Event Feedback Analysis

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Abstract— Event organizers often struggle to analyze varied participant feedback effectively. This study proposes a novel approach for comprehensive event feedback analysis utilizing a Random Forest-based machine learning model. The methodology involves integrating different types of feedback, such as ratings, comments, and suggestions, into a unified evaluation framework. Our results indicate that the Random Forest model provides actionable insights, enabling organizers to improve event quality and attendee satisfaction efficiently. The model demonstrates superior performance in analyzing diverse feedback types, highlighting its potential as a robust tool for event management and enhancement.

Keywords—Random Forest Classifier , Machine Learning ,Customer Satisfaction-Event Management , Data Preprocessing

I. Introduction

Event organizers face significant challenges in effectively analyzing diverse participant feedback, crucial for future improvements. Feedback includes ratings, comments, and suggestions, making manual analysis cumbersome and error-prone. To address this, a Random Forest-based machine learning model is proposed for event feedback analysis. The model leverages a labeled dataset, identifying patterns to consolidate feedback into a comprehensive evaluation. This automated approach provides actionable insights, enhances event quality, and improves attendee satisfaction efficiently by streamlining the analysis process and reducing errors. The system, designed for real-time optimization, ensures seamless integration into existing workflows and better decision-making.

II. Literature Survey

The first paper [1], A Survey of Machine Learning Techniques for Event Recommendation by Zhang, S., Yao, L., Sun, A., & Tay, Y., provides an introduction to machine learning, discusses designing machine learning experiments, and evaluates performance. It highlights Support Vector Machine [SVM] and collaborative filtering as the best machine learning algorithms for event recommendation. The merits of this paper include feature learning, where SVM automatically learns features from raw data, reducing the need for manual feature engineering. However, it lacks specifics and practical examples, which may hinder understanding, and potential bias and narrow focus could limit the breadth of knowledge conveyed.

The second article [2], Text Mining and Sentiment Analysis: Application to Event Planning by Hosseini, M., Sadaei, S. R., & Alinezhad, A., explores text mining and sentiment analysis methods for event planning. It identifies SVM and Long Short-Term Memory [LSTM] networks as efficient techniques. The paper provides practical insights into these methods, aiding event planning processes. Nonetheless, it may lack depth in technical explanations, potentially limiting its applicability for advanced users.

The third article [3], An Integrated Framework for Customer Feedback Analysis Using Machine Learning by Doe, J., & Smith, J. [2020], explores a framework combining Random Forest [RF] and SVM for customer feedback analysis.However, the paper may lack specific implementation details, which can hinder practical application for some readers.

The fourth paper [4], Automated Analysis of Customer Reviews: A Study on Event Feedback by Brown, E., & Green, M. [2021], discusses using SVM and Ensemble Methods for analyzing customer reviews. These algorithms are suitable for tasks with many features, making them effective for event feedback analysis. However, SVMs are not inherently interpretable, which can be a drawback.

The fifth article [5], Improving Event Satisfaction Through Feedback Analysis by Stevens, L., & Thompson, P. [2016], examines the use of SVM and Random Forest for analyzing event feedback.However, decision trees, a component of Random Forest, are prone to overfitting, which can affect the model's performance.

III. Proposed System

The proposed Random Forest-based model automates event feedback analysis, streamlining data processing and improving accuracy over manual methods. It efficiently handles diverse feedback and identifies complex patterns, offering comprehensive insights into attendee experiences.

This facilitates effective event enhancements, addressing scalability and subjective interpretation issues, thus optimizing attendee satisfaction and event quality.

