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Multitude based Quiz System: Targeted Crowd Sourcing.

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A B S T R A C T

The multitude (Crowd) based Quiz System is described as gamified system that simultaneously accesses the knowledge of users and acquires the new knowledge from them. This QS operates by asking the users some basic questions to know their basic knowledge. To acquire the new knowledge QS also incorporates new questions that we don't have known answers. The answers given by the competent users provide useful information for selecting the correct answers. QS Also tries to identify the competent users on the Internet by running the advertisement campaign. This QS quantifies the user contribution by the principle of Information Gain and sends feed back to the each user about their contribution. The cost and quality of this approach is optimized in terms of less cost and good quality respectively for this paid crowd sourcing.

PAPER-QR CODE

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Introduction:

The multitude (Crowd) sourcing is a mechanism used to acquire information from the billions of volunteers across the world just like Wikipedia and Freebase. Here we engage the user with attractive interfaces just like an ESP game. However, despite these widely-known success stories, building and engaging the users is a critical task' and this gamified system enables efficiency of QS. Machine intelligence concepts are also involved and different types of user engagement is has to be done.

We not only initialize the process with simple advertising campaign but also integrate information with the crowd sourcing application and provide feedback with each click to the advertising network. If we click on the any of the advertisements, then the total control transfers to that website. Our quiz contains two kinds of questions.

A. Calibration questions: having known answers.
B. Collection questions: having unknown answers.

Literature Review:

Web research is now a major interdisciplinary area of study, including the modeling of user behavior and Crowd sourcing applications. Studies on online quiz systems have evolved as an important area of web research since the mid-1990. Many online quiz systems have been developed and commercially implemented, but very little research has investigated the usage and performance of crowd based quiz systems.

The Xing-dong Yang (2012) study deals with the continuous development of network technology, teaching and examinations have changed significantly. For online courses, online exam is a hot topic of the reform of current education mode and development trends. This article is in view of the research on online examination system of PE theory course, using the NET and SQL for research and development, firstly, describe the demand analysis of the system, secondly design the details of the exam system, finally, how to implement the system. The research and development of online examination will improve teaching quality and perfect the education system.

According to the Umeda K,Yasuda.T(2002)study they says that the purpose of this research is to create a comprehensive multimedia online quiz system on the Web that makes it easy to create and administer a "rich" online quiz, and to reuse and exchange it efficiently

with collaboration from specialists such as teachers or curators. For the first phase, we proposed a method of packaging of multimedia online quiz, and developed the online quiz system. Also, an experiment was conducted under a high speed network environment. Based on the results of first phase, we are developing the authoring tool of multimedia online quiz for reuse and efficient exchange.

Another study by Kroll,C.(1997)says that computer based training has been greatly improved by the introduction of new multimedia systems and techniques. However, the integration of multimedia training techniques and network capabilities that modern high speed Wide Area Networks can provide has only recently been envisaged. The computer and network department in the European Space Operations Centre of the European Space Agency conducted in cooperation with CAE Canada a project to show which configurations and techniques of an online multimedia system for remote reaching and guidance have demonstrable advantages in efficiency and effectiveness.

The study of Chu-Chun Liu and Yuan-Deng Chuang the Internet and telecommunication system are now used to disseminate information for the education sector. Traditional classroom teaching has transformed into the "far-distance teaching" and "on-line teaching", which both utilize the information transmission via the Internet or telecommunication system. The mechanism of "on-line teaching" enables students to participate in course discussion and learn in any time they wish. On-line teaching is being listed as a necessity in education propagation. The use of SOAP (simple object access protocol) technology as the standard remote data access scheme is emphasized, and is applied by On-line Teaching System to provide access for different mobile devices. SOAP technology will be used to design the on-line teaching system and SOAP functional components on mobile device that use the SOAP technology to access the on-line teaching system. Its communication mechanism, implementation and provided functions are discussed. The SOAP adopting access mechanism is also compared with the traditional access technology implementation.

According to Sole-Beteta(2014), the online teaching courses are becoming an appealing alternative to traditional in-class learning methods, therefore driving practitioners to explore new strategies for delivering contents to an overwhelming number of students. Nevertheless, migrating face-to-face learning methodologies to an online teaching environment is certainly challenging. More specifically, collaborative work, which provides valuable learning outcomes in classroom-based environments, is apparently unable to meet the online paradigm due to its intrinsic specificities: widely heterogeneous profiles, considerably large numbers of subscribers, scarcely balanced and doubtfully relevant feedback concerning students' progress, and poorly conducted personal attention facilities. The purpose of this paper is to introduce Sagittarius, a novel Open Educational Resource that uses data mining techniques to overcome such limitations. This open-source software enables building reliable and effective working groups in order to boost the learning experience of online courses by means of collaborative work. Collected observations on the Computer Engineering field show the feasibility of our approach and encourage practitioners to focus their efforts on this direction.

