IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2024

DOI: 10.17148/IJARCCE.2024.13375

Customized learning strategies for students

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Abstract: Effective learning results in modern educational environments increasingly depend on attending to students' different learning preferences and styles. This study describes a complete methodology that builds personalized learning methods for individual students by fusing state-of-the-art machine learning algorithms with well-established educational frameworks. In particular, we suggest combining the VARK model, Glove embedding, and the Long Short-Term Memory (LSTM) method to create a strong foundation for individualized instruction. The VARK approach divides students into four learning styles: kinesthetic, visual, auditory, and reading/writing.

Keywords: Personalized learning, machine learning, LSTM algorithm, VARK model, Glove embedding, learning styles, text classification.

INTRODUCTION

In the educational landscape, the need for personalized learning experiences has never been more pronounced. Students exhibit diverse preferences and learning styles, necessitating a departure from traditional, one-size-fits-all approaches to education.

In the dynamic landscape of education, the demand for personalized learning experiences has reached unprecedented levels. As students manifest an array of preferences and learning styles, the inadequacy of traditional, standardized approaches becomes increasingly apparent. Consequently, there is a compelling need to shift towards educational methodologies that embrace and accommodate this diversity. This paper delves into the imperative for personalized learning, offering a departure from conventional teaching methods towards tailored educational experiences that resonate with each student's unique characteristics and learning journey.

The project, titled "Customized Learning Strategies ," seeks to address this imperative by harnessing the power of text classification methodologies. By understanding and catering to individual student needs, the project endeavors to make learning more engaging, effective, and accessible. Through the integration of advanced machine learning techniques and user-centric design principles, the project aspires to create a learning ecosystem.

In education today, recognizing and accommodating diverse learning styles is crucial. Traditional teaching methods may not engage all students effectively. This paper introduces a new approach to customized learning, combining advanced machine learning with established educational models like the VARK system and Glove embedding. By doing so, we aim to create tailored learning strategies that adapt to each student's preferences and needs, ultimately enhancing their learning experiences..

LITERATURE REVIEW

The variety of terms used for personalized learning poses a challenge to the progress of theories and research. Personalized learning is increasingly in demand due to advancements in technology and learning analytics. The systematic review aims to analyze the terms used for personalized learning and their implications. Research questions focus on defining personalized learning, adaptive learning, and individualized instruction [7]. The paper focuses on algorithm design rather than programming and adopts a machine-learning model to enable a personalized and self-tutoring system [2]. Personalized learning algorithms have rapidly developed due to educational information. Research focuses on recommendation systems and data mining methods. Collaborative filtering addresses sparsity and cold-starting problems

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in learning resource recommendations. Clustering algorithms analyze learning behavior and detect abnormalities. Association rules mining and sequential pattern mining discover learning habits for personalized recommendations. This paper provides insights into the development and effects of personalized learning algorithms, emphasizing the importance of recommendation systems and data mining methods in enhancing educational outcomes [17].

METHODOLOGY

1.Text Preprocessing: Clean and standardize the educational content to ensure consistency and coherence in the dataset.

2. Data Division: Divide the preprocessed data into training and testing sets to facilitate model development and evaluation**.**

3. Glove Word Embedding: Utilize pre-trained Glove word embedding to enhance the semantic understanding of the textual data**.**

4. Neural Network Construction: Construct a neural network model using the keras Sequential API. Incorporate LSTM layers to capture sequential patterns inherent in educational content**.**

5. Model Compilation and Training: Compile the neural network model .Train the model using the training dataset.

6. Performance Evaluation : Evaluate the performance of the trained model through rigorous testing and validation processes using the testing dataset.

7. Development of Flask Web Application: Develop a Flask web application to enable user interaction. Allow students to access personalized learning recommendations based on their preferences and learning styles through the web application.

By following these steps, the methodology effectively combines text preprocessing, utilization of Glove embedding, LSTM-based neural network modeling, model training and evaluation, and the development of a user-friendly web application for customized learning **.**

MODELING AND ANALYSIS

In our Customized learning, we utilized the VAK model for identifying the different learning styles. We began by collecting a dataset containing various sequence of texts which has a different learning styles which includes Visual, Auditory , kinesthetic .

It starts by getting data from a dataset that has examples of sentences and their types. Then, it cleans up the sentences, making sure they only contain letters and are in lowercase.

