Internship Project
report on

IBM Watson Studio For Building An Automated Essay Grading System

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CHAPTER 1

INTRODUCTION

1.1 Overview

Essays are crucial testing tools for assessing academic achievement, integration of ideas and ability to recall, but are expensive and time-consuming to grade manually. Manual grading of essays takes up an amount of instructors' valuable time and hence is an expensive process. Automated grading, if proven to match or exceed the reliability of human graders, will reduce costs. Currently, automated grading is used instead of second graders in some high-stakes applications, and as the only grading scheme in low stakes evaluation. This application can have a high utility in many places. For instance, currently, evaluation of essay writing sections in exams like GRE, GMAT, and TOEFL is done manually. And, so automating such a system may prove to be highly useful. An automated grading system is built with the magical powers of neural networks. Using automation reduces time and effort in evaluation. NLTK libraries for feature extraction and LSTM are used for the learning process.

Project Objectives:

- You'll be able to understand the text and process it.
- You will be able to extract important features from the text.
- You will be able to understand RNN and LSTM working principles.
- You will be able to know how to pre-process/clean the text using different data pre-processing techniques.
- You will be able to know how to find the accuracy of the model.
- You will be able to build web applications using the Flask framework.

CHAPTER 2

LITERATURE SURVEY

2.1 EXISTING SYSTEM

The AutoAI graphical tool in Watson Studio automatically analyzes your data and generates candidate model pipelines customized for your predictive modeling problem. These model pipelines are created iteratively as AutoAI analyzes your dataset and discovers data transformations, algorithms, and parameter settings that work best for your problem setting. Results are displayed on a leaderboard, showing the automatically generated model pipelines ranked according to your problem optimization objective.

2.2 PROPOSED SYSTEM

tutorial demonstrates how to build and evaluate machine learning models by using the AutoAI feature in IBM Watson® Studio. In the modeling phase, various modeling techniques are selected and applied, and their parameters are calibrated to achieve an optimal prediction. Typically, there are several techniques that can be applied, and some techniques have specific requirements regarding the form of data. Therefore, going back to the data preparation phase is often necessary. However, in the model evaluation phase, the goal is to build a model that has high quality from a data analysis perspective.

CHAPTER 3

THEORETICAL ANALYSIS

3.1 BLOCK DIAGRAM

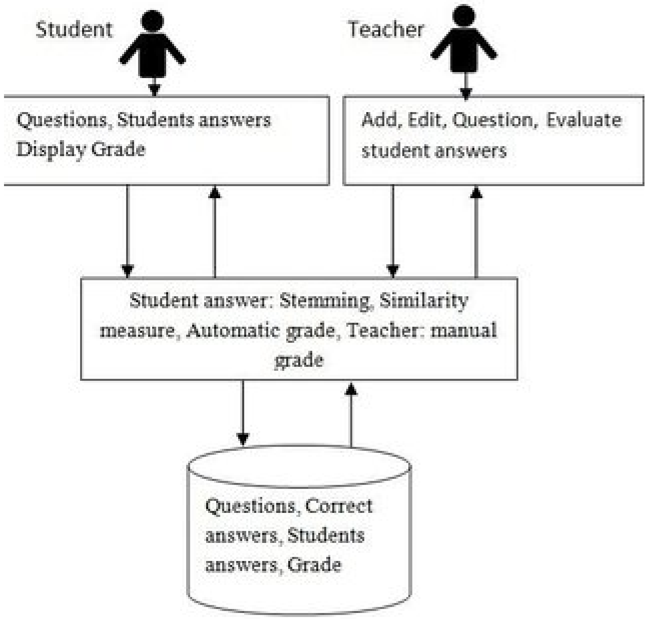

Student
Teacher
Questions, Students answers Display Grade
Add, Edit, Question, Evaluate student answers
Student answer: Stemming, Similarity measure, Automatic grade, Teacher: manual grade
Questions, Correct answers, Students answers, Grade

Figure 3.1.1: Block Diagram of Project

3.2 HARDWARE AND SOFTWARE DESIGNING

HARDWARE DESIGNING:

The hardware required for the development of this project is:

➤ Processor : Intel® CoreTM i5-9300H

➤ Processor speed : 2.4GHz

➤ RAM Size : 8 GB DDR

➤ System Type : X64-based processor

SOFTWARE DESIGNING:

The software required for the development of this project is:

➤ Desktop GUI : Anaconda Navigator

➤ Operating System : Windows 10(and other higher version)

➤ Front end : HTML,CSS,JAVASCRIPT

➤ Programming Language : PYTHON

➤ Cloud Computing Service : IBM Cloud Services

CHAPTER 4

EXPERIMENTAL ANALYSIS

4.1 **Pre-Process The Data:**

In this milestone, we will be preprocessing the dataset that is collected. Preprocessing includes:

1. Handling null values and dimensionality reduction.
2. Processing the text and vectorizing.
3. Identify the dependent and independent variables.
4. Split the dataset into train and test sets.

