



Machine Learning and Data Mining for Student Result Prediction

Girija Prasan Das, Anshuman Mishra, Surabika Hota

Dept. of Computer Science and Engineering, GIFT Autonomous, Bhubaneswar, 752054, India

Email : surabika@gift.edu.in

Abstract— The Online examination system is based on web services, which allows the institute to conduct exam via web based environment. Some of the problems faced during manual examination systems are the delays occurred in result processing and analysis. Also the filtering of records, as per user requirement is sometimes difficult. In the existing system record searching is difficult and also there are chances of data loss. Online examination system is playing one of the important roles in online education system. It reduces time, man power and large amount of material resources. This paper describes, the system which presents the main function of system, analyzing papers and results. It is also incorporated with security features. These capabilities make the proposed online examination system user-friendly and reliable.

Keywords— Data mining, Security, Randomization, Result Analysis, SMTP

I. INTRODUCTION

The examination plays an important role in social life for evaluating the ability of people. Traditional way of examination is time and money consuming. Now, online examination systems are mostly used in various fields. Traditional examination systems are only giving result of the exam but our system is evaluating the overall performance of the students. This system is compatible on all browsers and devices. This system will take questions randomly from the database. Timer is set for whole examination system and also for each question. Exam will be submitted automatically after termination of time. Student will not be able to copy the problem and also not able to open new tab or window. The system sets different permissions and operation interface for users with different roles; the users enter into the different interface, and have different operation according to different permissions [6].

System users include administrator, teacher and student. Administrator module is the main module of system. Admin has an authority to add teachers and students. In order to ensure the correctness of the information, the teacher can view personal information and change the password after login system, and then can arrange the relevant examination [3]. Teacher can import questions in the form of excel sheets or PDF file. This system represents students' result in the graphical format. These graphs are subject-wise, unit-wise and question-wise. According to these graphs teacher will evaluate students' performance. For giving the exam students have to first register. System will verify the email ID of students. After verification, one time password (OTP) will be sent to the respective student's email ID. The student can view the test information, which includes exam subjects, exam time and rules to follow while attempting the test [3]. After termination of exam result will be stored into database and will be send to respective mail ID. The teacher will be able to visualise the result data for further analysis.

II. LITERATURE SURVEY TABLE 1

LITERATURE SURVEY

Sr. No.	Paper Description	Methodologies/Algorithms/Features	Technologies used
1.	Hussein Al Bazar "Forms distribution algorithm for online examination system", ICIT, 2017[1].	Form distribution algorithm is preventing forms to be repeated and shared between adjacent terminals	Virtual Private Network(VPN) technique
2.	Deepankar Vishwas Kotwal, Shubham Rajendra Bhadke, Aishwarya Sanjay Gunjal Puspendu Biswas, "Online examination system", IRJET, 2016[2].	The algorithm for random number generator has been implemented.	1. JSP and JavaBeans as the business logic 2. MS Access for the database manipulation. 3. Tomcat acting as a JSP Engine and web server.
3.	Mustafa Yagci, Menderes Unal, "Designing and implementing an	Fuzzy logic and artificial intelligence techniques are used for decision making	1. Micromedia Dream ware8 software is used for designing interface in html.
	adaptive online examination system", ELSEVIER, 2013[4].		2. Security is maintained through IPSec and Kerberos authentication.
4.	LI Xiao-Feng, WANG Jian- Hua, GAO Wei-Wei, "Examination System in the Cloud Computing platform based on Data mining", ICMES, 2013.	Apriori algorithm is used for predicting result in Boolean form.	Map reduce technique

5.	Huiqiang Lu, Ying Hu,"The design and implementation of online examination system",ICICE,2012[5]	Teachers and admin can export the scores in the form of excel sheets to do some statistical analysis. Implements J2EE architecture	Security aspects are considered as MD5 encryption and WEB-INF directory techniques are used
6.	E.Venkatesan,S.Selvaragini Asst.Professor Department of MCABIST BIHAR,Bharath University,Chennai-73,"A study on the result based analysis of student performance using data mining techniques".	The student result data has been analyzed with the data mining techniques that involve some of the classification algorithms.	ID3 and C4.5 classification algorithms have been used for result analysis.

