sentiment analysis on Twitter data to assess public opinion on various trending topics. Twitter, being a high-traffic microblogging platform, plays a significant role in shaping and reflecting public sentiment. The authors designed a system that allows users to input a keyword or hashtag and retrieve the polarity (positive or negative) of tweets associated with that keyword, thereby helping users understand public perception in real-time.

For data collection, the authors utilized tweets and movie reviews, with part of the dataset drawn from the IMDB website. The primary machine learning model employed in this study was Naïve Bayes, a simple yet effective probabilistic classifier commonly used for text classification tasks. The performance of the model was validated using various testing metrics, and the system showed promising accuracy in classifying tweet sentiments.

A notable focus of the study is the impact of negation words on sentiment polarity. The authors highlight how the proximity of negation words to sentiment-bearing unigrams significantly influences the classification outcome. For example, phrases like "not good" require contextual understanding that can reverse the expected polarity.

The paper also discusses the potential of incorporating more advanced n-gram models (bigrams and trigrams) and Part-of-Speech (POS) tagging to capture more nuanced linguistic patterns. However, due to the limitations of a relatively small dataset (~9,000 tweets), these methods were only lightly explored. The authors found that while POS tagging showed slight improvements in classification, the gains were not significant enough to justify its standalone use.

Looking forward, the paper proposes expanding sentiment analysis into domain-specific applications (e.g., media, politics, and celebrities), arguing that specialized models might outperform general-purpose ones by better capturing contextual and linguistic variations specific to a domain.

In conclusion, the research lays foundational work in real-time sentiment analysis using NLP and machine learning. It successfully demonstrates the feasibility of using a lightweight model like Naïve Bayes for Twitter sentiment classification while also pointing to several future directions—especially in handling negation, linguistic structure, and domain-specific nuances—that could significantly enhance the depth and accuracy of sentiment analysis tools [11].

III. PROBLEM FORMULATION

A. Problem Statement

Social media has ended up an imperative portion of standard of, living permitting people to share their considerations, sentiments, and encounters in real-time. Posts on stages like Twitter, Instagram, and Facebook frequently capture a run of feelings, from delight and energy to pity and disappointment. Whereas this emotional data is ample, it is seldom utilized to make important individual encounters [12]. Music, an all-inclusive dialect profoundly tied to feelings, presents an energizing opportunity to bridge this crevice by interfacing social media estimations with personalized melody suggestions.

This extends points to create a framework that analyzes the enthusiastic tone of social media posts and matches them with suitable music. Utilizing progressed characteristic dialect handling (NLP) strategies and machine learning models such as Calculated Relapse, the framework will classify posts into three categories: positive, negative or unbiased. Freely accessible social media information will be preprocessed to expel commotion like unimportant images and URLs, guaranteeing clean inputs for assumption examination. Based on the distinguished assumption, clients will get custom fitted playlists—cheerful and playful for positive posts, calming for negative ones and flexible or unwinding tracks for impartial feelings [13].

By combining opinion investigation with music suggestion, this venture makes a candidly mindful and personalized client involvement. It not only enhances how individuals lock in with their feelings and music but too has broader applications in areas like mental wellbeing and promoting. This inventive approach illustrates the potential of innovation to be sympathetic and transformative, making intuitive more important and sincerely improving.

B. Objectives of the Present Study

- Create a machine learning demonstrate that classifies social media posts into positive, negative, or impartial assumptions utilizing NLP procedures.
- Make a proposal framework that sets the identified opinion with tunes that reflect the user's passionate state [14].
- Construct an inventive framework that combines assumption investigation with music proposal Motivate clients to investigate and grasp their feelings by advertising music to their sentiments [15].
- Permit clients to bookmark tunes related with particular feelings, making it simple to return to their favored tracks based on disposition.
- Create a framework competent of analysing large-scale content information and extending the music library to incorporate assorted classes and dialects for a worldwide client base.

