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Theory, Numerical, MCQ Paper Evaluation Using Ml

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ABSTRACT: Manual answer evaluation is a very tedious task. The manual checking is a very time consuming process and also requires lots of manpower. Also, the paper checker is not able to give marks equally. So, our system will evaluate answers based on some keyword and also manpower will be saved. One has to scan the paper then, based on the keyword in the answer the system will provide the marks to the question according to the dataset present. Also, by this system, the evaluation error of the marks to the particular question will be reduced. In this study to evaluate the student answer Natural Language Processing (NLP) algorithm and Fuzzy Logic are used.

I. 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. 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.

Manual answer evaluation is a very tedious task. The manual checking is very time consuming process and also requires lots of manpower. Also, the paper checker is not able to give marks equally. So, our system will evaluate answer based on some keyword and also manpower will be saved. Only one has to scan the paper then, based on the keyword in the answer the system will provide the marks to the question according to the dataset present. Also, by this system, the evaluation error of the marks to the particular question will be reduced.

In this study to evaluate the student answer Natural Language Processing (NLP) algorithm and Artificial Neural Networks are used. The process starts by first staff creates answer sheet and keyword dataset for the examination process. These dataset stored in data storage and students enter their answer in the examination page. Once the student has submitted an answer text, the system will automatically calculate result using two algorithms of NLP and Fuzzy Logic. Before this evaluation process the pre-processing technique in undergone for the answer. Here we used Artificial Neural Networks algorithm for the normal answer comparison and stores mark for this in database and also evaluates the same answer using Natural language processing [NLP] algorithm to check grammar mistakes and stores the marks for this in database. Some basic linguistic analysis is performed in a natural language parser is respectively used to perform POS tagging of the student's answer text. After linguistic analysis, the student's answer text is processed by the artificial neural networks algorithm it will compares the student's answer text with the staff answer and with keywords. The result of each process is calculated used by "marks calculator" to compute the total marks obtained by the student for his/her answer. and finally compares both marks and provides final result. By these methods we can get an efficient result

II. LITERATURE REVIEW

V. Lakshmi et al [10] proposed system for evaluating student's descriptive answers, in this system, staff member creates answer sheet and keyword dataset for the examination process. These dataset are stored in data storage and student enters their answers in the examination page. This system automatically calculates result using two algorithms of NLP and ANN.

Meena K and Lawrence Raj [11] did a research work on "Evaluation of the Descriptive answers using the Hyperspace Analog to language algorithm and self-organizing Map". These works focused on the online evaluation of the descriptive answer which will be eliminate the discrepancy in that manual evaluation. The HAL algorithm is used to separate categories of words.

Shweta M. Patil and Prof. Ms. Sonal Patil [12] did a research work on "Evaluating the student descriptive answer using natural language processing". The method evaluates the paper using the NLP tools.

Sr. No.	Paper Title	Methodology	Advantage	Limitation
1	A Systematic Mapping Study of Language Features Identification from Large Text Collection [1]	Systematic review study to determine and answer the research questions based on analysing and cross-referencing related articles	Efficient method for translation between languages and text to understand how NLP advances in it	Creating a vocabulary for any language is hard.
2	Knowledge Base Question Answering with a Matching-Aggregation Model and Question-Specific Contextual Relations [2]	Use of matching aggregation for mapping students answer with questions	Use question specific contextual relations connected to candidate answers	Same answers are detected.
3	Using K Nearest Neighbours for Text Segmentation with Feature Similarity [3]	KNN for checking text similarity	KNN is implemented in large text Collection to gather similarities between user entered and actual text	Large data require for text collection.

| 4 | Can Duplicate Questions on Stack Overflow Benefit the Software Development Community? [4] | Checking the similarities between the questions on Stack Overflow | TFIDF's working for verifying the duplication of questions | Sometime duplicate question have different answers. |

Different algorithms used for OCR

Paper name	Author	Year	Algorithm	Database	Tool	Accuracy
Sentiment Analysis for Amazon Products using Isolation Forest	S. Salmiah et al [6]	2019	NLP	Amazon review	Python, Jupyter Notebook	93%
Text Analysis for Product Reviews for Sentiment Analysis using NLP Methods	S. Muthukumaran et al [5]	2017	NLP & NB	Review articles	Python	93%
Sentiment Analysis and Prediction of Online Reviews with Empty Ratings	Sasikala P et al [7]	2018	Logistic Regression, Naïve Bayes	-	Python, NLTK, BOW	92%
Multi-Strategy Sentiment Analysis of Consumer Reviews Based on Semantic Fuzziness	K. Sridharan et al [8]	2019	NB, SVM	Twitter API	R tool, POS tagging	-
Sentiment Analysis On Online Product Review	Raheesa et al [9]	2017	NLP, K means clustering	Review from own website	Python, POS tagging	90.47%