Python Flask:

Flask is a micro web framework written in Python.Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools. Flask is used for the backend, but it makes use of a templating language called Jinja2 which is used to create HTML, XML or other markup formats that are returned to the user via an HTTP request. Flask offers a diversified working style while Django offers a Monolithic working style. It is designed as a web framework for restful API development

CHAPTER 5

FLOWCHART

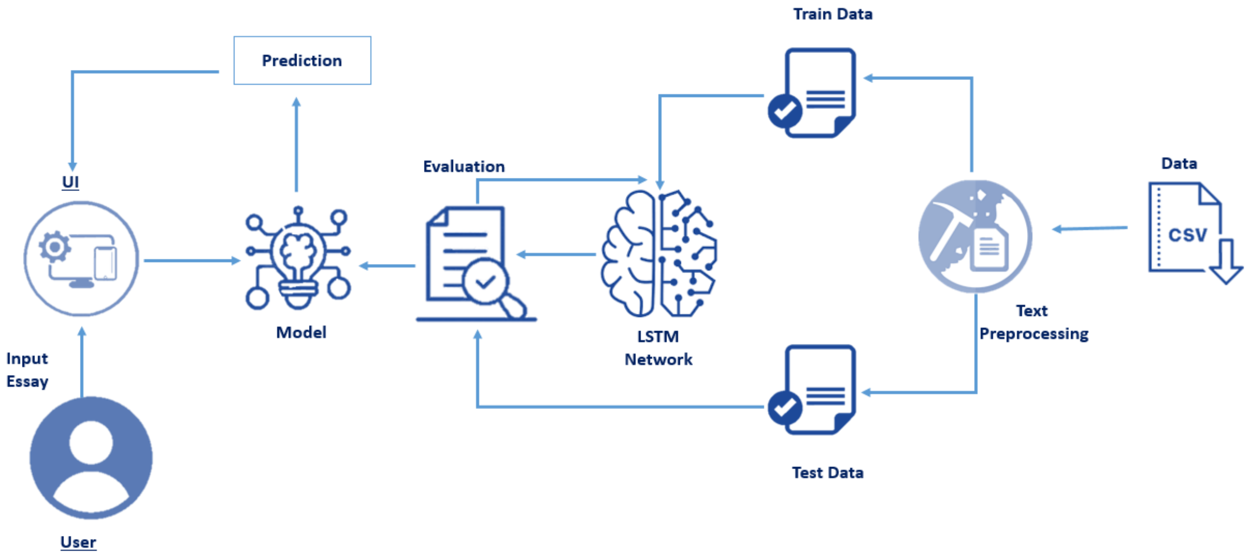