IV. METHODOLOGY AND ARCHITECTURE

A. Architecture of the Proposed System

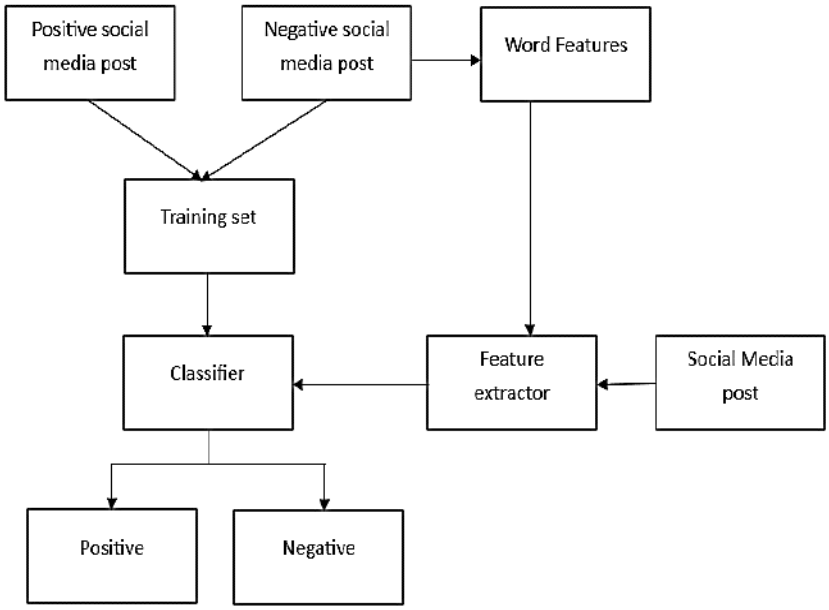

Figure 1: Architecture of the Proposed System

The designing handle for the estimation examination framework starts with the precise collection of positive and negative social media posts, which serve as the establishment for show preparing and assessment. These posts are preprocessed to clean and normalize the information, guaranteeing it is prepared for examination. Preprocessing includes evacuating insignificant components such as URLs, uncommon characters, and stop words, which don't contribute altogether to the estimation classification assignment. This step is vital for diminishing commotion and progressing the quality of the dataset. Once cleaned, key highlights are extricated from the posts utilizing progressed methods in characteristic dialect handling (NLP). These highlights, regularly spoken to as catchphrases or tokenized expressions, shape an organized representation of the information that captures the semantic and syntactic traits of the content. This organized dataset serves as the input for 22 machine learning calculations, empowering them to memorize designs and connections that recognize positive from negative estimations.

The prepared posts are at that point partitioned into preparing and testing datasets, which are utilized to create and approve machine learning models. The preparing set is utilized to prepare models such as Calculated Relapse (LR) and other NLP-based approaches. Each show experiences thorough assessment based on measurements like exactness, accuracy, review and guarantee ideal execution. These measurements give a understanding of the model's capacity to classify opinions precisely, handle imbalanced datasets, and generalize to modern information.

After exhaustive appraisal, the demonstrate illustrating the most noteworthy precision and overall unwavering quality is chosen as the essential classifier. This step is basic to guarantee that the framework performs effectively in real-world applications. The chosen classifier is at that point sent to anticipate the opinion of unused, inconspicuous social media posts. By analyzing the extricated highlights of these posts, the classifier decides whether the opinion communicated is positive, negative or unbiased.

The designing system too emphasizes adaptability and vigor. The preprocessing pipeline is outlined to handle huge volumes of information, whereas the include extraction and classification forms use effective calculations to preserve execution beneath overwhelming computational loads. In rundown, this end-to-end designing approach combines information preprocessing, include extraction, and machine learning to make a capable and versatile estimation examination framework. By leveraging real-time assumption classification, the system gives profitable bits of knowledge into open supposition and client opinion, making it an important instrument for applications in promoting, client benefit, social investigate and past.

B. System Flowchart

The system flowchart diagrams the organized handle for opinion investigation, beginning with information collection, where significant social media posts are assembled. This step includes the securing of posts from different stages such as Twitter, Facebook, or Instagram, centering on posts that contain profitable data with respect to open estimation. The collected information frequently contains a blend of noise such as unessential content, URLs, hashtags, and uncommon characters—so information preprocessing is the following pivotal step.

Amid the information preprocessing stage, the information is cleaned and normalized to evacuate any commotion or unessential components. This incorporates the expulsion of halt words (common words such as "the," "and," etc.), extraordinary characters, pointless URLs, and client notices. Furthermore, content normalization methods such

as changing over all content to lowercase, stemming (lessening words to their root shapes), and lemmatization (gathering distinctive shapes of a word) are utilized to standardize the content for advance examination. Once the information is cleaned, estimation distinguishing proof is carried out utilizing estimation investigation models. This includes analyzing the content to decide whether the assumption communicated is positive, negative, or unbiased. Progressed strategies, such as Normal Dialect Preparing (NLP) and machine learning, are utilized to distinguish estimation by assessing the fundamental tone of the content. Estimation models ordinarily classify writings based on pre-defined names such as "positive" or "negative."

