

Intelligent Question Paper Generation System

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Abstract—Generation of an effective question paper is a task of great importance for any educational institute. Setting a question paper manually is a tedious task for teachers. They have to consider different parameters such as difficulty level, portion coverage etc. In this paper, a smart question paper generating system is proposed in which a question paper can be set on a random basis, with equal coverage of portion. This system uses ant colonies with fuzzy simulated which has high search efficiency of questions in the database. An administrator is allowed to input a set of questions and also provide weightage and complexity for each question. The admin selects the difficulty level and the questions are stored in database. The system selects the questions randomly and based on the difficulty level the paper gets generated randomly within seconds.

Keywords— Ant colonies algorithm; classical method; difficulty level; fuzzy logic; knowledge base; modules; portion coverage; QPGS.

I. INTRODUCTION

Education is the backbone of society and examination is of great importance, so the system has to be designed and administered in a systematic manner. The predominant methodology is that, a certain predetermined number of faculties are handed over a syllabus and allocated the task of framing a question paper out of it. One of so developed question papers is picked up randomly and used for the purpose and this method is treated as Classical method [2]. According to the need, an autonomous system named as Intelligent Question Paper Generation System is proposed which helps in reducing the time taken by the instructor in setting the papers manually and also to make the system more efficient and reliable.

This system consists of seven modules namely, Admin Login, Question Insertion, Difficulty Choosing, Random Paper generation, Wide Chapter Coverage, Doc File Creation and Emailing. The Question Paper Generator System (QPGS) is a software for setting examination question paper. The software performs all tasks related to paper setting, starting from preparing question bank to printing paper. This software is very useful for small, medium and large scale institutes.

II. BACKGROUND

A. Fuzzy Logic

The term “fuzzy logic” emerged in the development of the theory of fuzzy sets by Lotfi Zadeh (1965). A fuzzy subset A of a (crisp) set X is characterized by assigning to each element x of X the degree of membership of x in A (e.g., X is a group of people, A the fuzzy set of *old* people in X). Now if X is a set of propositions then its elements may be assigned their *degree of truth*, which may be “absolutely true,” “absolutely false” or some intermediate truth degree: a proposition may be more true than another proposition. This is obvious in the case of vague (imprecise) propositions like “this person is old” (beautiful, rich, etc.). In the analogy to various definitions of operations on fuzzy sets (intersection, union, complement, ...) one may ask how propositions can be combined by *connectives* (conjunction, disjunction, negation, ...) and if the

truth degree of a composed proposition is determined by the truth degrees of its components, i.e. if the connectives have their corresponding truth functions (like truth tables of classical logic). Saying “yes” (which is the mainstream of fuzzy logic) one accepts the truth-functional approach; this makes fuzzy logic to something distinctly different from probability theory since the latter is not truth-functional (the probability of conjunction of two propositions is *not* determined by the probabilities of those propositions).

B. Ant Colony

Ants communicate information by leaving pheromone tracks. A moving ant leaves, in varying quantities, some pheromone on the ground to mark its way. While an isolated ant moves essentially at random, an ant encountering a previously laid trail is able to detect it and decide with high probability to follow it, thus reinforcing the track with its own pheromone. The collective behavior that emerges is thus a positive feedback: where the more the ants following a track, the more attractive that track becomes for being followed; thus the probability with which an ant chooses a path increases with the number of ants that previously chose the same path. This elementary ant's behavior inspired the development of ant colony optimization by Marco Dorigo in 1992, constructing a meta-heuristic stochastic combinatorial computational methodology belonging to a family of related meta-heuristic methods such as simulated annealing.

III. PROPOSED SYSTEM

A. System Overview

In this system we present a smart question paper generating system for universities. It is made to allow universities to generate question papers with random but even questions to cover most chapters of subject with difficulty level within seconds and mail them to colleges instantly. In our system we allow administrator to input a set of questions and respective answers for option ticking. We also allow admin to provide weight age and complexity for each of these questions. After this the questions are stored in database along with their weightage. Now on question paper generating time

the admin just has to select the percentage of difficulty. On this selection the system selects questions randomly in a way that their weightage makes up for 100 marks and according to difficulty that admin chooses the questions are chosen based on their complexity level. The questions are also added for various difficulty levels so that as soon admin chooses the type of paper difficulty (Easy, medium, difficult) the system automatically generates paper, prepares doc file as per selected paper format. Also emails it to other colleges. After this question paper is converted to pdf file and emailed to colleges on button click.

B. System Architecture

A system architecture can comprise system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall system. The admin logs in with his id and password, the questions are then inserted by selecting the modules and the difficulty level. The question paper is generated which is created into a word document and simultaneously gets downloaded in the browser and mailed to colleges.

