*IOSR Journal of Computer Engineering (IOSR-JCE)*
*e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 17, Issue 1, Ver. II (Jan – Feb. 2015), PP 46-52*
*www.iosrjournals.org*

# A Trinity Construction for Web Extraction Using Efficient Algorithm

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***Abstract:*** *Trinity – An unconventional structure for automatically catch or extract the content from the website or the webpages by the source of internet. The basic applications are done by the trinity characteristics in order to gather the data in the form of sequential or linear tree structure or format. Many users will be searching for the effective and efficient device in order to perform the optimized solution without any big loss or expenditure. In this system an automatic parser is placed at the back end of the complete trinitized format or structure. Now it performs the action or task of sub-dividing the extracted web content in the form of small pieces of web content which has three main categories as prefix, suffix and separator. Once the action of gathering is completed, now the extracted content of the located data in the relevant webpages. Gradually that data will be cleaned and formatted for the calculation which results in an effective and efficient cost comparative system. In this proposed system an 'Ant Colony Optimization ' algorithm is used in order to extract the relevant content from the website. Finally the trinity will computes and executes any major estimation problem or collision of the device or system.. The Ant colony optimization provides accuracy without NP-Complete Problem.*

***Keywords:*** *Automated crawling, extraction, formatting style; scrutiny; styling;*

## I. Introduction

Data mining is the process of examining data from multiple perspectives and summarizing it into useful information - information that can be used to increase financial aspects, cuts costs, or both. Data mining software is one of a number of measureable tools for identified data. It is the method of inspecting large pre-existing databases in order to generate new information. It allows users to identify data from different dimensions or views, categorize it, and encapsulate the relationships obtained. Technologically, data mining is the process of checking correlations or patterns among dozens of fields in large relational database. Data mining is predominately used today by companies with a strong consumer focus on retail, financial, communication, and marketing organizations. It enables these companies to determine correspondence, among "internal" factors such as cost, product range or staff skills, and "external" factors such as economic measure, competition, and customer enumeration. And, it enables them to ascertain, the consequence on disposal, consumer contentment, and company profits .Finally, it enables them to "drill down" into summary information to view detail transactional content. Trinity gives enterprises a custom operational plan for optimizing infrastructure Quality of Service and minimizing capital spending throughout the entire life cycle.

The web crawler is a program that automatically traverses the web by downloading the pages andfollo wing the links from page to page

## II. Web Mining For Extraction

Web mining describes the practice, of conservative; data mining techniques onto the web resources and has facilitated the further development of these techniques to consider the specific structures of web data [1]. The analyzed web resources contain the actual web site and the hyperlinks connecting these sites and the path that online users take on the web to reach a distinct site. Web usage mining then refers to the deduction of useful knowledge from the data inputs. While the input data are mostly web server logs and other primarily technically position data, the expected output is an understanding of user behavior in the domain of online data search, online shopping, online learning etc.

The contents facet of this goal requires an understanding of behavioral theories in the investigated domains and a highly interdisciplinary research approach. User behavior and data availability tend to transmute over time. Therefore the vigour or vitality of a domain is an important question in every mining analysis and in each presentation of mining results for domain experts. Most of the mining algorithms tend to treat the dataset being analyzed as a instant unit. There are two types of pattern change: changes in the essential make up of a pattern, the association in the data as reflected by the certain pattern, and changes in the statistical measurement of the pattern. Data gathering and data examining practices are coming under increasing scrutiny from legislation and technical proposals that aim at either minimizing recording or at extending it.

## III. Existing System

In the existing system trinity framework system which can locate some of the characteristic, like automatic data extraction by forming trinity tree .Effective option of creating patterns and child's under a specific node. Eliminating the undesirable prefix and suffix data. Find Pattern algorithm option to identify the data inside the required filed content. Analysis on Different field information for a website is done and its displayed to the user.

An automated crawling on the web pages followed by Trinity Tree based Prefix/Suffix sorting algorithm is implemented in the existing system. But the pitfall of this system is that an option of building web content into user defined or user expected format which the real website owner couldn't produce to the consumer. In the present system only single website can be crawled. And it takes more amount of time to complete the extraction. The considerable problem is the production of a less effective solution of what we are going to do after fetching the data and also it provides a minimum value of analysis framework with the utilized data is identified in the missed out state.

## IV. Proposed System

In this proposed system fuzzy logic is designed for a multi perspective crawling mechanism in multiple websites [1]. Genetic algorithm defined for multiple websites and load into the trinity structure has an automated process to remove unwanted stuffs of extraction. Finally an "Ant colony optimization" algorithm is used to obtain effective structure. During the web extraction and data gathering the fuzzy logic algorithm are used .