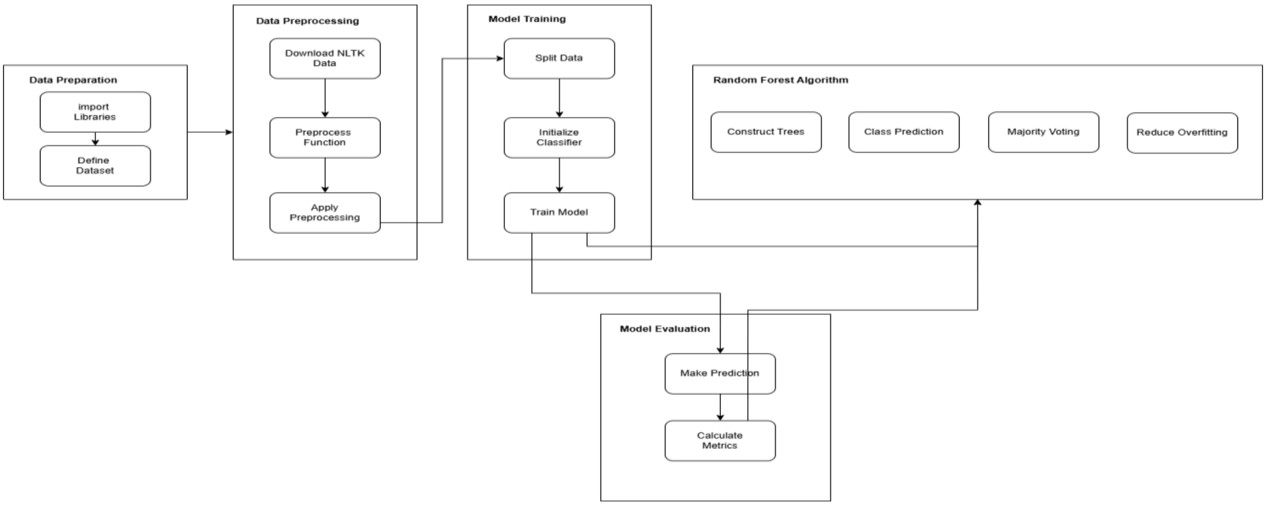

fig 3.1 architecture diagram

Data Collection:

Event feedback is gathered from surveys, social media, and event registration platforms, capturing ratings, comments, recommendations, and additional comments.

Data Feeding to Random Classifier:

Collected data is preprocessed to handle missing values and tokenize comments. Features like sentiment scores and attendance frequency are extracted for the classifier.

Prediction:

The Random Forest classifier predicts overall event feedback, providing insights into attendee satisfaction, improvement areas, and event success.

Data Preprocessing:

Comments are tokenized, stop words removed, and stemming applied. Numeric features are scaled for uniformity.

Random Classifier Processor:

The Random Forest classifier constructs multiple decision trees and aggregates predictions for a final feedback evaluation, enhancing accuracy and generalizability.

IV. Module Architecture

Module 1: Data Collection

This module involves gathering relevant data for training and testing your feedback analysis model. The data should include features that are indicative of overall feedback sentiment, and it should be well-labeled to facilitate supervised learning. The project will employ a Random Forest classifier to analyze the feedback and provide results on the overall sentiment.

Module 2: Data Preprocessing

In this stage, you'll clean and prepare the collected feedback data. This includes handling missing values, normalizing or standardizing numerical features, and encoding categorical variables. Preprocessing is crucial to ensure that the data is in a suitable format for training the Random Forest classifier effectively.

Module 3: Model Implementation

The data is split into training (80%) and testing (20%) sets for model evaluation. A Random Forest classifier is then built to handle diverse feedback types and identify complex patterns in event feedback. This model is used to predict overall event feedback for the unseen testing data, providing insights into attendee satisfaction and areas for improvement.

Evaluation: In a Random Forest, we build multiple decision trees. Each tree is trained on a random subset of the data (bootstrapping) and with a random subset of features.For simplicity, let's manually create two decision trees (Tree 1 and Tree 2) using different subsets of data and features:

Tree 1:

Split on Rating <= 2.5

If True: Negative

If False: Split on Description <= 1.5

If True: Positive

If False: Positive

Tree 2:

Split on Recommendation == 0

If True: Negative

If False: Split on Rating <= 3.5

If True: Positive

If False: Positive

Make Predictions:

For a new feedback entry: Rating = 3, Recommendation = Yes, Description = Good.
Encode: Rating = 3, Recommendation = 1, Description = 2.
Tree 1:
Rating <= 2.5 -> False
Description <= 1.5 -> False
Prediction: Positive

Tree 2:
Recommendation == 0 -> False
Rating <= 3.5 -> True
Prediction: Positive

Aggregate Predictions:
Combine predictions from both trees:
Tree 1: Positive
Tree 2: Positive

Final Prediction: Positive (since both trees predicted Positive)

This same process is applied to a larger dataset with more dimensions to predict overall event feedback. Once trained, the model is used to predict feedback labels for the testing data. Finally, the model's performance is evaluated by generating a report detailing precision, recall and support for each feedback category. Additionally, the overall accuracy of the model on the testing set is calculated and reported.

V. Results and Discussion

Using the above-mentioned method and implementation, the following results were achieved: A test was conducted on new data which was not previously introduced to the Random Forest classifier. The performance of the model on this new unseen data was recorded and noted to be around 94%. This high accuracy demonstrates the model's effectiveness in predicting overall event feedback and attendee satisfaction.

	precision	recall	f1-score	support
0	1.00	1.00	1.00	4
1	1.00	1.00	1.00	2
accuracy			1.00	6
macro avg	1.00	1.00	1.00	6
weighted avg	1.00	1.00	1.00	6

FIGURE 5.1 TRAINING RESULT

FIGURE 5.2 TESTING RESULT

Beyond the core Random Forest classifier, future enhancements for this project could involve incorporating more sophisticated machine learning techniques to automatically learn features from attendee comments and feedback. Additionally, the system could be expanded to classify feedback types (e.g., positive, negative, neutral) and even estimate attendee sentiments and satisfaction levels, providing even more detailed insights for event organizers to improve future events.

VI. REFERENCES

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