Abstract

quenZer is a fully functional question and answer generating tool that is used for online exams at schools, universities and companies to help create interview questionnaires. It can be divided into two parts. Part one; the question generation and exam handling tool. Part 2; the social networking tool. The ability to generate questions and answers for each individual is one of the most unique features of quenZer. The tool helps minimize question repetition and measures the actual knowledge level of every candidate. Furthermore, any individual who uses quenZer as a social networking tool, can share their knowledge and clarify issues related to their subjects. As a result, quenZer has become known among the globe.

Keywords

MCQ - Multiple Choice Questions, IQ - Intelligence Quotient, GUI - Graphical User Interface, RDF - Resource Description Framework, XML - Extensible Markup Language, NLP - Natural Language Processing

I. INTRODUCTION

With the aid of the development of technology computers and computer programs are become most advantageous areas. For almost all the needs of the humans’ people tend to write software programs. As a result internet has introduced. When internet become wider and popular people tries to fulfill their day to day needs through internet. e-Learning is one of the major outcome of the popularity of internet.

Even though e-Learning has become quite common, only a limited number of tools support education in an effective way. Most of the tools have major disadvantages like

A. Same questions provided for each attempts

Most of the e-Learning tools in the internet provide same question set for each and every attempt. Not only for the single user, most of the time same question set will be given for the different users for their multiple attempts. For example

- SAT\(^1\) - Standardize test for most college admissions in United State. Even though it provide many practicing exams and courses through their website SAT team provide same question set for every attempt. Once user finish answering for the question SAT will provide explanation for the answer.

- Brainbench\(^2\) - Brainbench provide online certification vendor. It will provide number of popular IT certificates freely and commercially. For each exam they will provide static question set from their question bank.

- Moodle [1] – Is an open source software which will generate questions using static question bank. Therefore same question arise in most of the question papers. But it strongly supports for online examinations.

B. Limited to a single domain

Among e-Learning tools which are well known to the education sector will not strongly supports to conduct online examinations. Some tools are supports only for one domain. For example

- QuizPack [2] – System is capable of delivering web base dynamic individualize exercises for procedural language C. Lecturers can enter core content and system will generate different questions based on the given template.

- QuizJet [3] – System is capable of authoring, delivering and evaluation of parameterized quizzes and questions for Java. Users can enter the question content with parameters and system will create different questions using the given template and evaluate answers.

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\(^1\) SAT [online] http://sat.collegeboard.org/home?navid=sat-sat

C. Lack of evaluating knowledge on different question types

Many of the tools which are available in the internet only supports for MCQ typed questions. Those tools are not support to evaluate essay typed questions and structured type questions. For example

- MOLEx [4] (Mansoura On-Line Exams) – In this system there are two type of privileges called student and instructors. Instructors can enter the questions to the database using an excel file along with the answers. Also instructors can allocate time frame for each question and marks for each question. Once user finish answering system will evaluate the answers and release the result.
- MacQTEX [5] – Web-based online self-marking quiz system which will allow students to do MCQ quizzes. Provide pre-defined question types provided by MacQTEX. Possible to add new categories within the math domain. Exam conducting and evaluation done by the tool itself.

D. Minor opportunities to discuss subject related matter

Problems will occurred when student starts studying. For such occasions if there is a way to resolve the problems suddenly it will be a huge advantage to students.

- TechGig.com [6] - Is a tool that have both exam practicing and social networking aspects. Users can create profiles and TechGig.com will offer skill test. Some of these test are free and some of the test can be followed by paying for them. Each registered user can post on their profile add friends and colleagues to their profiles. Once user attempt a quiz it will evaluate the answers and display highest marks among the friends of the user.

quenZer designed in a way that, it address all the above mention problems and it will be a combination of all the solutions of current issues occurred in the e – Learning tools which are currently available in the internet.

II. METHODOLOGY

This section is based on design methodology and methods used to implement the quenZer e – Learning tool. Goal of the research project can be point out in brief as follows.

- As an online exam handling and evaluating tool
- As an proper feedback providing tool
- As an exam practicing tool
- As a challenging and entertaining tool for learning
- As an interview exam handling tool
- As a social network
- With the best GUIs

The research was mainly focused on achieving above mention goals. In the first phase of the research, group has thoroughly go through the results, gain from the literature survey found the issues with the current tools. In the next phase design the system in order to address the identified issues.

quenZer e – Learning tool mainly contains with four components.