Following, highlight extraction is performed to change over the literary information into numerical representations that can be deciphered by machine learning calculations. Common highlight extraction procedures incorporate bag-of-words, TF-IDF (Term Frequency-Inverse Archive Recurrence), and word embeddings, which capture the setting and semantics of the words within the posts. The extricated highlights serve as inputs to the classification demonstrate.

At long last, the yield of the classification handle gives a assumption name for each post, deciding whether the opinion is positive or negative. This concludes the method and gives important experiences for assist examination or decision-making. The classified posts can at that point be totaled and analyzed for trends, making a difference to distinguish the common assumption within the dataset.

This flowchart illustrates a orderly and proficient approach to assumption investigation, changing crude social media posts into noteworthy bits of knowledge. It gives a clear way 25 for analyzing large-scale social media information and can be adjusted for different utilize cases, counting brand checking, advertise investigate, and social estimation following.

V. RESULTS

The most point of the extend was to classify social media posts as positive or negative opinions utilizing machine learning algorithms. Table 1 appears the investigation that was performed on the two calculations with distinctive preparing and testing sizes. It was found that Logistic Relapse was the foremost precise in all the cases.

Table 1: Analysis of the two algorithms

Training Size	Testing Size	Accuracy (%)	
		NLP	LR
80%	20%	92.98	94.73
70%	30%	92.39	95.32

Figure 2 shows confusion matrix demonstrates how well the model is performing across all classes by showing the correct and incorrect classifications.

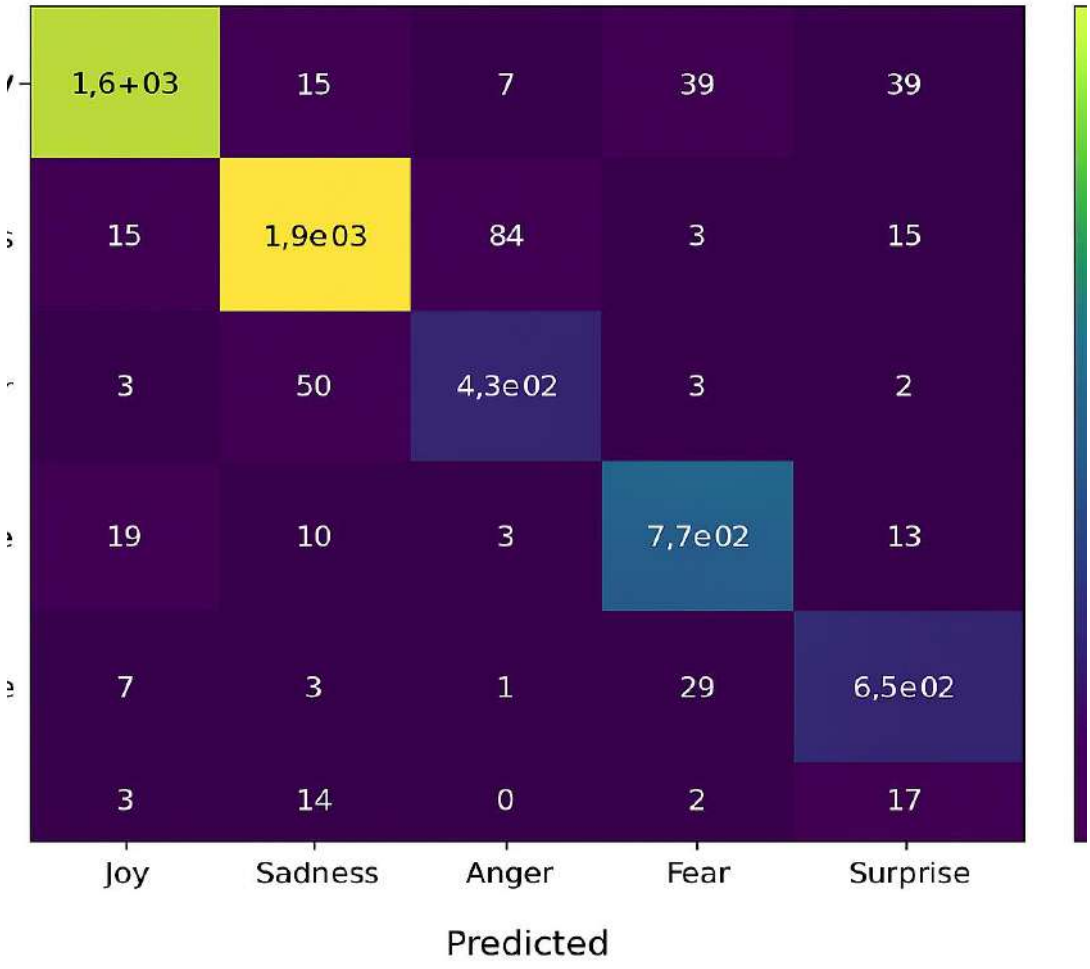

Figure 2: Confusion matrix

Figure 3 shows the bar graph which provides model's performance for emotion classification task.