After that, it divides the data into two parts: one to teach the system (training data) and the other to test how well it's learned (testing data). It then converts the words into numbers so the computer can understand them better.

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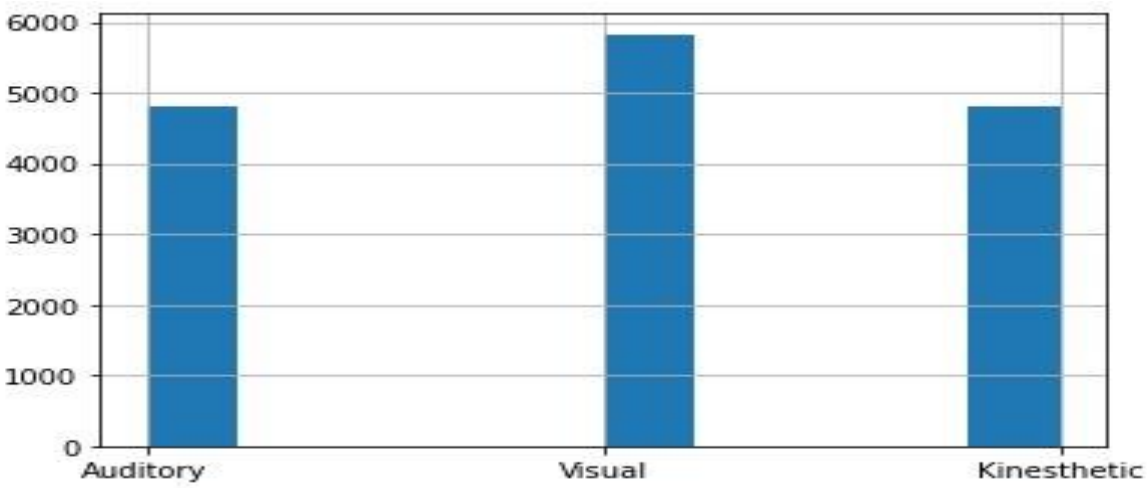
Next, it loads a special kind of knowledge about words called "word embedding" that helps the system understand the meaning of words in sentences. It builds a model to learn from the data, trains this model using the training data, and checks how well it's doing with the testing data.

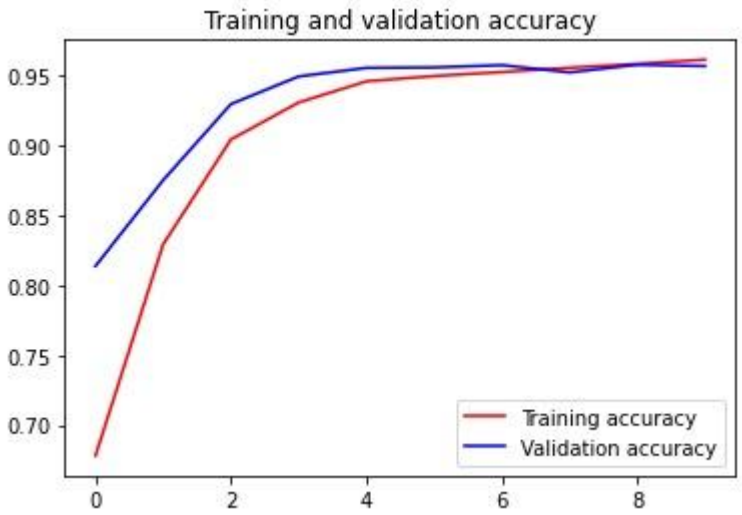
By comparing LSTM algorithm with other algorithms like naïve bayes, BFS, K-means it produces a more efficient accuracy .

In this users can input custom text samples, and the model will predict their respective labels. Additionally, it provides visualizations of training and validation metrics for model evaluation.