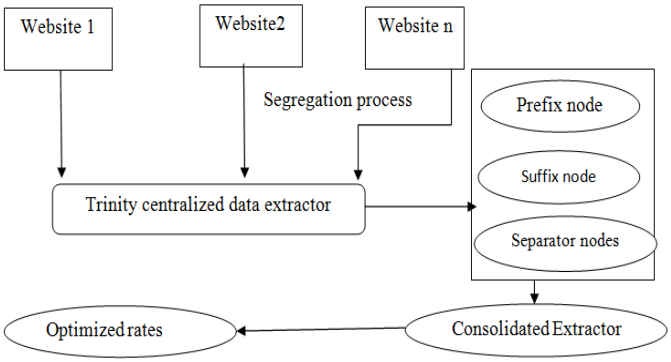


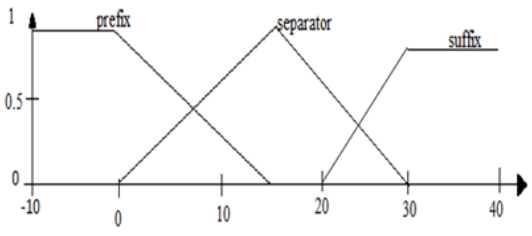

**Fig. 1. Architecture diagram for Web extraction**

An online web extraction model framework with online feature selection helps the human to extract the relevant content of their desired products. On a real-world the trinity based web extraction; this model can potentially detect more extracted web contents and significantly reduce the option of attaining the irrelevant data [1]. A multi perspective crawling mechanism in fetching the information from Admin defined multiple websites. An effective Trinity structure defining from multiple websites and load into the system.

After fetching the website structure an automated stemming process to remove unwanted stuffs surrounding the conceptual data is removed [2]. After fetching the data from a website an automatic manipulation is processed and the data will be formatted based on users requirement and a comparative analysis followed by an Ant colony algorithm technique to suggest an optimized cost effective best solution for the buyers. It also over comes the NP-complete problem and so achieves accurate data [2].

### 4.1 Fuzzy logic

A fuzzy logic is a form of many-valued logic; it deals with reasoning that is approximate rather than fixed and exact. Compared to traditional binary, fuzzy logic variables may have a truth value that ranges between 0 and 1. This logic can handle the concept of partial truth, and the truth output may range between completely true and completely false [3]. Irrationality can be explained in terms of what is known as the fuzzjective.