We can infer that the above papers are implementing technologies and methods which are quite primitive. Hence in our project, we have a wider scope with following regards-

1. Analyzing the student result subject-wise with the help of decision tree based algorithms like C4.5 and Naïve Bayes through graphical representations like histograms, pie charts, etc.
2. The test will be generated unit-wise and subject-wise.
3. The result of a student is immediately delivered to him/her through the registered email ID.

III. SYSTEM ARCHITECTURE

The system architecture diagram is as follows which involves the MVC architecture for the purpose that the GUI works in a proper manner.

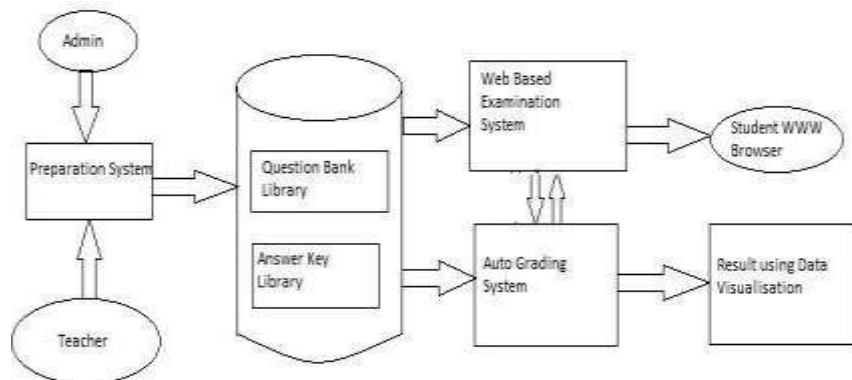


Fig. 1 System Architecture

The above system architecture involves the MVC architecture [6] for the purpose that the GUI works in a proper manner. The MVC architecture provides the separation of the display and data. This helps manage the data coming from the user interface. The data generated is thus managed and processed. That data is used further for deriving certain patterns for making predictions. The predictions will be made with the help of data mining techniques. The decision tree algorithms like C4.5, CART are used for making student result prediction. The decision trees help in deriving the association rules.

The questions are generated with the help of Random Question Generator Technique. It shuffles the questions which will allow different and unique questions to a particular student user. The score of each exam corresponding to the student user will be sent immediately. SMTP protocol is used for sending the mails.

IV.

ENTITY RELATIONSHIP DIAGRAM

The diagram below depicts the ER diagram.

Fig. 2 ER Diagram

The Entity Relationship diagram involves the entities and object variables. It helps us to understand the relationship between them. Thus helping us in constructing proper interactions between entities and its attributes. This diagram signifies the role in participating entity plays in relationship instance.

V. FLOW OF SYSTEM

The following diagram depicts the basic path of the functionalities involved in the application. It will guide user to understand the exact way of implementation. The flowchart works as a blueprint in designing the flow of the system.

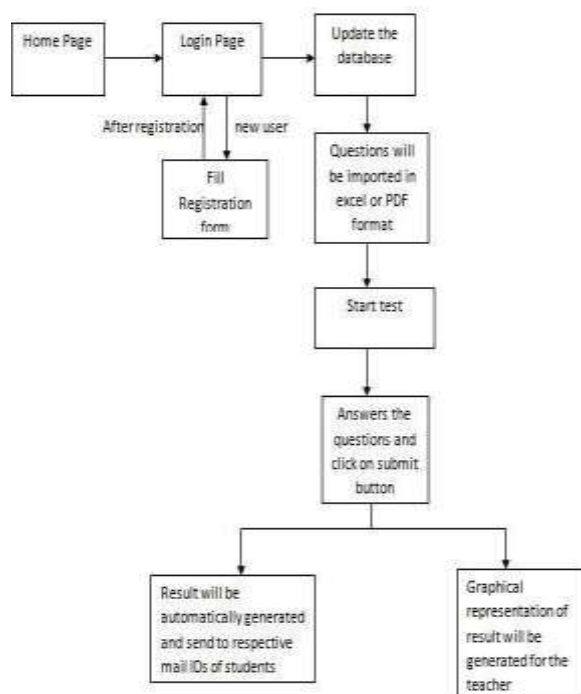


Fig. 3 Flow Chart of System

It starts with the login page. After the successful login the database gets updated. For the test to commence, the teacher needs to import the excel sheet of the questions. The student also needs to register before applying for test. The student user then can give the test. After the student user finishes his/her attempt of the test, the respective result of the student gets delivered to the email IDs instantly. For the teachers to understand the individual student performance with regards to the subject, passing rate, failure rate, and many more such parameters. This will involve data mining techniques for this analysis and further prediction. The decision tree algorithms like C4.5, CART are used for making student result prediction. These decision tree algorithms design the association rules. This help in deriving the prediction.