III. PROJECT ARCHITECTURE

The question papers of many academic institutions contain a significant part of descriptive type questions. Generally, these question papers follow a fixed pattern. Normally, the descriptive type answers are evaluated manually with the possibilities of deviation in the evaluation of the same answer-script by different examiners with almost the same amount of experience and academic qualifications. The present work focuses on the online evaluation of descriptive type answers which will eliminate the discrepancy in manual evaluation.
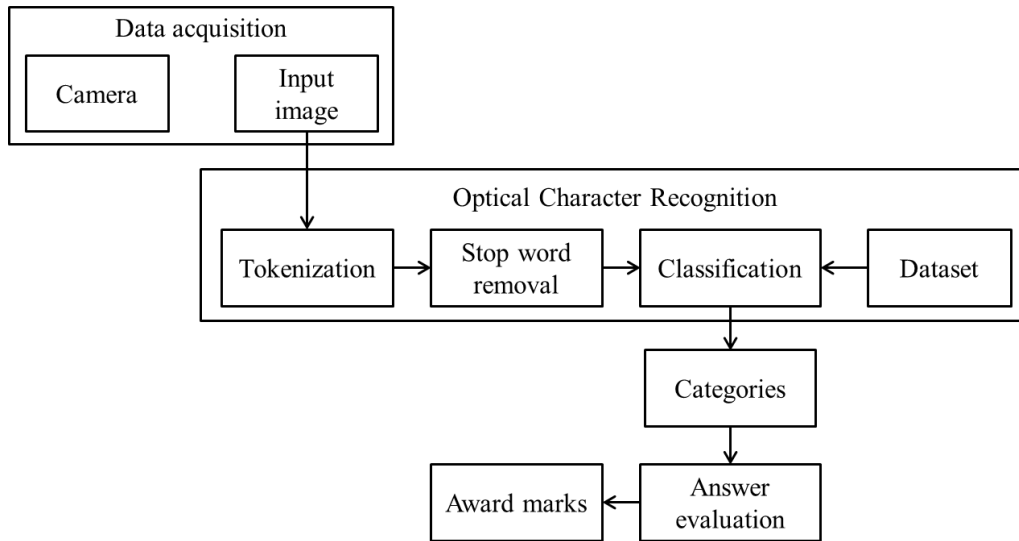
Fig .1. block diagram of proposed system

In this scheme, the answer sheet written by the candidate is scanned by using camera. The scanned answers can be rehabilitated into the word document by using OCR (Optical Character Recognition).

Steps of OCR are as follows:

- Tokenization: Tokenization is breaking the raw text into small chunks. Tokenization breaks the raw text into words, sentences called tokens.

- Stop word Removal: A stop word is a commonly used word (such as "the", "a", "an", "in" in English) that a search engine has been programmed to ignore.

    o We did not want these words to take up space in our database, or taking up valuable processing time.

- Classification: NLP then classifies character and group them to form a sentence.

First question is categorized into 3 categories

- Subjective

- Objective

- Numerical

Based on the evaluation mark should be awarded. Awarding mark is done using Fuzzy logic classifier.

Method/Algorithm- NLP

The field of artificial intelligence has always envisioned machines being able to mimic the functioning and abilities of the human mind. Language is considered as one of the most significant achievements of humans that has accelerated the progress of humanity. So, it is not a surprise that there is plenty of work being done to integrate language into the field of artificial intelligence in the form of Natural Language Processing (NLP). NLP primarily comprises of natural language understanding (human to machine) and natural language generation (machine to human). NLP is a subfield of linguistics, computer science, information engineering, and artificial intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to process and analyze

large amounts of natural language data. Challenges in natural language processing frequently involve speech recognition, natural language understanding, and natural language generation.

Natural language processing (NLP) is a method to translate between computer and human languages. It is a method of getting a computer to understandably read a line of text without the computer being fed some sort of clue or calculation. In other words, NLP automates the translation process between computers and humans.

Natural Language Processing or NLP is a field of Artificial Intelligence that gives the machines the ability to read, understand and derive meaning from human languages. Natural Language Processing usually signifies the processing of text or text-based information (audio, video). An important step in this process is to transform different words and word forms into one speech form. Also, we often need to measure how similar or different the strings are. Usually, in this case, we use various metrics showing the difference between words.

The input to natural language processing will be a simple stream of Unicode characters (typically UTF-8). Basic processing will be required to convert this character stream into a sequence of lexical items (words, phrases, and syntactic markers) which can then be used to better understand the content.