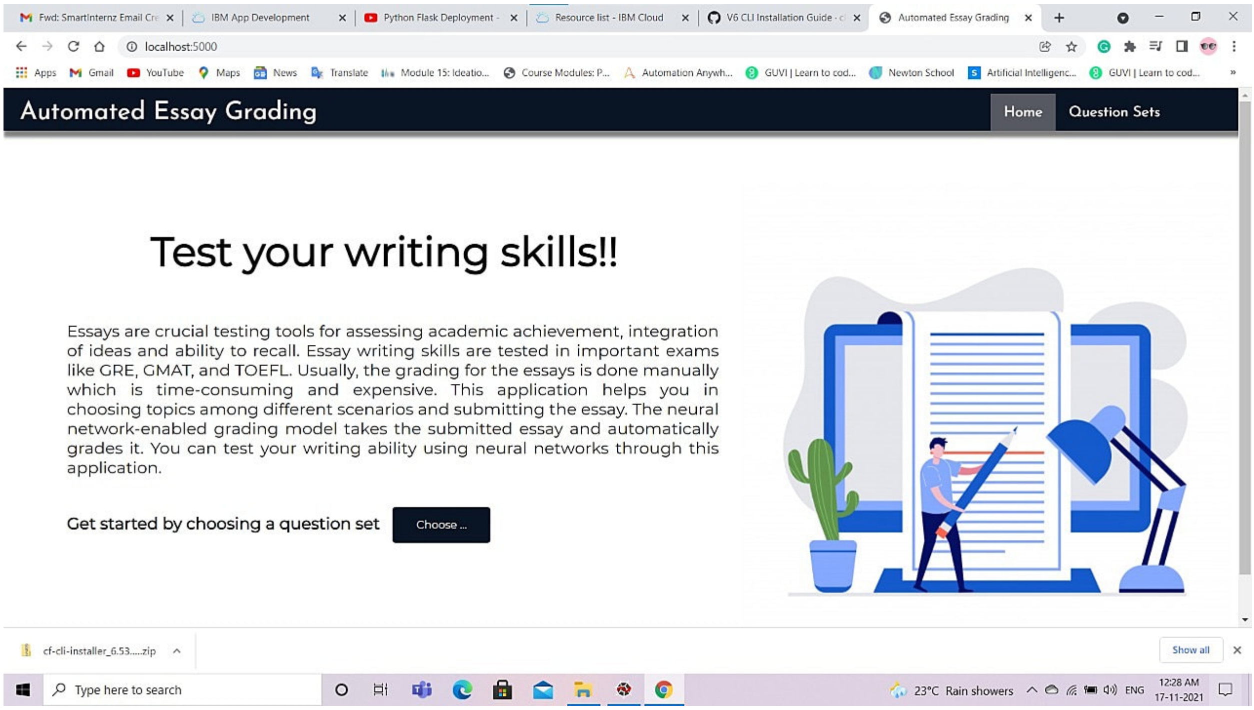
Figure 5.1: Flowchart of the Project

Project Flow:

Find below the project flow to be followed while developing the project.

- Download the dataset.
- Preprocess the textual data.
- Classify the dataset into train and test sets.
- Add the neural network layers.
- Load the trained data and fit the model.
- Test the model.
- Save the model and its dependencies.
- Build a Web application using flask that integrates with the model built.

RESULTS

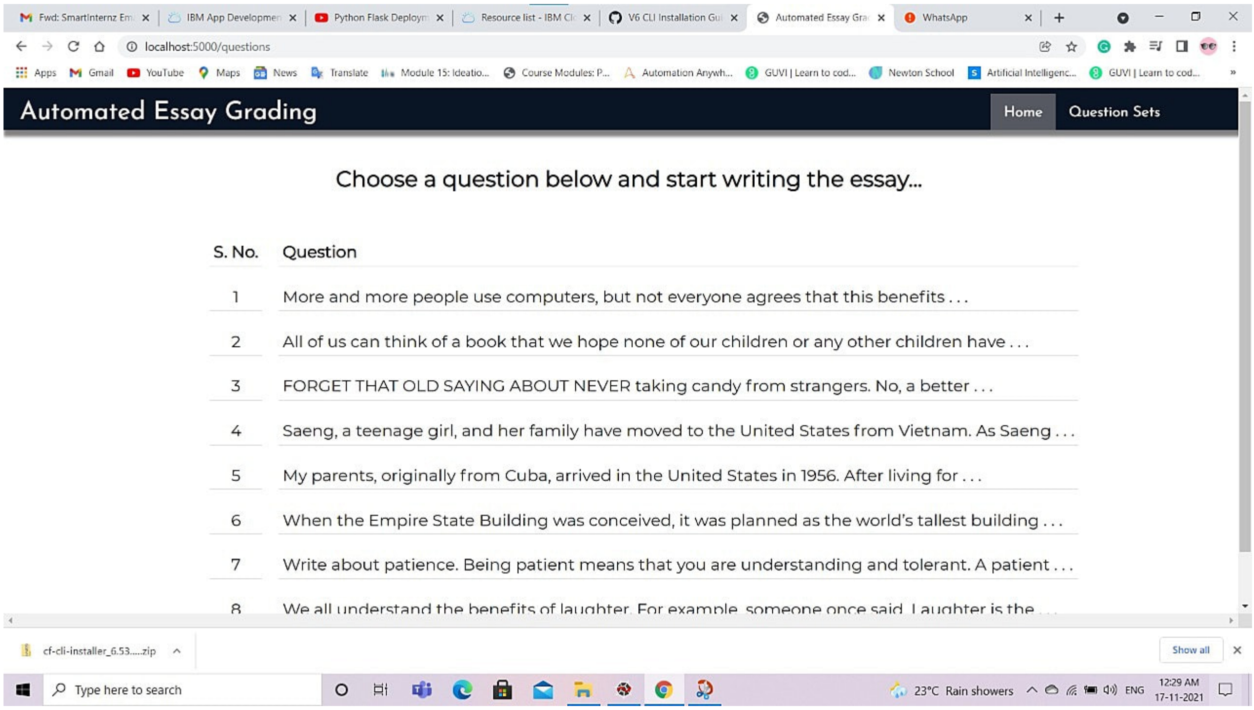


Test your writing skills!!