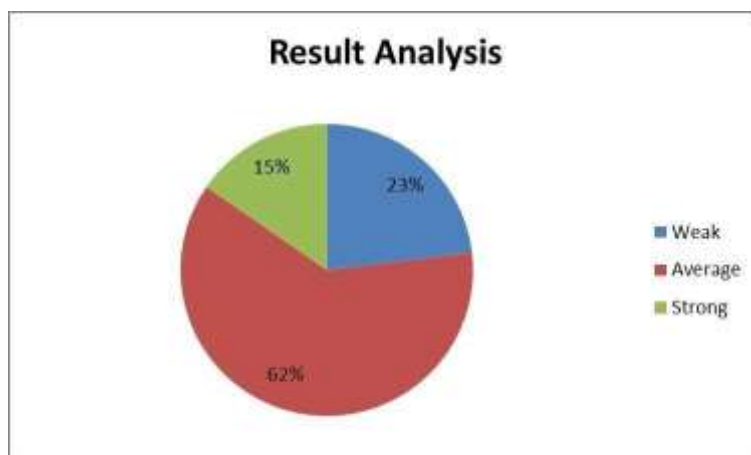


Fig. 4 Visualization using Pie chart

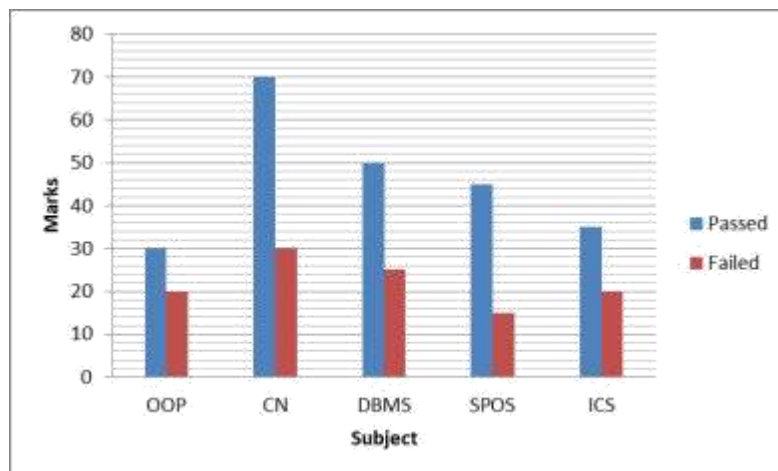


Fig. 5 Visualization using Bar-graph

The final result will be shown to the teachers who are associated with particular subject in the form of pie charts, bar graphs as shown in the above figure. This visualization will be done on the basis of number of students appeared for the exam and out of which how many students have passed or failed the exam of particular subject. Only subject teacher will have access for result visualization and analysis. Thus analysis will be done accordingly and grades (i.e., Excellent, Average, Weak) of the students will be mailed to them according to determined criteria. Student will get accurate marks of the test or exam he/she appeared. In the report sheet, the student can see the numbers of questions appeared and answer of the question with justification for self - assessment and improvement.

The teachers will get the report that will have the information regarding the test. Even the students will get the consolidated report of the tests, he/she has appeared. It will contain the attempted answer, correct answer and the justification for every wrong answer.

VI. CONCLUSIONS AND FUTURE WORK

Online examination system is a digitized solution to the paper based examination system that is quite hassle free. The resources required for the manufacturing of paper can be saved on a large scale. This will help in the sustainability of the natural resources. It is also time saving and efficient. The result of the response would be available who has designed question sets. It will be displayed with the help of data mining techniques through visualization. The visualization will be done with the help of pie charts, histograms, etc. All the institutions which are having academic needs can use this software application. This project can be further extended for designing the tests having descriptive answers. This will involve the information retrieval and natural language processing techniques for the processing of descriptive answers and thus deriving to a particular polarity of the answer.

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