By Visualizing the datasets the classes count present in this are:



And then training and validating the model we will get the accuracy as:



And then by training and validating the loss is:

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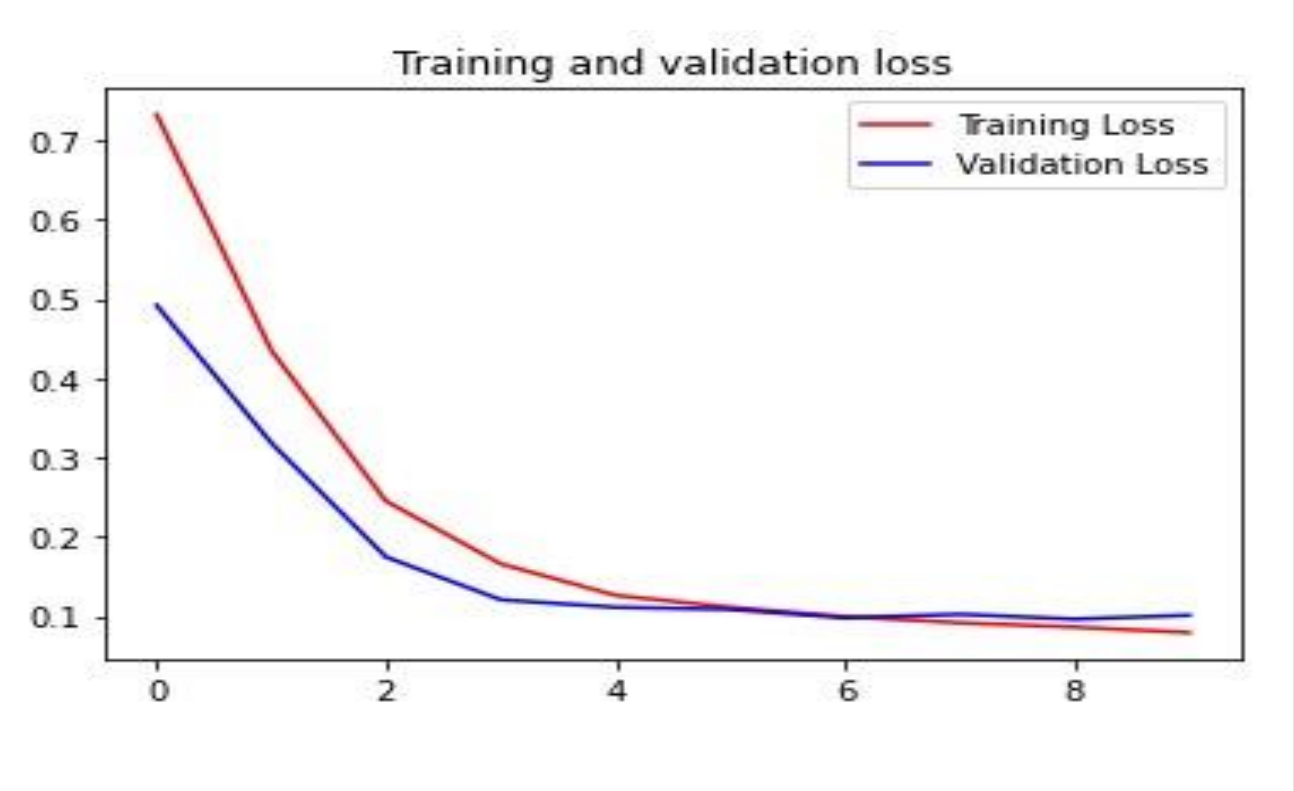
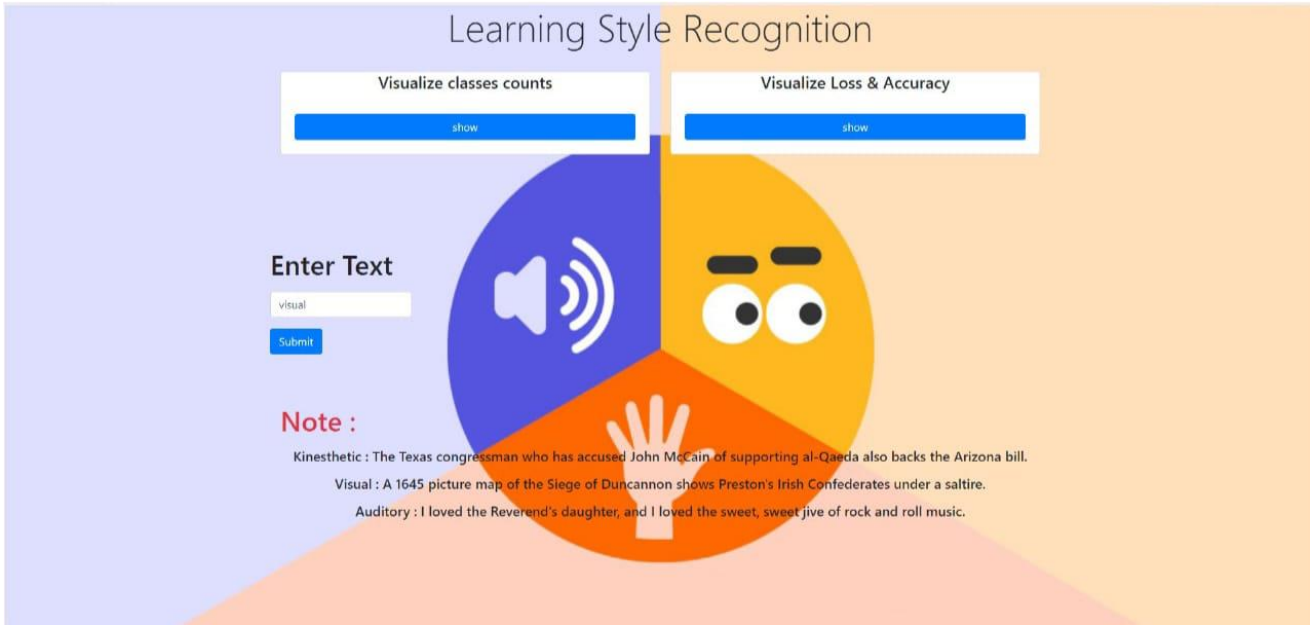