Problem specification:

The present online quiz systems are not using any algorithm to evaluate the efficiency and also are not using the benefits of crowd as well. The present online quiz systems are not considering the performances of other users while calculating the knowledge of others. The present systems are not providing the users to post a question to the crowd to obtain the useful information about their questions. And the present systems are not showing the results the rank wise among the crowd and percentage of correct answers among the crowd. Human factors in computing systems plays a major role.

Problem Description:

Existing online quiz systems are not using the benefits of crowd to evaluate the competency of participant users. In crowd based quiz system, we resolve the problem of evaluating the competency of participated crowd of users. To avoid all the drawbacks specified in the problem specification, compute utility algorithm can be used. This problem can be view in probabilistic perspective.

Compute Crowd Utility Algorithm:

Data: Correct answers a, Incorrect answers b, Unknown answers c,

Question utility U(now), Horizontal limit l

Result: Utility for all actions, Optimal next action

1. Begin

2. If l<0 then

3. Return 0 // Reached the limit of computing horizon

4. End

/* Utility estimation of the displayed question

5. ɤ=Pr(survive(a,b,c)) // The (conditional) probability that the user will answer the served question

6. eig=E[IG(a,b,n)] // Expected information gain

7. sig=√var[IG(a,b,n)] // Standard deviation of information gain

8. U(now)= eig-sig // The estimate of the information gain for a question at the (a,b,c) state

/* Utility estimation for a collection question

9. U(coll)=U(now) // If we ask a collection question, we get eig-sig extra utility

10. U(future)= ComputeUtility(a,b,c+1,U(now),l-1) // Utility for future steps

11.U(coll)=ɤ.(U(now)+U(future)) // Utility of asking a collection question

/* Utility estimation for a calibration question

12. q=(a+1)/(a+b+n) // Probability of user answering correctly a calibration question

/* Utility if the user answers correctly

13. U(now/Corr)= E[IG(a+1,b,n)] - √Var[IG(a+1,b,n)] //Information gain after a correct answer

14.U(now/Corr)=c.(U(now)-U(past)) // Revise information gain for all c previously asked collection questions

15.U(future/Corr)= ComputeUtility(a+1,b,c,U(now/Corr),l-1)// Utility form future steps, after a correct answer

/* Utility if the user answers incorrectly

16.U(now/incorr)=E[IG(a,b+1,n)]-√var[IG(a,b+1,n)] // Information gain, after an incorrect answer

17.U(now/incorr)=c.(U(now/incorr)-U(past)) // Revise information gain for all c previously-asked collection question

18.U(future)=ComputeUtility(a,b+1,c,U(now),l-1) // Utility for future steps

19.U(calib)=ɤ.(q.(U(future/corr)+(1-q).(U(future)+U(now)) // Total utility of calibration

20. If U(calib)>U(call) then

21. Action=Ask a calibration question

22.Else

23. Action=Ask a collection question

24.End

25. Return{U(calib),U(coll),U(now)}, Action

26.end

Procedure (Pictorial Representation):

