Automatic Answer Checker Using Unstructured Text Analysis

A.K Preethi[1], S. Nirmala Sugirtharajini[2]
[1, 2] Dept of Computer Applications
[1, 2] Dr. M.G.R. Educational and Research Institute, Chennai - 95

Abstract- *Web Application provides facility to conduct online examination in anywhere and any place. It saves time as it allows number of students to give the exam at a time and displays the results as the test gets over, so no need to wait for the result. It is automatically generated by the server. Administrator has a privilege to create, modify and delete the test papers and its particular questions. User can register, login and give the test with his specific id, and can see the results as well. Student information System is very useful for Educational Institute to prepare an exam, safe the time that will take to check the paper and prepare mark sheets. It will help the Institute to testing of students and develop their skills. But the disadvantages for this system, it takes a lot of times when you prepare the exam at the first time for usage. And we are needs number of computers with the same number of students.*

Keywords- Automated Assessment, Answer Grading ,Unstructured Text Analysis, Automatic Evaluation, Text-based Answer Checking, AI-driven Assessment.

I. INTRODUCTION

The textual data can be compared using various techniques such as document similarity, latent semantic structures, concept graphs, ontologies. The final score can be evaluated based on Similarity, keywords presence, structure, language[1].

The rise and widespread use of social media platforms, a huge amount of text data is generated every day. Text usually contains a lot of information, such as emotions and positions. However, text is unstructured data, which leads to time-consuming and labor-intensive manual analysis. It is very important to understand how to represent unstructured text as a hash vector that is easily recognized by a computer [2].

Text representation has become increasingly important in natural language processing (NLP). A good performance should fully learn grammatical and semantic information in natural language and provide a strong foundation for subsequent tasks such as text classification and sentiment analysis [3].

Evaluation of such questions using computers is a tricky task, mainly because natural language is ambiguous. Several preprocessing steps must be performed, such as cleaning the data and tokenization before working[4].

Single-label classification techniques struggle to meet the needs of text classification, and multi-label text classification has become an important research problem in natural language processing (NLP). Extracting semantic features from different levels and levels of text is the main and central task of multi-label text classification research [5].

II. LITERATURE SURVEY

According to **Yueshan&YijieWang**.et al.,2019 word vector representation is frequently utilized in applications involving natural language processing. Word order is lost and word semantics are ignored in bag of word functions, which are the two fundamental drawbacks of most word vectors that are generated using a probabilistic approach. As continuous space language models for encoding words in high-dimensional real-valued vectors, neural network language models CBOW and Skip-Gram have recently been developed[6].

Weikai& Ma.et al.,2020 says that continuous bag-of-words model constrained by frequency, some words do not receive enough training. At the same time, the model ignores some low frequency words based on the minimum frequency set. In this paper, we construct the corresponding clusters from the semantic dictionary and integrate it into the CBOW model using a multi-classifier[7].

According to **Krishna**.et al ., 2020word input is very important in all NLP tasks. Word input is used to match a word in the dictionary to a vector. Gram's jump model is a type of model for learning word embeddings. This model predicts surrounding words based on given input words that are a certain distance away. Its purpose is to predict the context based on a given word[8].

Xin & Wang.et al., 2020says that we present how to hybridize the word2vec model and an attention-based end-to-end speech recognition model. We are building a phoneme recognition system based on the Listening, Attending and Spelling model. And the phoneme detection model uses the word2vec model to restore the embedding matrix to improve performance, which can increase the distance between phoneme embedding vectors. Meanwhile, we propose a new training method to solve the overfitting problem of the 61 phoneme recognition models of the TIMIT dataset[9].

According to**Dipali Baviskar**.et al., 2021 the literature lacks a comprehensive study of artificial intelligence-based techniques for automatic information extraction from unstructured documents. The purpose of this systematic literature review (SLR) is to identify and analyze studies on techniques for automatic data extraction from unstructured documents and to provide directions for further research[10].

III. PROPOSED SYSTEM

- The online test created for taking online test has following features In comparison to the present system the proposed system will be less time consuming and is more efficient. Analysis will be very easy in proposed system as it is automated Result will be very precise and accurate and will be declared in very short span of time because calculation and evaluations are done by the itself.
- The proposed system is very secure as no chances of leakage of question paper as it is dependent on the administrator only. The logs of appeared candidates and their marks are stored and can be backup for future use.

Secure -Ensuring the security of an automatic answer checker using unstructured text analysis involves implementing secure coding practices, encryption for data transmission, and access controls. Regular security audits and updates are crucial to address vulnerabilities

Easy to use-Designing an easy-to-use automatic answer checker involves creating an intuitive user interface, providing clear instructions, and minimizing complexity. Consider user-friendly features like drag-and-drop functionality, straightforward setup processes, and comprehensive documentation to make the system accessible to a broad audience. Testing with potential users can help identify and address usability issues.