Essays are crucial testing tools for assessing academic achievement, integration of ideas and ability to recall. Essay writing skills are tested in important exams like GRE, GMAT, and TOEFL. Usually, the grading for the essays is done manually which is time-consuming and expensive. This application helps you in choosing topics among different scenarios and submitting the essay. The neural network-enabled grading model takes the submitted essay and automatically grades it. You can test your writing ability using neural networks through this application.

Get started by choosing a question set

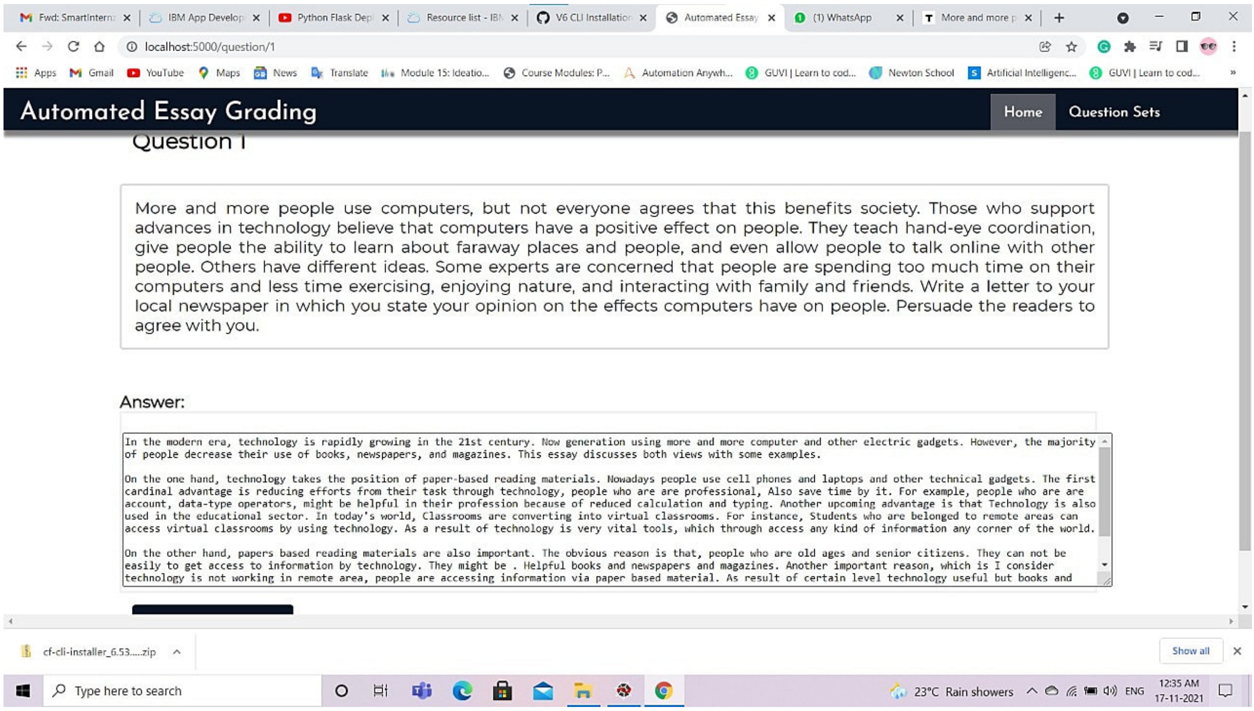
Fig 1: home page



Choose a question below and start writing the essay...

S. No.	Question
1	More and more people use computers, but not everyone agrees that this benefits . . .
2	All of us can think of a book that we hope none of our children or any other children have . . .
3	FORGET THAT OLD SAYING ABOUT NEVER taking candy from strangers. No, a better . . .
4	Saeng, a teenage girl, and her family have moved to the United States from Vietnam. As Saeng . . .
5	My parents, originally from Cuba, arrived in the United States in 1956. After living for . . .
6	When the Empire State Building was conceived, it was planned as the world's tallest building . . .
7	Write about patience. Being patient means that you are understanding and tolerant. A patient . . .
8	We all understand the benefits of laughter. For example, someone once said, Laughter is the . . .

