Automated Subjective Answer Scoring With Natural Language Processing And Machine Learning

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Abstract- **Every year boards and universities exams are conducted offline mode. Large number of student attend subjective type exam. For evaluation of such large number of paper manually required hard efforts. Sometimes quality of evaluation may change according to mood of evaluator. The evaluation work is very lengthy and time consuming. Competitive and entrance exams typically contain objective or multiple choice questions. These exams are evaluated on machine as they conducted on machine and therefore their evaluation is easy. It also saves multiple resources and human interaction and hence it is errorless. There are multiple system are available for evaluation objective (MCQ) type question but there is no provision for subjective (Descriptive) type question. It will be very helpful for educational institutions if the process of evaluation of descriptive answers is automated to capably assess student's exam answer sheets.**

*Key Words***: Subjective Answer Evaluation, Big Data, Machine Learning, Natural Language Processing, Word2vec.**

INTRODUCTION

Computer based evaluation of student answer is the common work which is used in many areas in assessment of students learning process. The great idea on using the computers in learning process has changed the field of learning system widely. The computer assisted assessment system was developed for to evaluate the one word answer such as of multiple choice questions. And can also evaluate the paragraph answer such as descriptive answer based on the keyword matching. The great drawback of this system is the student cannot know their mistakes and they won't try to improve them. Hence to make them to improve their English knowledge and grammar knowledge the proposed new method called evaluating the student descriptive answer using the Natural Language Processing algorithm and Artificial Neural Networks algorithm will be used. Computer based evaluation of student answer is the common work which is used in many areas in assessment of students learning process. The great idea on using the computers in learning process has changed the field of learning system widely. The computer assisted assessment system was developed for to evaluate the one word answer such as of multiple choice questions. And can also evaluate the paragraph answer such as descriptive answer based on the keyword matching. This system can be widely used in academic institutions for checking answer sheets. It can also be implemented in different organizations which conduct competitive examinations. Student writes answer on answer-sheet. The system will take scanned copy of the answer as an I/P then after the preprocessing step it will extract the text of the answer. Model answer sets will be provided by the moderator/evaluator. This model answers will be then trained. This system is based on three parameters i.e. Keywords, Grammar and Question Specific Things Many Researchers at this field only try to provide the marks and by this method the student will not know their mistakes and again at other exams they will make the same mistakes. It cannot able to improve the student knowledge on study. Hence this method of Evaluation of student answer using natural language processing and artificial neural

networks is used. In the text mining for assessment of student answer, the teacher prepares questions and answers. Text mining process is done by natural language processing and word net tools. Artificial Intelligence and computational Linguistics concerned with the interaction between computer and human (natural) languages. It will groups the English words into some of the sets of synonyms called synsets provides short definitions and usage examples, and records a number of relations among these synonym sets. PoS tagger (Part of Speech tagger) is implemented to extract the important keywords 1 Online Subjective Answer Verifying System using Artifitial Intelligence in the answer given by staff before assessment is done. The extracted Keywords are categorized as mandatory keywords, subordinate keywords, and technical keywords. WordNet tool is used to give the related synonyms to literal word in the subordinate terms. Now Teachers can feed the servers with the eligible terms in the categories to be present for student evaluation. The main objectives of this study is to evaluate the student descriptive type answers using the NLP and ANN algorithm and to design a tool for evaluation of the student descriptive type answer using the NLP algorithm for Grammatical checking and produce marks and ANN algorithm for normal answer comparison and produce marks