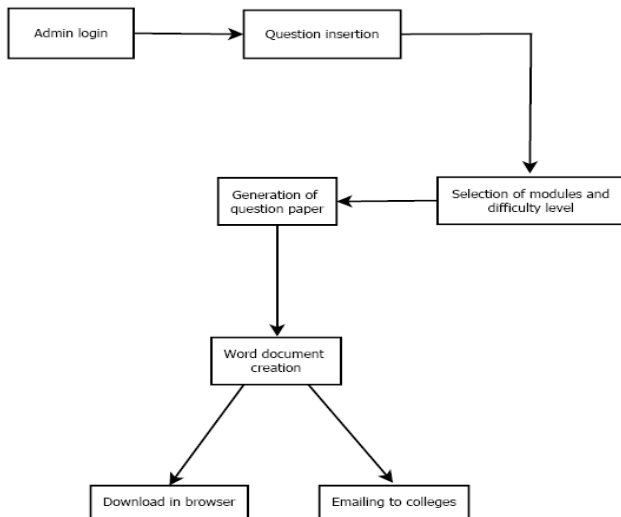


Fig. 1. Proposed system.

C. Flow Chart

The steps of ant colonies algorithm based on fuzzy simulation are as follows:

Step 1: Initialize parameter. Set the number of the maximal cycles times. The m ants are set in the space grid point of the first level. Set initialization information quantity $\tau(0) = \text{const}$.

Step 2: Cycle times $N_{c1} \leftarrow N_{c1} + 1$;

Step 3: The number of ants is $k \leftarrow k + 1$;

Step 4: Calculate space grid point of probability selection according to state transition probability formula (4), complete all selection of space grid point with n stages;

Step 5: Repeat step 3 and step 4 until all ants finish selection of space net point with n stages;

Step 6: Calculate all target value of ant's route based on fuzzy simulation.

Step 7: Refresh information quantity of each route using formula (5), (6) and (7);

Step 8: Repeat step 2 to 7 until the given cycle times are finished;

Step 9: Find the best ant to be the optimum solution.

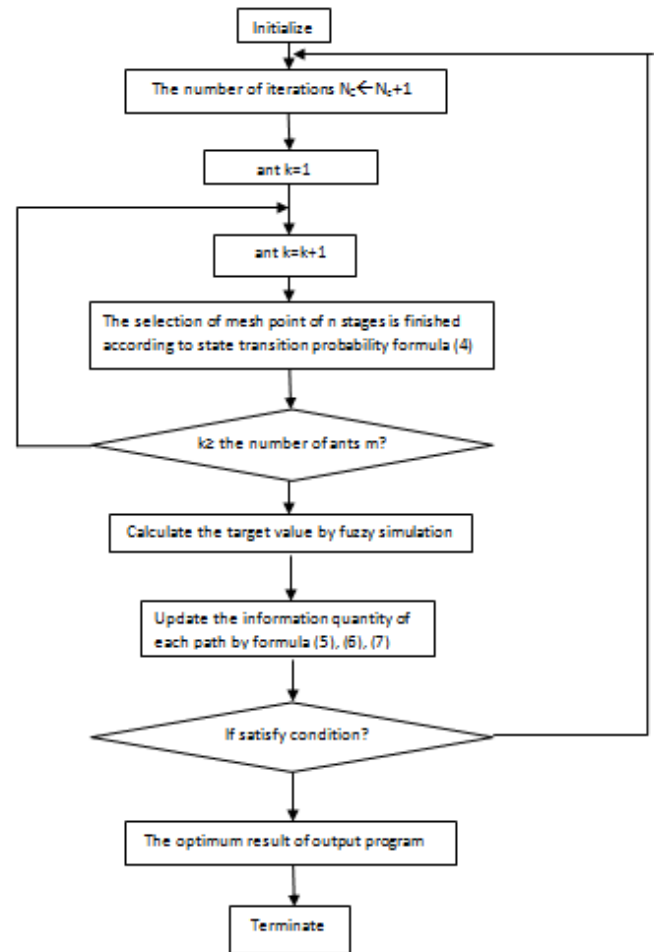


Fig. 2. Flowchart.

IV. DATABASE

As we enter the questions for a specific subject and branch, the questions get stored in the database as given in the following table:

TABLE I. Database.

Questions

Paper for Branch :-

Semester :-

Subject :-

QId	Ques	Difficulty	Mod	Subject	Sem	Branch	id
1066	Explain MapReduce.	Easy	1	bda	1	IT	1
1067	what is Hadoop?	Easy	1	bda	1	IT	1
1068	Explain the architecture of DSMS.	Easy	1	bda	1	IT	1
1069	What are the components of Hadoop?	Easy	1	bda	1	IT	1

V. ADVANTAGES

Wide portion coverage and efficient question paper generation. No chance of paper leaks. No need of transporting papers through police/security vans to all colleges. The system provides an unbiased result. Thus the system excludes human efforts and saves time and resources.

VI. CONCLUSION

In this paper, an approach to implement "Intelligent Question Paper Generation System" with fuzzy parameters has been proposed. Comparison with classical method shows that the proposed system is more reliable in terms of duplicity removal, uncompromised issues and lesser man power logical in terms of unbiased selection [2]. The success of this project will provide a great aid for the organization in effective question modeling and its assessment. The future goal is to create a flexible system which manages question paper generation for various domains of particular educational institutions. It gives a novel approach for generating test using utility based agent. It provides us a great ease in following ways:

a) The development of knowledge base of question items either using file system or relational database

b) Generation of test paper using question items in knowledgebase according to difficulty level selected, and
c) The final simulation results validated the feasibility of the proposed approach.

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