AN AUTOMATED WEB-BASED ESSAY CHECKER FOR ENGLISH ESSAYS IN HIGHSCHOOL USING KNOWLEDGE-BASED ARTIFICIAL INTELLIGENCE

A Thesis Project
Presented to the Faculty of the
Computer Studies Department

College of Science
Technological University of the Philippines
Ayala Blvd., Manila

by

Chayryjoy S. Bustamante

Ma. Cristina Agatha C. Deladia

Janelyn F. Lompot

Angela Nicole S. Pinlac

Clarence G. Prades

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science in Computer Science

May 2024

INTRODUCTION

The study aims to develop an automated essay checker for high school students. It uses Knowledge-based Artificial Intelligence to detect and correct errors in essays. The system was created to simplify the process of checking and rating English essays for the high school. The main objective is to provide information to educators, administrators, and others who need information about these tools in the academic world. The study examined their effectiveness, drawbacks, and possible advantages to show how the educational era is changing in the digital era. The system is designed to provide feedback on answered essays, offer suggestions, and include a scoring system for overall assessment. It was developed with Visual Studio Code, Typescript, Tailwind CSS, Zustand, Node.js, Prisma, and JSON WebToken. The system is available on the website in desktop and mobile web browsers. The study is limited to both teachers and high school students. It involved developing a user-friendly interface, utilizing NLP, Jaccard, and Cosine Similarity algorithms.

METHOD

The website designed for teachers has the following features: Login, Signup, Password Recovery, and Logout. The characteristics of the website created for students are as follows, based on system requirements: login, Forgot Password, Browse Essays, Viewing score and feedback. The website was developed using Visual Studio Code for front-end and backend development. Various testing methods were used to ensure the capability and the quality of the project. The following procedures were followed on how the website wasDeveloped. The website was used to test the usability and user experience of the website view. The user interface, navigation, and ease of use of the system were tested. Feedback from users, such as students and teachers, was gathered on their experience using the system. The scoring criteria will be based on the results of the grammar check, the oroussimilarity analysis, and the lessening and adding of the scores along the process. The backend application used CORS for domains that can only access the API request. The ESay-Checker was developed to test the usability, security and functionality of English essays. The errors and suggestions to better their essay will be shown to the student. Various modeling tools were employed to analyze the scope and requirements of the web-based application. The researchers outlined a detailed design for the web application. Students need to log in to their accounts to view the assigned questions of the teacher. The teacher can assign the essay type and the criteria was displayed based on the essaytype. The algorithm for the Automated Web-Based Essay Checker for English Essays included the following steps. The base grade depends on the accumulated mean of the two-similarity metric PostgreSQL. The system will identify the input text or essays, and it will be preprocessed using NLP techniques and algorithms, as seen in Figure 3. The website had tabs with the following features found on the left side of the page: ?eSay Checker? in any web browser. Artificial Intelligence (AI)-powered educational solutions have enormous potential to improve learning experiences in the digital age. The research study created a web application functioning as an automated essay checker. It becomes necessary to follow a thorough usability, functionality suitability, and security testing approach to guarantee its efficacy and safety, as shown

in Tables 2, 3, 4, and 5. The researchers chose to utilize two similarity algorithms, specifically, Cosine and Jaccard Similarity. The study was based on the following sections: project design, project development, operation and testing procedure, and viewpoints. ed all functional paralleledrequirements from the teacher and students. The AI services file holds the functions that calculate each score per criteria. Teachers can assign essays to students based on their choices after they have set up accounts. Vectorization will be used to convert the essay texts into numerical viewpoints. A connection using middleware was created and used to make verification work together with the authentication managing and error managing anderror messages as per execution. Any free web browser, including Mozilla Firefox, Microsoft Edge, and Google Mozilla Firefox, Mogul Edge, and Google Chrome, can access the page.

RESULTS

The ?Account Information? page enables the teacher and student to view their name, the email they used to register the account and to change their password. Shown in Figure 8 is the ?Essay Checker? page, where all the essays viewpoints by the teacher can be seen. On this page, found in Figure 13, the teacher could add more students using the ?Add Student? button found at the upper right corner of the screen. The teacher may also add a new question to assign to their students. The automated essay checker was designed to check students' typed essays and help teachers in checking student essays. It reduces the time and effort required by teachers to grade essays while maintaining accuracy and consistency in the assessment process. The A-cards possess the following information: answered essay number, essay question, student?s answer, and the date and time of the student's submission. When a student logs in, the student will be greeted with the ?Browse Essays? page, which shows all the questions assigned by the teacher. , with various input labels on them, like ?Old paralleledPassword,? ?New Password,? and ?Confirm New Password.? Alongside this, a ?Forgot paralleledpassword?? link has been provided below the input field for ? old Password. This allows the teacher to provide access to the student when giving out essay questions. The ?Submit another question? button is placed there, so when the teacher decides to create another question without having to go back to the ?Essay Checker? ?Manage? button will lead the teacher. The automated essay checker demonstrates high functionality, reliability, and userfriendliness. It can be used to quantify the similarity of two essays by comparing their unique n-grams. The system is limited to high school students and English teachers; the creation of the system is for academic purposes for high school level only. The application excels in providing essential features for both teachers and students, ensuring accurate and efficient assessment. However, there are minor areas for improvement, as well as dependable, dependable and dependable environments for educational environments. The study uses an automated essay checker to help students and teachers alike. It has a weighted mean of 3.75 for Functional Completeness, indicating that it includes nearly all required information. It also enables the student

to belong to a class automatically. The ?My My Essay Essays? page is where students can find all their submitted essays. It is clickable, and if a Qcard is clicked, this could lead to the Q-card?s content.

DISCUSSION

The "Automated Essay Checker" web application, based on testing and evaluation, can improve communication between students and teachers. 25 evaluators consisting of students and IT professionals were involved. The developed web application was evaluated to be highly acceptable in terms of the ISO 25010 Criteria. The following recommendations are put forward for further enhancement of the Automated Essays Checker. The recommendations are based on the following criteria: functional suitability, performance efficiency, cross-device compatibility, usability, and reliability. The web-based essay checker is considered secure and user-centric. It provides accurate grading while maintaining a user-friendly interface. It can be improved by adding a feature that differentiates the type of essay before assigning the questions to the students. The test results indicated that the web application was considered secure overall. It is possible to improve the user experience further by optimizing network connectivity to improve user experience. It could also be improved to include the teacher?s feedback in the generated scores.