LITERATURE SURVEY

Author: Kavita Shirsat, Akash Hamare, Sourabh Pardeshi, Vaishnavi Patil Findings: - Exams and assignments play a crucial role in determining the overall academic performance of the students and foster their cognitive learning. However, evaluation of these papers is quite a tedious job for the evaluators as they come in huge numbers. Most of the competitive exams typical comprise of objective and multiple-choice questions. In this ever-increasing modern age, where the world moves towards automation, there is a need for automation in the answer evaluation system. However, there hasn't been developed any system which could assign grades to the descriptive questions. The current system takes extra manpower and the process is laborious. Hence, there is a high need of developing an auto evaluation system which could perform the task of analyzing and assigning precise marks to the given subjective answer. This automation of descriptive answer evaluation process would be helpful for various universities and academic institution to efficiently handle the assessment of exam answer sheets of students. Our objective is to design a Subjective Answer Evaluation Model for the automatic evaluation of the multiple sentence subjective answer. This paper provides an outlook to test the degree of student's learning, by evaluating their answers. Our system uses concepts of natural language processing and Machine learning to achieve the goal. The proposed system uses the techniques of natural language processing for preprocessing the text and then using machine learning algorithms for evaluation of the text and assigning the accurate grades [1]

Author: Era Johri,.Nidhi Dedhia, Kunal Bohra Findings: Drift in the digitization of education is a prime concern at present to enable quality education to every individual. Now, there are no geographical barriers to the availability of education and evaluation. Imparting education is easier through digitization but inconvenient to evaluate. In this paper, we propose 'ASSESS', a system where the evaluation of subjective answers for an examination becomes easier and convenient. We have even catered to the requirements of specially-abled students online. The diversity in educational courses encouraged us to research how we can efficiently auto-evaluate subjective answers and provide feedback for the purpose of self-analysis. During the pandemic of COVID-19, most of the colleges and organizations shifted to the online mode of examinations. These examinations only had MCQs or objective questions which can be easily assessed by the online system. Since such systems can only be used for the evaluation of objective questions, the subjective questions pose a great challenge. In this paper, we directed our research to propose a system that gives features like full-length subjective tests, automated subjective answer evaluation using natural language processing and semantic learning, auto-generated feedback for self-improvement of the students, visual statistics for both teacher and student after each test, text-to-speech speech-to-text accessibility options and a fully functional hands-free mode for the specially-abled students with disabilities like sluggish typing, poor eyesight, and amputated hands. Since everything will be automated from the evaluation of the answers to providing feedback, there will be minimal stress on the assessors.[2].

Author: Vishwas Tanwar Findings: - In today's scenario, examinations can be classified into 2 types one is objective and the other is subjective . Competitive ex ams are usually of mcq types and due to this they need

to be conducted on computer screens as well as evaluated on them. Currently , almost every competetive exam is conducted in online mode due to the large number of students appearing in them . But apart from competitive exams , computers cannot be used to carry out subjective exams like boards exam . This bring s in the nee d of Artificial In telligence in our online exam systems . If artificial intelligence gets implemented in online exam conduction systems then it will be a great help in checking subjective answers as well. Another advantage of this would be the speed and accuracy with which the results of the exams would be produced. Our proposed system would be designed in such a way that it will give marks in a similar way as of a human.

AIM & OBJECTIVES
1. The main aim is to ensure user-friendly and more interactive software to the institution.
2. Performing evaluation through our system will ensure uniformity in marking as the same inference mechanism will be used for all students.
3. Create a standardized evaluation process that is less influenced by the mood or bias of individual evaluators, ensuring that students are graded fairly and consistently.
4. Use the data generated by the automated evaluation system to identify areas where students commonly struggle, allowing educators to adapt their teaching methods and materials to improve learning outcomes.

MOTIVATION
Computer based evaluation of student answer is the common work which is used in many areas in assessment of students learning process. The great idea on using the computers in learning process has changed the field of learning system widely. The computer assisted assessment system was developed for to evaluate the one word answer such as of multiple choice questions. And can also evaluate the paragraph answer such as descriptive answer based on the keyword matching. This system can be widely used in academic institutions for checking answer sheets. It can also be implemented in different organizations which conduct competitive examinations. Student writes answer on answer-sheet. The system will take scanned copy of the answer as an I/P then after the preprocessing step it will extract the text of the answer. Model answer sets will be provided by the moderator/evaluator. This model answers will be then trained. This system is based on three parameters i.e. Keywords, Grammar and Question Specific Things