RESULTS AND DISCUSSION

Home page:



Once we open like this we have to enter the Text in the field “ENTER TEXT”.

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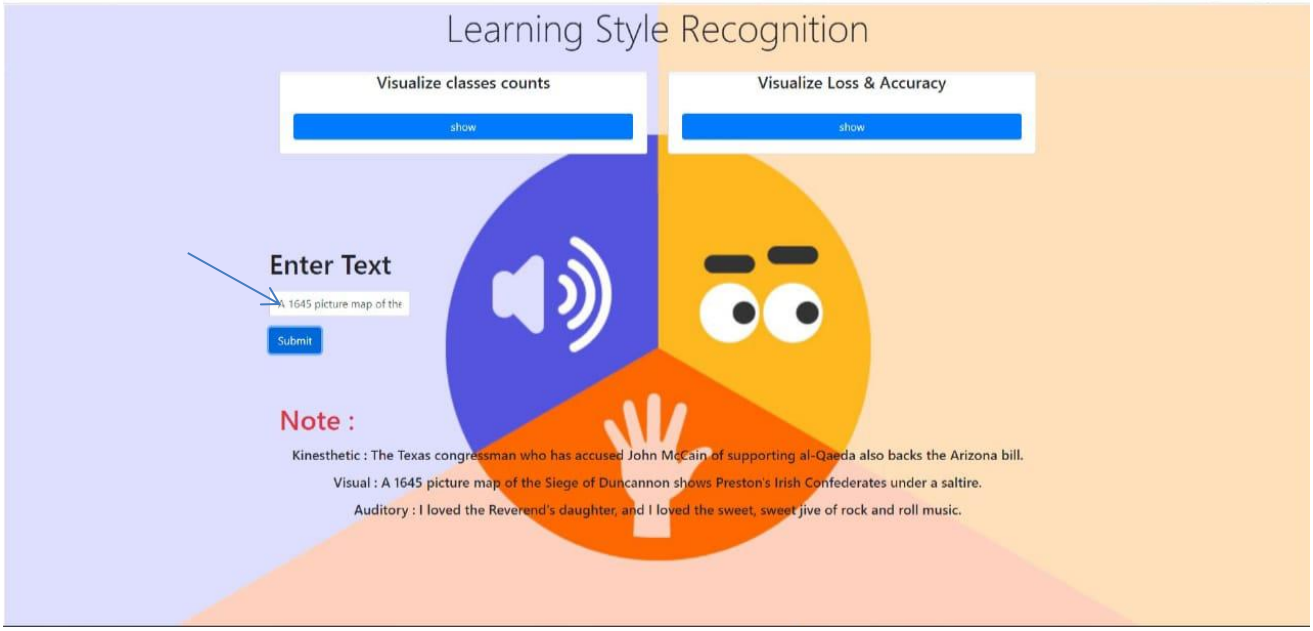
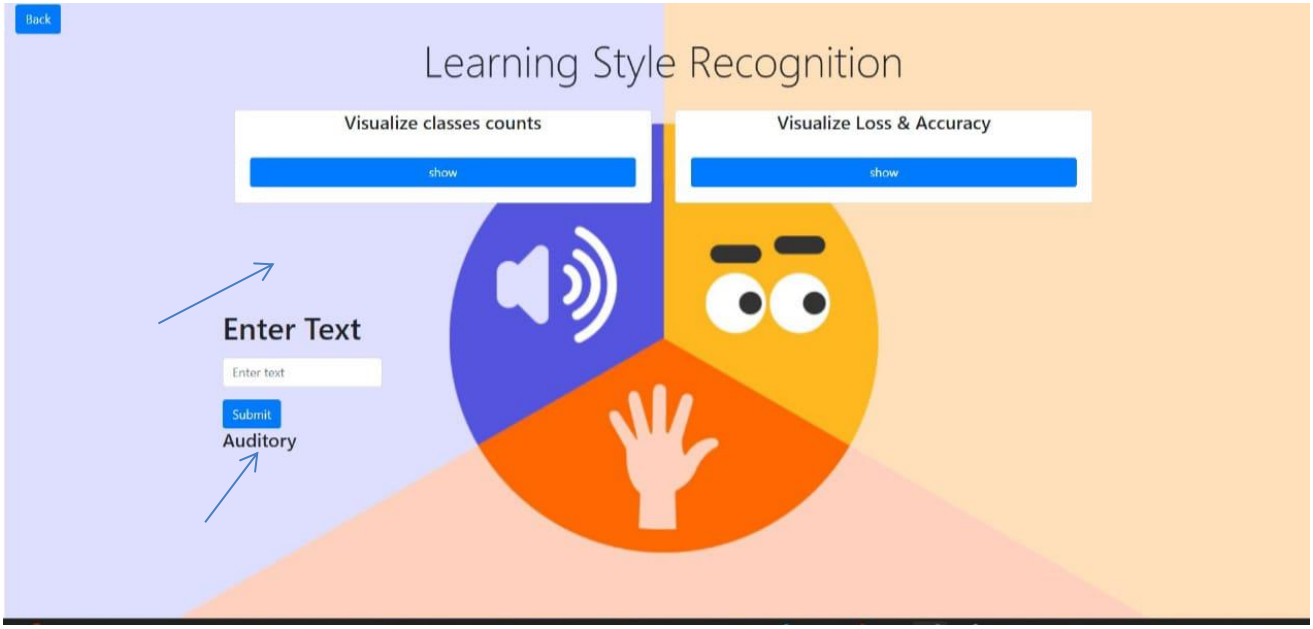


After entering of the text we have to click ”SUBMIT” button to know the output



The results obtained from the project underscore its efficacy in enhancing education through customized learning strategies. The model's remarkable accuracy and minimal loss validate its proficiency in classifying educational content effectively. Furthermore, the user-centric design of the Flask web application ensures accessibility and inclusivity, fostering a conducive learning environment for students of all backgrounds and abilities. The project's success heralds a new era in education, where personalized learning experiences are the norm rather than the exception, empowering students to realize their full potential.

CONCLUSION

In conclusion, the project represents a significant leap forward in educational technology, offering customized learning strategies tailored to individual student needs. By leveraging advanced text classification techniques and LSTM neural networks, the project demonstrates the transformative potential of customized education. The integration of pre-trained word embedding and user-friendly web interfaces underscores the project's commitment to accessibility, inclusivity, and

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innovation in education. With a training accuracy of 95% and a minimal loss of 6%, the project sets a new standard for educational technology, paving the way for a future where every student can thrive and succeed.

This project establishes a text classification system using LSTM neural networks within a Flask web application. It preprocesses text data, trains a model to understand sentences, and provides a user interface for classification. Further improvements involve experimenting with advanced architectures, embedding, and deployment optimizations to enhance accuracy and applicability in real-world scenarios.

Overall, this project demonstrates the power of machine learning techniques in understanding and processing natural language, paving the way for various applications in text analysis and classification.

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