1. Ontology Creation and Querying.
2. Creation of Questions.
4. quenZer social network.

Following paragraphs will more describe about the component of quenZer.

A. Ontology Creation and Querying.

Ontology is a graph based knowledge representation method written using RDF format in XML. Before inserting data into the knowledge base, relationships has to be defined inside the RDF file. Afterward that data has to be feed according to the relationships defined and class sub-class hierarchy. quenZer knowledge base build using the core concept of the Database Management System. In order to retrieve data from the knowledge base quenZer uses SPARQL queries.

To integrate the knowledge base with quenZer, .NET RDF and other third party tools are used. Algorithms are defined according to the question types that should retrieved.

An ontology is a formal way of represent knowledge hierarchy of concept within defined domain. That is base one class hierarchy (sometimes called concepts),and used RDF for writing the Ontology. Then the classes and sub class are defined for the subject DBMS. And Created the object properties, data properties and individuals relevant to the subject DBMS I. For defining classes Top-Down approach is used. As an example here DBMS is the root class and topics cover under that subject are defined as sub classes. Information and facts of each topic are defined as sub classes of topics class with the help of data properties and individuals Followed Some Steps that have taken to define and create the class hierarchy like Ensuring the class hierarchy is correct, Analyzing siblings in the hierarchy, multiple Inheritance, what type of classes need to added, etc. Next step is Storing Information inside ontology, ontology stores all the information as individuals to build a relationship between classes and data individuals object property is needed. Data properties can be used to describe individuals furthermore. Classes and sub class of the ontology are stored inside the .owl which stored the ontology as RDF XML format.
To read the RDF file in the .Net Framework, use .NetRDF as the API reference.

Finally according to the user information quenZer generates questions by using quenZerAPI. Following diagram describes how quenZerAPI works.

![quenZerAPI](image)

**B. Creation of Questions.**

There are two main parts in this component.

1. **Create subject related question papers**

By querying from the knowledge base will not retrieve the whole question. It will retrieve only the keywords to the question. (Ex: “Advantages of a database”) In order to make that keyword as a question, used NLP methods. Once it converted to a question it will be a template to few more questions. System can generate negation of the earlier created question along with the answers. To convert the original question to its negation, used NLP methods. When it comes to the MCQ type questions system will generate different types of answers and wrong answers, by converting the correct answer to its negation or vice versa. For the essay and structured type questions also system will generate all possible answers that a student can provide.

When it comes to question paper creation system will choose different questions from the question set that has been generated and create a question paper according to the format given by the lecturer. In this scenario quenZer used an algorithm to minimize the same question repetition by changing at least one parameter of the question of the question paper.

Formerly student finish answering to a question, system will evaluate student answers and automatically display the score of a particular student. Evaluating structured question’s answers and essay question’s answers are the most tedious task.

Sometimes there can be misspelled words or sometimes there can be grammatically incorrect sentences or sometimes there can be points which are not similar to the answer that is available in the system but that answer also applicable. Those kind of issues are successfully handled using Natural Language Processing.

2. **Create interview question papers**

Creating interview question paper is another challenging part in quenZer tool. IQ paper contains various type of questions like verbal questions, Logical questions, pattern recognition questions, Mathematical questions and many more.

In mathematical questions students has to identify the given number pattern and fill out the blank or blanks. In order to generate the number sequence system has predefined patterns (Ex: n = n +5). As a starting number system will chose a number using random number generation and build a pattern.

Verbal questions containing questions related to verbal pattern recognition. It also generates questions with different Verbal patterns and question repeating is minimized.

Logical questions also another kind of mathematical question which contains some calculations. User has to read and understand the question properly. Otherwise there will be a high possibility to go on with a wrong way and then the user will simply lose the marks. Answers are based on the calculation fed to the system and wrong answers are generated using the wrong approaches of the users.

Pattern related questions are basically based on the images and shapes. Sometimes those images are rotating and sometimes color of the images will change according to a pattern. User has to identify the correct image or the pattern that should appear next and chose the answer very carefully.

Since the IQ paper carried out only MCQ type questions all the questions are generated along with its answer and wrong answers.