SYSTEM ARCHITECTURE
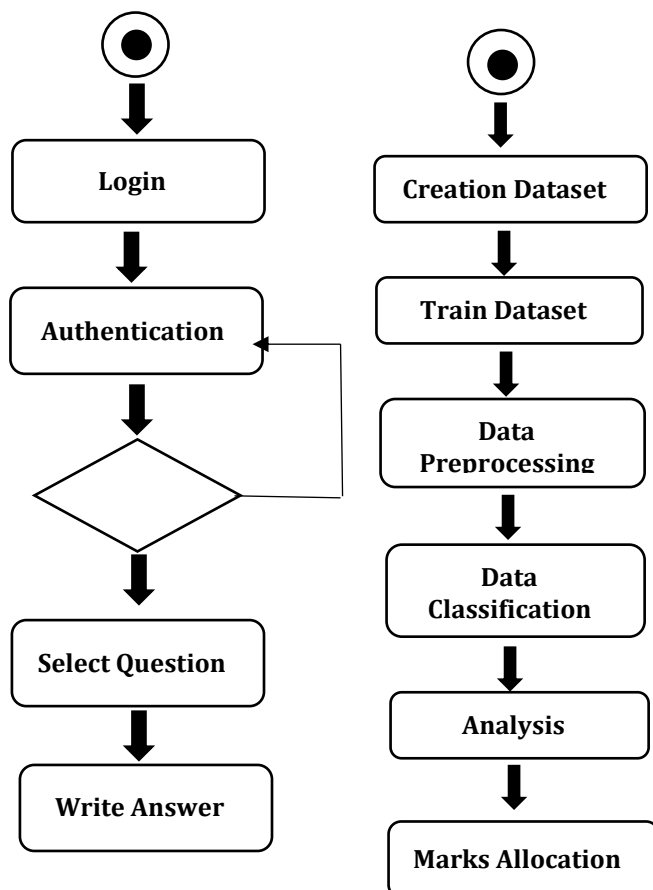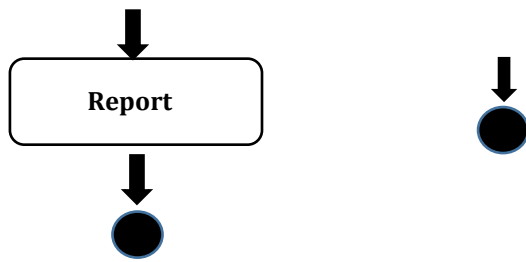
Fig : **System Architecture Diagram**

An Automated Subjective Answer Scoring system leveraging Natural Language Processing (NLP) and Machine Learning employs a structured architecture to evaluate open-ended responses, such as those in educational assessments or other subjective contexts. The system begins with the input data, comprising student responses and a grading rubric. Text preprocessing techniques are applied to clean and standardize the text. Features are extracted from the processed text, which might include Bag of Words, TF-IDF, or word embeddings. Machine learning models, like regression or classification models, are then trained on labeled data to predict scores or categories based on the grading criteria. The model's performance is evaluated using appropriate metrics. Subsequently, the system is employed to score new responses, which are post-processed if necessary. The final output provides automated assessments of subjective answers. Continuous feedback and iteration ensure ongoing improvement in system accuracy and alignment with human grading standards

APPLICATION:
- In marine studies
- Personal
- Educational

CONCLUSION
The project report whose title is Automatic Answer Checker has now reached its last stage. The application has been made keeping every possible chance of error in mind and so the system is quite efficient and reliable. The application has a very unique property of being robust in nature due to which there are many ways of implementing improvisations in the application in the near future. The application would soon be approved and authenticated and then implemented. Future work would be consisting of creating an algorithm for the assessment whose purpose would be to find all the syntax errors in our keywords and then we would be investigating it for high performance and high equality for addressing them.

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