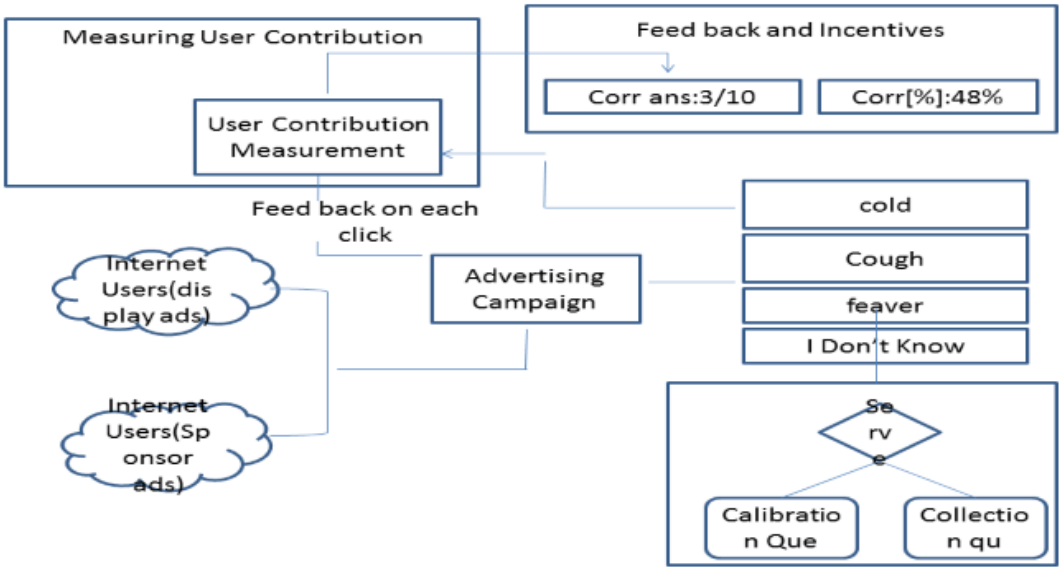

Fig. 1: Pictorial Representation

In the Compute crowd Utility algorithm we have five phases:

They are:

1. Utility estimation for displayed question
2. Utility estimation for collection question
3. Utility estimation for calibration question
4. Utility if the user answers correctly
5. Utility if the user answers incorrectly

Example:

Data: correct answer a=1/3, incorrect answer b=1/3, unknown answer c=1/3, utility U(past), horizontal limit l=10

Result: utility for all actions, optimal next action to be taken

1. begin

2. check condition l<0

So continued

/* utility estimation for displayed question

5.ɤ=Pr(survive(a,b,c))=0.5 //pro of user answer the served question

6. eig=E[IG(a,b,n)]=

log(n)-b/a+b.log(n-1)-Ψ(a+b+1)+aΨ(a+1)+bΨ(b+1)/a+b

Where Ψ is a reciprocal Fibonacci constant

and its value =3.35988

and eig value=0.535

7. sig=√var[IG(a,b,n)]=0.2 // standard deviation of information gain

8. U(now)=eig-sig=0.535-0.2=0.335

Utility estimation for a collection question
9. U(now/coll)=U(now)=0.335
10. U(future/coll)=ComputeUtility(a,b,c+1,U(now),l-1)=ComputeUtility(0.5,0.335,9)=0.787
11. U(coll)=ɤ.(U(now/coll)+U(future/coll))
=0.5*(0.335+0.787)=0.561
Utility estimation for a calibration question
12. q=(a+1)/(a+b+n)=0.285
Here the question is a calibration so the formula for info gain is
IG(q,n)=H(1/n,n)-H(q,n)
Where H(q,n) is entropy for an answer
On submit we have H(q,n)=-q.log(q)-(1-q)log(1-q/n-1)=0.600 and H(1/n,n)=0.81
On similar way here the algorithm calculates the utility for correct answer and incorrect answer
And finally
20. Check condition (U(calib)>U(coll))
i.e (0.21>0.56) which is wrong
22. Else part is executed
23. Action=Ask collection question
26. end

And IG(0.285,4)=0.81

Algorithm for Compute Utility: Self Proportional Integration and Derivation:

1. Take user answers for questions.

2. Divide the answers as correct, incorrect and unanswered.

3. Compute the utility for the displayed question.

4. Calculate the Information Gain for that question.

5. Do Utility estimation for the collection question.

6. Do Utility estimation for the calibration question.

7. Do Utility estimation if the user answers correctly.

8. Do Utility estimation if the user answers incorrectly.

9. Check condition (U(calibration)>U(collection)).

10 Based on condition, decide whether to continue or discard the user.

11. Do all steps from 1 to 10 for each user.

Notations:

a: a is the correct answers.

b: b is the incorrect answers.

c: c is the unknown answers.

ɤ: ɤ is the Utility of the displayes question.

IG: IG means Information Gain calculated using Compute Utility algorithm.

Ψ: Ψ is the reciprocal Fibonacci constant.

Results Analysis:

In this system winner can be selected based on leader board position in case of calibration questions (questions have known answers) but in case of collection questions (questions have unknown answers) answers will be identified by getting information gain by the algorithm proposed in this project. Based on the information gain value answers can be selected to the collection questions and winner will be selected subsequently. This approach is very much efficient than paid crowd sourcing.

Conclusion:

The multitude based Quiz system obtains the knowledge of users on the crowd, evaluates the utility of the answers and based on, the utility the system calculate the future gain.

Based on the future gain of each user, the system decides whether to continue the user or discard at the present stage. The system also gives the leader boards, crowd answers, correct answers to the users.

Future scope:

Multitude Based Knowledge abstraction is widely used application to obtain the knowledge of billions of users on the Crowd. Most of the online examinations today uses the benefits of knowledge of users to evaluate the competency of participated users.

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