Fig 2: Questions page of project



Question 1

More and more people use computers, but not everyone agrees that this benefits society. Those who support advances in technology believe that computers have a positive effect on people. They teach hand-eye coordination, give people the ability to learn about faraway places and people, and even allow people to talk online with other people. Others have different ideas. Some experts are concerned that people are spending too much time on their computers and less time exercising, enjoying nature, and interacting with family and friends. Write a letter to your local newspaper in which you state your opinion on the effects computers have on people. Persuade the readers to agree with you.

Answer:

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In the modern era, technology is rapidly growing in the 21st century. Now generation using more and more computer and other electric gadgets. However, the majority
of people decrease their use of books, newspapers, and magazines. This essay discusses both views with some examples.

On the one hand, technology takes the position of paper-based reading materials. Nowadays people use cell phones and laptops and other technical gadgets. The first
cardinal advantage is reducing efforts from their task through technology, people who are are professional, Also save time by it. For example, people who are are
account, data-type operators, might be helpful in their profession because of reduced calculation and typing. Another upcoming advantage is that Technology is also
used in the educational sector. In today's world, Classrooms are converting into virtual classrooms. For instance, Students who are belonged to remote areas can
access virtual classrooms by using technology. As a result of technology is very vital tools, which through access any kind of information any corner of the world.

On the other hand, papers based reading materials are also important. The obvious reason is that, people who are old ages and senior citizens. They can not be
easily to get access to information by technology. They might be . Helpful books and newspapers and magazines. Another important reason, which is I consider
technology is not working in remote area, people are accessing information via paper based material. As result of certain level technology useful but books and
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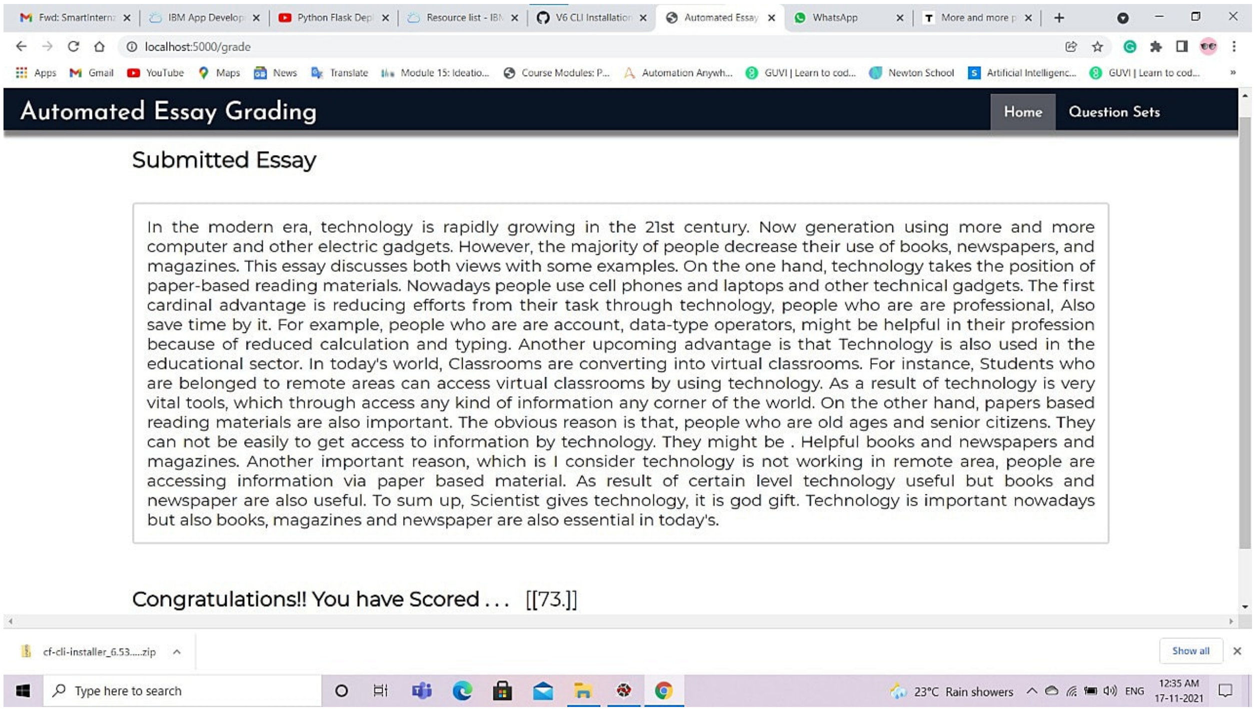
Fig 3: Answer page of this project