Fuzzy Logic

Although, the concept of fuzzy logic had been studied since the 1920's. The term fuzzy logic was first used with 1965 by Lotfi Zadeh a professor of UC Berkeley in California. He observed that conventional computer logic was not capable of manipulating data representing subjective or unclear human ideas. Fuzzy logic has been applied to various fields, from control theory to AI. It was designed to allow the computer to determine the distinctions among data which is neither true nor false. Something similar to the process of human reasoning. Like Little dark, Some brightness, etc.

The term fuzzy refers to things which are not clear or are vague. In the real world many times we encounter a situation when we can't determine whether the state is true or false, their fuzzy logic provides a very valuable flexibility for reasoning. In this way, we can consider the inaccuracies and uncertainties of any situation. In boolean system truth value, 1.0 represents absolute truth value and 0.0 represents absolute false value. But in the fuzzy system, there is no logic for absolute truth and absolute false value. But in fuzzy logic, there is intermediate value too present which is partially true and partially false.

IV. CONCLUSION

In this paper, we are going to develop an algorithm which will evaluate theoretical, objective and numerical answers and give marks according to the keyword matching which will reduce manual work and saves time with faster result evaluation. A person should collect the answer copy from the student and scan it. The machine will take the image as input and will evaluate the answer based on the length of the answer and important keywords covered which are specified by the teacher with each answer which is to be evaluated.

REFERENCES

[1] Diellza Nagavci, Jaumin Ajdari, Bujar Raufi, Besnik Selimi, "A Systematic Mapping Study of Language Features Identification from Large Text Collection", 2019 8th MEDITERRANEAN CONFERENCE ON EMBEDDED COMPUTING (MECO), 10-14 JUNE 2019, BUDVA, MONTENEGRO

[2] Lan, Y., Wang, S., & Jiang, J. (2019). Knowledge Base Question Answering with a Matching-Aggregation Model and Question-Specific Contextual Relations. IEEE/ACM Transactions on Audio, Speech, and Language Processing, 1–1. doi:10.1109/taslp.2019.2926125

[3] Jo, T. (2017). Using K Nearest Neighbors for text segmentation with feature similarity. 2017 International Conference on Communication, Control, Computing and Electronics Engineering (ICCCCEE). doi:10.1109/iccccee.2017.7866706

[4] Durham Abric, Oliver E. Clark, Matthew Caminiti, KeheliyaGallaba, and Shane McIntosh, "Can Duplicate Questions on Stack Overflow Benefit the Software Development Community?", 2019 IEEE/ACM 16th International Conference on Mining Software Repositories (MSR)

[5] S.Muthukumaran, Dr.P.Suresh "Text Analysis for Product Reviews for Sentiment Analysis using NLP Methods" International Journal of Engineering Trends and Technology (IJETT) – Volume 47 Number 8 May 2017

[6] S. Salmiah, Dadang Sudrajat, N. Nasrul, Tuti Agustin, Nisa Hanum Harani, Phong Thanh Nguyen, "Sentiment Analysis for Amazon Products using Isolation Forest", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-8, Issue-6S August 2019 894 Published By: Blue Eyes Intelligence Engineering & Sciences Publication DOI:10.35940/ijeat.F1169.0886S19

[7] Sasikala P, L.Mary Immaculate Sheela, "Sentiment Analysis and Prediction of Online Reviews with Empty Ratings", International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 14 (2018) pp. 11525-11531 © Research India Publications.

[8] Dr.K.Sridharan, Karthick.S, Naveen Kumar.P, Syed Tanish Ahmed, Vignesh.E "Multi-Strategy Sentiment Analysis of Consumer Reviews Based on Semantic Fuzziness" International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE) Vol. 7, Issue 3, March 2019 DOI: 10.15680/IJIRCCE.2019. 0703028 1743

[9] Raheesa Safrin, K.R.Sharmila, T.S.Shri Subangi, E.A.Vimal, "Sentiment analysis on online product review", International Research Journal of Engineering and Technology (IRJET) Volume: 04 Issue: 04 | Apr -2017 2017, IRJET Page 2381

[10] V. Lakshmi, 2Dr. V. Ramesh, "EVALUATING STUDENTS' DESCRIPTIVE ANSWERS USING NATURAL LANGUAGE PROCESSING AND ARTIFICIAL NEURAL NETWORKS", IJCRT1704424 International Journal of Creative Research Thoughts (IJCRT) www.ijcrt.org 3168, Volume 5, Issue 4 December 2017 | ISSN: 2320-2882

[11] Meena k and Lawrence Raj (2014), "Evaluation of the Descriptive answers using the Hyperspace Analog to language and self organizing Map", IEEE International conference on Computational Intelligence and Computing Research.

[12] Shweta M. Patil and Prof. Ms. Sonal Patil, "Evaluating the student descriptive answer using natural language processing" International Journal of Engineering research and Technology , Volume 3, Issue 3.

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