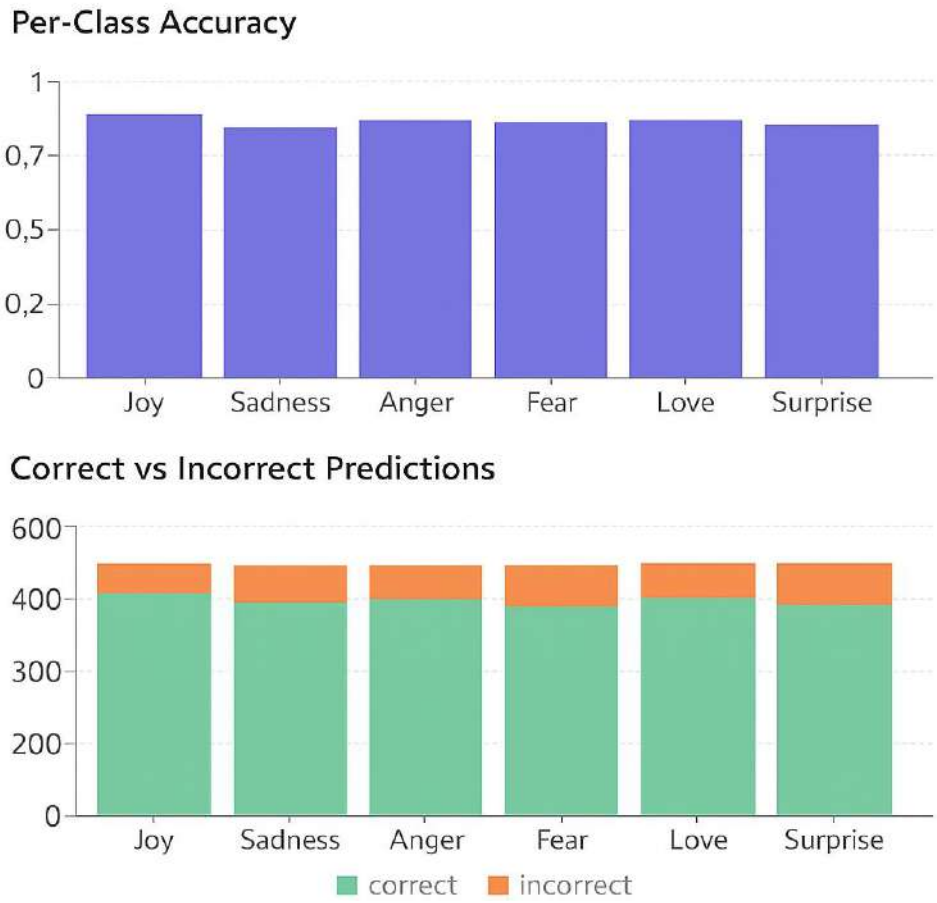

Figure 3: Graphical representation of emotion classification

The application was created utilizing the Carafe system, a lightweight and effective stage that encouraged consistent web application advancement. Carafe's streamlined highlights given the fundamental instruments to form a vigorous however versatile framework, guaranteeing an ideal adjust between backend usefulness and frontend interactivity. The primary programming dialects utilized within the extend were Python, HTML and CSS. This combination permitted for smooth integration of backend rationale with a natural and responsive client interface, conveying a cohesive and user-friendly encounter.

The figures within the past area advertised impressions into the application's plan and usefulness, displaying different pages and their particular client interfacing. These previews highlighted key highlights such as route stream, client input instruments, and result shows, reflecting the system's accentuation on ease of use and tasteful request.

To classify social media posts viably into positive or negative assumptions, the extend utilized Calculated Relapse as the center prescient show. After assessing numerous calculations, Calculated Relapse developed as the foremost exact and dependable arrangement for opinion investigation, making it the establishment of the system's prescient capabilities. By analyzing literary input from social media posts, the demonstrate effectively decides the enthusiastic tone, laying the foundation for advance personalization. In expansion to estimation classification, the application brags an interesting include:

emotion-based music bookmarking. This usefulness takes personalization to the following level by permitting the system to prescribe and spare tunes based on the identified feelings in client input. When clients give content that reflects their emotional state, the framework scholarly people match these assumptions with fitting melodies. These suggestions are at that point organized into personalized playlists and put away locally inside the application. By interfacing enthusiastic examination with music, the application not as it were upgrades client engagement but moreover gives a profoundly personalized touch that reverberates with person inclinations.