Reliable and accurate -To ensure reliability and accuracy in your automatic answer checker using unstructured text analysis, focus on robust natural language processing (NLP) algorithms, extensive training data, and regular model updates.

Implement a feedback loop to collect user corrections and continuously improve the system. Rigorous testing and validation against diverse**.**

No need of examiner- Creating an automatic answer checker without the need for an examiner involves developing sophisticated natural language processing (NLP) algorithms capable of accurately assessing responses independently. Implement machine learning models that can generalize well across various contexts and adapt to different writing styles. Extensive training with diverse datasets will be crucial to achieve autonomy in evaluating answers without human intervention. Regular updates and feedback mechanisms can help refine the system's capabilities over time.

ARCHITECTURE DIAGRAM:
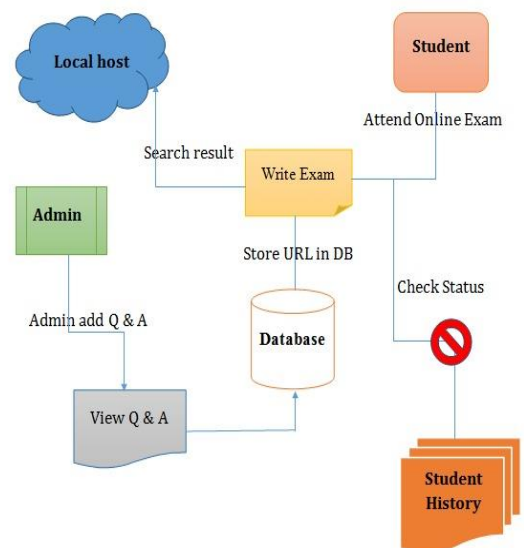
Explanation:

The components and processes involved in building an automatic answer checker using unstructured text analysis:

1. Text Input:
  - This represents the raw textual responses provided by users, which could be answers to questions, essays, or any other form of text input.

2. Text Preprocessing:
  - Tokenization: This initial step involves breaking down the raw text into individual words or tokens, making it easier to analyze.
  - Stop Words Removal: Common words like "and", "the", "is" are removed as they do not carry significant meaning.
  - Lemmatization/Stemming: Words are reduced to their base or root form to standardize variations of the same word.

- Punctuation Removal: Special characters and punctuation marks are eliminated to clean the text.

3. Feature Extraction:

- TF-IDF: This technique calculates the importance of words in the text relative to the entire dataset, highlighting words that are more relevant to the context.

- Word Embeddings: Words are represented as dense vectors in a continuous vector space, capturing semantic relationships between words.

4. Model Training:

- Selection of ML Model: Choose a suitable machine learning model such as Support Vector Machines (SVM), Naive Bayes, or deep learning models like Convolutional Neural Networks (CNNs) or Recurrent Neural Networks (RNNs).

- Training with Labeled Data: Train the selected model using labeled data, which includes examples of correct and incorrect answers. The model learns to differentiate between the two based on the provided features.

5. Evaluation:

- Performance Metrics: Metrics such as accuracy, precision, recall, and F1-score are used to evaluate the performance of the trained model on a separate test dataset.

- Iterative Improvement: Based on the evaluation results, the model may undergo further refinement through adjustments to hyper parameters, feature selection, or algorithm selection.

6. Deployment:

- Integration: The trained model is integrated into an application or platform where users can input their responses.

- User Feedback: Users receive immediate feedback on the correctness of their answers, along with suggestions for improvement if applicable.

IV. RESULT AND DISCUSSION

Figure 1. Admin Login   admin Home   Admin Create Exam

a)ADMIN LOGIN: The admin login functionality allows administrators to securely authenticate themselves into the system using their credentials.

b)ADMIN HOME:After successful login, administrators are redirected to the admin home page, where they have access to various administrative functionalities.The admin home page serves as a centralized dashboard for administrators to manage different aspects of the system. It typically includes links or buttons to navigate to different admin features such as creating exams, managing users, viewing reports, etc.

c)ADMIN CREATE EXAM: The admin create exam functionality empowers administrators to design and configure exams according to their specific requirements. It should support various question types such as multiple choice, true/false, short answer, etc., and allow administrators to set parameters like time limits, passing scores, and question weights.
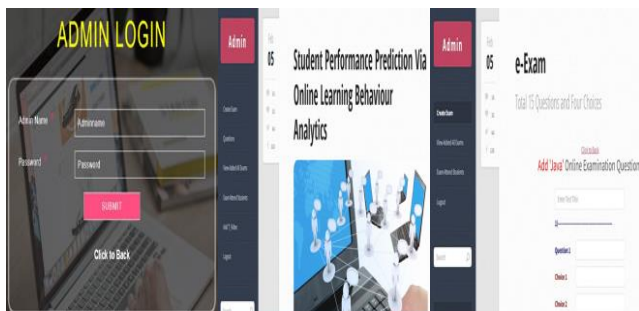