Submitted Essay

In the modern era, technology is rapidly growing in the 21st century. Now generation using more and more computer and other electric gadgets. However, the majority of people decrease their use of books, newspapers, and magazines. This essay discusses both views with some examples. On the one hand, technology takes the position of paper-based reading materials. Nowadays people use cell phones and laptops and other technical gadgets. The first cardinal advantage is reducing efforts from their task through technology, people who are are professional, Also save time by it. For example, people who are are account, data-type operators, might be helpful in their profession because of reduced calculation and typing. Another upcoming advantage is that Technology is also used in the educational sector. In today's world, Classrooms are converting into virtual classrooms. For instance, Students who are belonged to remote areas can access virtual classrooms by using technology. As a result of technology is very vital tools, which through access any kind of information any corner of the world. On the other hand, papers based reading materials are also important. The obvious reason is that, people who are old ages and senior citizens. They can not be easily to get access to information by technology. They might be . Helpful books and newspapers and magazines. Another important reason, which is I consider technology is not working in remote area, people are accessing information via paper based material. As result of certain level technology useful but books and newspaper are also useful. To sum up, Scientist gives technology, it is god gift. Technology is important nowadays but also books, magazines and newspaper are also essential in today's.

Congratulations!! You have Scored . . . [[73.]]

Fig 4: Submittion page

Advantages and disadvantages

The advantages of automated essay scoring are plain to see. It would ease teacher workloads, decrease testing costs, and allow more standardized testing to shift away from the easily scored, though narrowly focused, multiple choice format. But the unfortunate truth is that our level of technology just isn't there. True artificial intelligence is still a dream of the future rather than a tool for the present.

the disadvantages of using the automated software testing tools in the software testing. One of the disadvantages is that the automated software testing tools is no human insight, in other words, it is lack of human perspective. For example, an automated tool may not identify missing heading tags since it cannot read the content. Another example is although a testing tool can detect ALT attributes for graphics, it cannot determine if the attributes are descriptive enough. The same applies to frame titles and field labels. Only a human tester can provide feedback on these issues.

Applications:

Automated essay scoring (AES) is the use of specialized computer programs to assign grades to essays written in an educational setting. ... Its objective is to classify a large set of textual entities into a small number of discrete categories, corresponding to the possible grades, for example, the numbers 1 to 6.

CONCLUSION

Despite of its imperfection, AES can greatly promote the practice of college English writing and curriculum reform if used properly. It frees teachers for other constructive and advanced work. Meanwhile, its instant and intelligent feedback helps students improve their writing considerably. To minimize its drawbacks, the author suggests the following measures be taken in the application of AES:

- Increase the online peer-review process. Divide the students into groups and add peer review. The introduction of student mutual evaluation can make up for the lack of AES's appreciation of the essentials of effective writing. Speaking of peer review, although Pigai provides this feature, it cannot save group setting, where students can be assigned to certain groups according to their English level and help each other throughout the writing course. With each essay assigned, the teacher has to manually assign the reviewers or randomly assign reviewers, which is quite inconvenient and inefficient for group study.

Future scope

Text categorization is the problem of assigning predefined categories to free text document. The idea of automated essay grading based on text categorization techniques, text complexity features and linear regression methods was first explored by Larkey (1998).

The underlying idea of this approach relies on training of binary classifiers to distinguish “good” from “bad” essays and on using the scores produced by the classifiers to rank essays and assign grades to them. Several standard text categorization techniques are used to fulfill this goal: first, independent Bayesian classifiers allow assigning probabilities to documents estimating the likelihood that they belong to specific classes; then, an analysis of the occurrence of certain words in the documents is carried out and a k-nearest neighbor technique is used to find those essays closest to a sample of human graded essays; finally, eleven text complexity features are used to assess the style of the essays. Larkey conducted a number of regression trials, using different combinations of components. She also used a number of essay sets, including essays on social studies, where content was the primary interest and essay on general opinion where style was the main criteria for assessment.