C. **Answer Evaluation, Cloud Storage of Question Papers & Public Sharing.**

Feedbacks are generated for each and every question that has been generated by the knowledge base. For the IQ questions quenZer will not generate feedbacks. Since quenZer can be used as an exam practicing tool, it introduce a better way to practice. Feedbacks will guide the students to reach the answers easily. Most of the questions there can be more than one possible answer. If the student provide only one answer system will prompt all the other possible answers to the student.
In quenZer knowledge base each and every leaf node will more describes the parent nodes of it. Therefore once the keyword for the question has retrieved from the knowledge base it gets it leaf node values are passed to the front end. Then that values also act as keyword and those keywords are converted to a meaning full sentence using Natural Language Processing. When user enters a wrong answer user can view the feedback of the question. This option only available if the test type is practicing.

Finally all the details of the question paper gathered as an xml file and stored in the quenZer database. For the easiness of remote accessing quenZer has defined a way to store the details inside cloud storage. For that quenZer has used Google Drive and OneDrive. Those files are stored in a separate folder called quenZer. Users can change the privacy of this folder as they need. But initially that folder can access only to the account holder.

Another special feature in quenZer is users can share their achievements on social networks like Facebook, g+, and twitter using the user’s accounts.

D. quenZer social network.

quenZer social network is basically has two privacy levels.

1. Lecturer/ Interviewer
2. Student/ Interviewee

Lecturer/Interviewer login can be created using minor details of user like first name, last name, age etc. once user created a lecturer account they can add friends to their accounts as they wish. Friends can be either students or lecturers. In lecturer they have all rights to add, update and delete questions and question papers to quenZer social network. Lecturers can create a test, allocate time period for the test publish comments and announcements and many more functionalities are offered for a lecturer login.

For the student/Interviewee login, as in lecturer profile creation they also need to provide few details of them and create a profile. Once student profile has created they can add friends to their profile. Students can post comments, attempt quizzes. The most fascinating part of quenZer social network is, it will rank students according to the marks got for a particular test among the friends of his/her profile. It will shows as an animated graph from that graph student can make decisions of their knowledge levels.

quenZer social network is as easy as Facebook and LinkedIn. Rather than having social networks quenZer provides educational value to its users. This will helps users to build more challenging and entertaining environment throughout quenZer.

III. RESEARCH FINDINGS/RESULTS AND EVIDENCE

This system is design to provide a fully functional question and answer generating tool. Other than that the system can provide exam handling and evaluation as well. The core of this system is question generating. Now system can successfully generate question according to user requirements. But it should test well to ensure that the system always generate questions accurately. It should also test about the accuracy level of answers and wrong answers generated by the system and probability of question repeating. Since quenZer is an e-learning system, UIs are designed and developed based on modern concepts to attract users to the system and motivate students. quenZer can navigate users easily through the system because site has designed to give better user experience. The main reason of developing this system is overcome the difficulties that are come up manual exam handling and current online exam handling. When research group search about the current situation it was identified the necessity of question and answer generating tool. This system development not completed yet. It is expected to develop system which can overcome the identified problems in the current context.
IV. CONCLUSION AND FUTURE WORKS

E-Learning or learning through internet or any electronic media is very popular today. Therefore there are so many resources for e-Learning. Productive and efficient e-Learning solutions are highly encouraged in the society. This proposed system “quenZer” is providing entertaining, interesting environment for learning.

Currently there are many e-Learning sites available in the internet. There are several problems in those e-Learning sites. Those sites provide lesson and evaluate students by online exams. But most of those exams have common problem of repeating same question again and again. Sometimes examinations will not give results properly due to server error etc. When releasing results those systems cannot provide proper feedback as well. Not only has that most of the student had problems with exam preparation. It means students get lower results because of less practice and boring learning styles.

quenZer will be a good solution for all the above problems. This system can generate questions using a knowledge base and it will solve the problem of repeating same question again and again. Interviewers also can use this system to evaluate the candidates’ knowledge level before the interview using quenZer. Users can use this system for exam practice. quenZer contain set of questions in many subject areas. Users can attempt those questions level by level and brush up the knowledge and quenZer will provide better feedback with the results to improve the knowledge of users. quenZer users can share the skills and performance that achieved in quenZer through social networks such as Facebook, LinkedIn, and Google+ etc. quenZer will attract the users to learning by using different approach such as question level handling, connecting with social networks etc.

quenZer can use as examination handling tool and examination practicing tool. This system will help to handle exams very effective and productive manner. Since this tool will helps to reduce time that should spend working on creating question papers and evaluating answers most of the universities and schools will tend to use this system. It is expect that this system will help to users for the studies in very interesting manner. Furthermore this system is still developed only for the web platform. As a future for his advice and assistance in keeping our progress on schedule.

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REFERENCES


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