Figure 2.USERS REGISTERLOGIN   HOMEPAGE

a)USERS REGISTER: The user registration functionality allows new users to create accounts on the platform.

b)LOGIN: The user login feature enables registered users to access their accounts by providing their credentials.

c)HOMEPAGE: The homepage serves as the central hub of the platform, providing users with access to various features and functionalities.
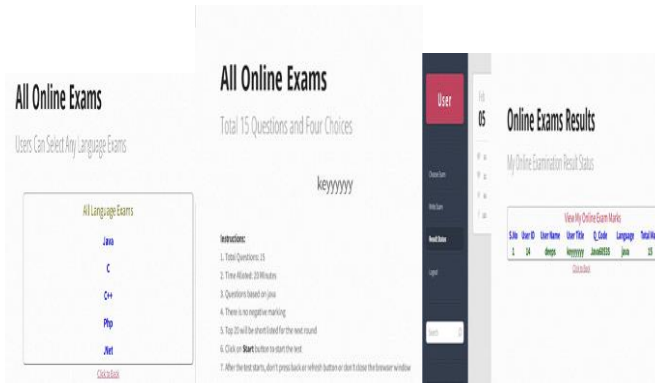
Figure 3. **Choose Exams**   **Start Exam**   **View Results**

a)CHOOSE EXAMS :It allows users to select the exams they wish to take from a list of available exams.

b)START EXAM: During the exam session, users have the opportunity to demonstrate their knowledge and skills by providing answers to the questions presented. The system employs unstructured text analysis techniques to evaluate and score the user responses, ensuring objectivity and consistency in the grading process.

c)VIEW RESULTS: Once the user completes the exam, they can access their results through the "View Results" feature.

V. CONCLUSION

In this paper, final examination have been predicated using four classification algorithms namely Linear Regression, Multilayer Keyword and Random Forest are compared and evaluated which give best result based on the value of correctly classified instance, mean absolute error and root mean squared error. The analysis of the experiment and the comparison of five classification algorithms has demonstrate evidence that Linear Regression is the most appropriate to predict students' performance result. The overall accuracy (85.37%) and overall error was extremely satisfactory (0.6214 and 0.7947). Moreover, the Linear Regression algorithm is the straightforward with formula and the best predication models in terms of accuracy, performance and error rate to compare their feasibility.The creation of an automatic answer checker using unstructured text analysis represents a valuable contribution to education, assessment, and various domains where textual evaluation is paramount. Continued refinement and innovation in this field promise to further enhance the accuracy, efficiency, and accessibility of automated text assessment systems in the future.

REFERENCES

[1] L. I. Voronova, R. V. Tolmachev and A. V. A. Usachev, "Resource development to prevent riots at mass events," 2018 Systems of Signals Generating and Processing in the Field of on Board Communications, Moscow, 2018, pp. 1-5,

[2] Zhao R., Mao K. Fuzzy bag-of-words model for document representation. IEEE Trans. Fuzzy Syst. 2018; PP 794–804.

[3] Jiang Z., Gao S., Chen L. Study on text representation method based on deep learning and topic information. Computing. 2020; PP 623–642.

[4] Zhou W., Wang H., Sun H., Sun T. A Method of Short Text Representation Based on the Feature Probability Embedded Vector Sensors 2019.

[5] Liu W., Pang J., Li N., Zhou X., Yue F. Research on Multi-label Text Classification Method Based on tALBERT-CNN. Int. J. Comput. Intell. Syst. 2021; PP1–12

[6] Xiong, Zeyu& Shen, Qiangqiang&Xiong, Yueshan&YijieWang, & Li, Weizi. (2019) New Generation Model of Word Vector Representation Based on CBOW or Skip-Gram Computers, Materials &Continua 58. 259-273.

[7] Sun, Weikai& Ma, Yinghua& Li, Shenghong& Zhang, Shiyi (2020). Similar Cluster Based Continuous Bag-of-Words for Word Vector Trainin 10.1007/978-981.

[8] Krishna, P. &Sharada, into the CBOW mode (2020). Word Embeddings - Skip Gram Model. 10.1007/978-981

[9] Feng, Xin & Wang, Lei (2020)Application of Word2vec in Phoneme Recognition 495-499.

[10] Dipali Baviskar, Swati Ahirrao, VidyasagarPotdar, KetanKotechaIEEE Access 9, 72894-72936(2021).