The combination of proficient web improvement utilizing the Carafe system, precise opinion investigation through Calculated Relapse and an inventive emotion-based music bookmarking system establishes this application as a groundbreaking arrangement in sentiment-driven personalization. Its consistent integration of innovation and user-centered 38 highlights sets the arrange for an exceedingly lock in and candidly resounding client encounter.

VI. CONCLUSION

This wander centers on actualizing assumption investigation for social media posts by leveraging Common Dialect Preparing (NLP) and Calculated Relapse (LR). The essential objective is to classify posts as positive or negative, displaying the transformative potential of Fake Insights (AI) in analyzing and deciphering tremendous sums of unstructured content information. By utilizing methods such as information preprocessing, include extraction, and directed learning, the extend guarantees solid and exact assumption classification, illustrating its capacity to address real-world literary challenges viably. The adaptability of this opinion investigation apparatus makes it a important asset over different spaces. In trade, it engages organizations to analyze client criticism, conduct advertise inquire about, and screen brand recognition, in this manner improving data-driven decision-making forms. For analysts and policymakers, the device serves as a basic implies to assess open assumption on basic social, political, and environmental issues, empowering them to form well-informed and impactful choices. The capacity to prepare and classify estimations at scale makes it a vital device for recognizing patterns, understanding group of onlookers' behavior, and forming successful communication techniques. The versatility and capacity of the title is to handle huge datasets highlight its common sense for real-world applications. Future headways may incorporate joining progressed profound learning models, such as transformers or repetitive neural systems, to make strides the precision and profundity of investigation. These models might empower the framework to way better get it complex assumptions like mockery, incongruity, and blended feelings. By joining real-time investigation, the instrument may moreover be utilized for time-sensitive applications, such as emergency administration, estimation following amid live occasions or observing brand estimation in competitive markets.

In outline, this venture stands as a confirmation to the potential of AI-driven arrangements to open profitable bits of knowledge from unstructured information and drive significant alter over businesses and divisions. By tending to current challenges and grasping future headways, this opinion examination solution can proceed to advance as a capable instrument for understanding human feelings in a progressively computerized world.

VII. SCOPE FOR FUTURE WORK

The wander holds gigantic potential for future improvements and extensions, clearing the way for a more immersive and impactful client involvement. Key regions for advancement incorporate refining the precision of estimation location through the integration of progressed machine learning procedures. By leveraging profound learning models, especially in ranges such as feeling acknowledgment and characteristic dialect understanding, the framework can accomplish more prominent exactness in translating nuanced passionate states communicated in social media posts.

Past text-based investigation, consolidating extra signals such as facial expressions, signals, and body dialect may altogether improve enthusiastic understanding. The integration of multimodal inputs including voice examination and biometric information from wearable devices could give a more comprehensive and real-time knowledge into users' passionate states. For case, analyzing vocal tone or heart rate varieties might offer profitable setting, empowering the framework to adjust its suggestions powerfully based on the user's current temperament.

Real-time feeling following presents another energizing road for change. By persistently observing users' passionate states, the framework might give energetic and relevantly significant music proposals. For occurrence, amid minutes of tall stretch or uneasiness, the stage might immediately propose calming playlists or nature sounds to assist the client unwind. Also, consolidating client input circles and relevant factors such as time of day, area or activity can advance refine the pertinence and personalization of the suggestions.

Extending the music library to incorporate assorted classes, social impacts, and dialects is fundamental for guaranteeing inclusivity and tending to the changed inclinations of a worldwide client base. For occasion, the framework seems suggest region-specific tracks or socially resounding music, improving its offer over diverse socioeconomics.

Tending to security concerns is another basic angle of the system's advancement. By executing strong information security measures, advertising clear assent components, and following to security directions, the stage can construct believe with its clients. Straightforward communication around how information is collected, put away, and utilized will be crucial in guaranteeing clients feel secure locks in with the benefit.

Ultimately, these upgrades point to make a more compassionate and comprehensive suggestion involvement. By joining cutting-edge innovations and prioritizing client believe 41 and differing qualities, this wander has the potential to rethink how feelings and music meet, cultivating a more profound association between innovation and humankind.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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