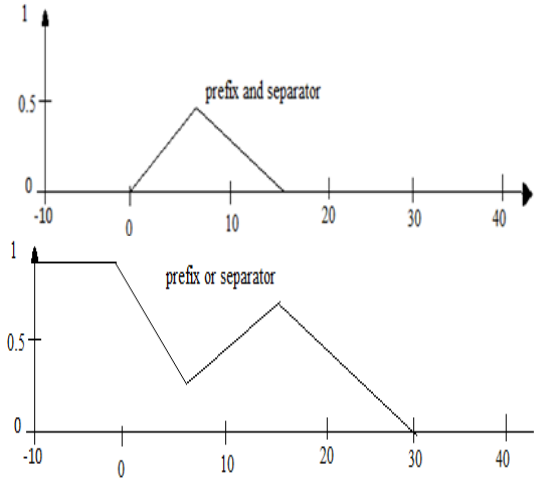


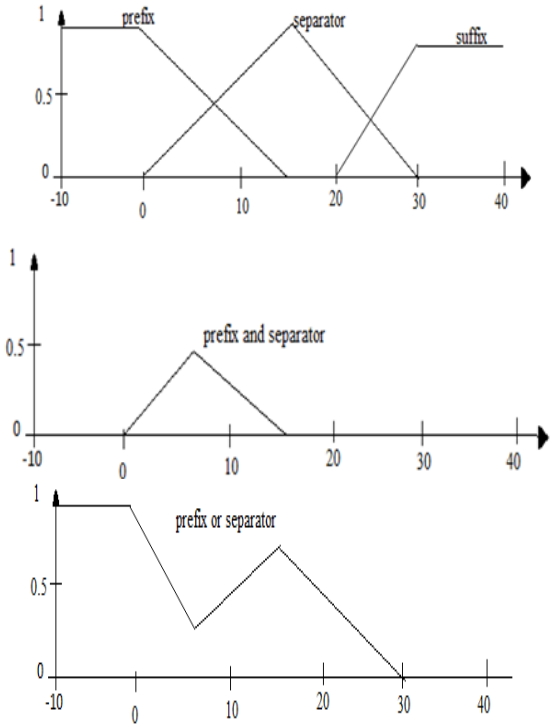

**Fig. 2. Graph for extracting the trinitized content by fuzzy method**

Fuzzy logic can be generalized by the set operations also. Some of the fuzzy logic operations are as follows:
$\sigma Y_1 \cap Y_2 (y) = \min \{\sigma Y_1 (y), \sigma Y_2 (y)\}$
$\sigma Y_1 \underline{\cup} Y_2 (y) = \max \{\sigma Y_1 (y), \sigma Y_2 (y)\}$
$\sigma \overline{Y (y)} = 1 - \sigma Y (y)$

**4.2 Genetic Algorithm**

A Genetic algorithm describes the estimation and attempts to improve the guesses by evolution. A GA are generally categorized into five parts: (1) a description of a estimation called a chromosome, (2) an inceptive pool of chromosome, (3) a fitness method, (4) a selection method and (5) a crossover operator and a mutation operator. A chromosome is defined as binary numbers or a more descriptive data structure. The inceptive pool of data can be randomly generated or manually created.

The fitness method calculates the suitability of a chromosome to meet a specified object a chromosome is said to be fitter if it corresponds to greater extent. The selection method decides which data will participate in the evolution stage of the genetic algorithm made up by the crossover and mutation operators [4]. The crossover exchanges genes from two groups and creates two new groups. The mutation operator changes a gene in a chromosome and creates one new chromosome.

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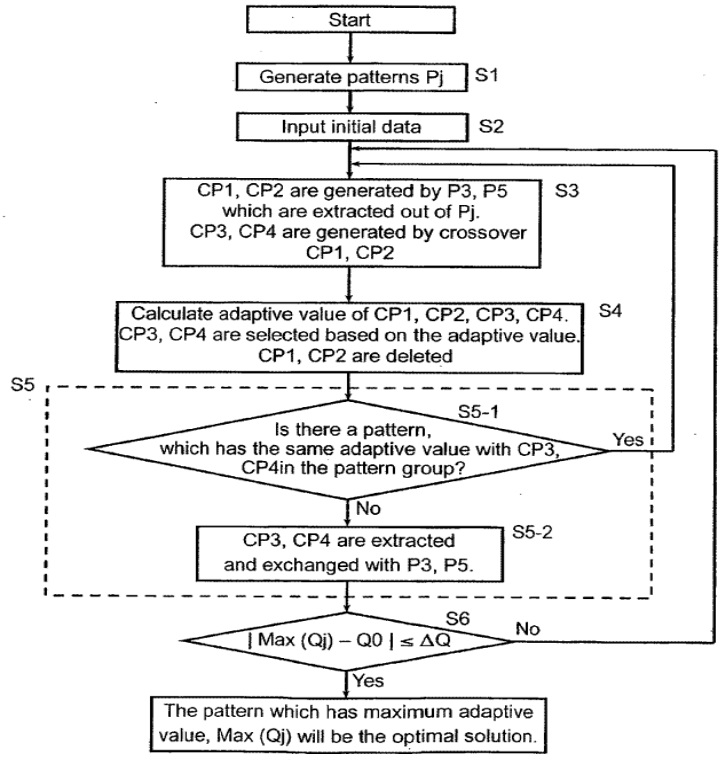


**Fig. 3. Workflow of genetic algorithm**

**4.3 Ant colony optimization Technique**

Ant Colony Optimization (ACO) is a designing Meta heuristic algorithms for combinatorial problems. The indispensable trait of ACO algorithms is the combination of a priori information about the structure of a promising solution with a posteriori information about the structure of previously obtained good solutions.

This Metaheuristic algorithm has the order to escape from local optima, drive some basic heuristic: either a constructive heuristic starting from a null solution and adding elements to build a good complete one, or a local search heuristic starting from a complete solution and iteratively modifying some of its elements in order to achieve a better one. The metaheuristic part permits the low-level heuristic to obtain solutions better than those it have achieved.

The original idea of ACO comes from observing the exploitation of food need among ants in which ants independently or individually limited cognitive abilities have collectively been able to find the shortest path between a food available place and the nest[5] . The first ant finds the food available place (F), and then returns to the nest (N), leaving behind a trail pheromone (b) Ants indiscriminately follow four feasible ways, but the strengthening of the runway makes it more attractive as the shortest path.

Ants take the shortest path; long portions of other ways lose their some sample pheromones. In a combination of experiments on a colony of ants with a choice between two unequal length paths leading to a available place of food, biologists have distinguished that ants preferred to use the shortest path. A model or prototype explaining this behavior is as follows: An ant (called "blitz") runs more or less at random around the colony; If it discovers a food available place, it returns more or less immediately to the nest, leaving in its path a trail of pheromone; These pheromones are attracted to nearby ants will be disposed to persue more or less directly the track; coming back to the colony, these ants will strengthen the path;

If two paths are possible to reach the same food available place, the shorter one will be, in the same time traveled by more ants than the long path will; The short path will be increasingly enhanced, and therefore become more attractive[6]; The long path will eventually disappear, pheromones are volatile; Eventually, all the ants have determined and therefore "chosen" the shortest path. Theoretically, if the quantity of pheromone remained the same over time on all connective edges, no path would be chosen. Anyways because of replication, a slight variation on an edge will be amplified to allow the choice of an edge and the algorithm will move from an unstable state in which no edge is stronger than another, to a stable state where the path is composed of the strongest edges.

The characteristic of ACO algorithms is their explicit use of elements of earlier solutions. In fact, they drive a constructive low-level solution, as GRASP does, but including it in a population framework and randomizing the construction in a Monte Carlo way. A Monte Carlo combination of different solution elements is suggested also by Genetic Algorithms, but in the case of ACO the probability distribution is explicitly defined by previously obtained solution components [7].

ACO is a class of algorithms, whose initial member, called Ant System. The collective behavior emerging from the interaction of the different search threads has the effective solving combinatorial optimization (CO) problems. A optimization problem is a problem defined over a set C = c1, ..., cn of basic components. A subset S of components represents a solution of the problem; F ⊆ 2C is the subset of feasible outcome, thus a solution S is feasible if and only if S ∈ F. A cost function z is defined over the solution domain, z : 2C <R, the objective being to find a minimum cost feasible solution S*, i.e., to find S*: S* ∈ F and z(S*) ≤ z(S), ∀S∈F.

Trail evaporation decreases all trail values above time, to avoid inexhaustible accumulation of trails over some component. That is, at each step σ, each ant k computes a set Ak σ(ι) of feasible expansions to its present state, and goes to one of its probability. For ant t, the probability sψk of moving from state ι to state ψ depends on the combination of two values: The attractiveness ηψ of the move, as computed by some heuristic showing the a priori desirability of that move; The trail level τιψ of the move, specifies how proficient it has been in the past to make that particular move: it represents therefore an a posteriori indication of the desirability of that move.

Trails are updated usually when all ants have completed their solution, increasing or decreasing the range of trails corresponding to moves that were part of "good" or "bad" solutions, respectively. The general framework just presented has been specified in different ways by the authors working on the ACO approach. The remainder will outline some of these contributions. The move probability distribution defines probabilities pψk to be equal to 0 for all moves which are infeasible (i.e., they are in the tabulated list of ant t, that is a list containing all moves which are infeasible for ants t starting from state s), otherwise they are computed by means of formula where α and β are user defined parameters (0 ≤ α,β ≤ 1): In general, the t ant moves from state to state with probability $S^k_{xy,}$

$$S^k_{xy} = \frac{(\tau^{\alpha}_{xy})(\eta^{\beta}_{xy})}{\sum_{y \in \text{allowed } x} (\tau^{\alpha}_{xy})(\eta^{\beta}_{xy})}$$

Where, $\tau_{xy}$ is the amount of pheromone deposited for transition from state to , 0 ≤ is a parameter to control the effect of , is the desirability of state transition (a priori knowledge, typically , where is the distance) and ≥ 1 is a parameter to control the influence of .And represent the attractiveness and trail level for the other possible state transitions. The another mechanism of optimization are as follows:

$$p(c_{ij} \mid s^p) = \frac{\tau_{ij}^{\alpha} * \eta_{ij}^{\beta}}{\sum_{c_{ij} \in N(s^p)} \tau_{il}^{\alpha} * \eta_{il}^{\beta}}, \forall c_{ij} \in N(s^p)$$

The algorithm is the following.

1. {Initialization}

Initialize τψ and ηψ, ∀(ψ).

2. {Construction}

For each ants t (currently in state s) do repeat choose in order the state to move into.

append the chosen move to the t-th ant's set tabu t. until ant t has completed its solution.
end for
3. {Trail update}
For each ant move (ιψ) do compute $\Delta\tau\psi$
update the trail matrix.
end for
4. {Terminating condition}
If not(end test) go to step 2

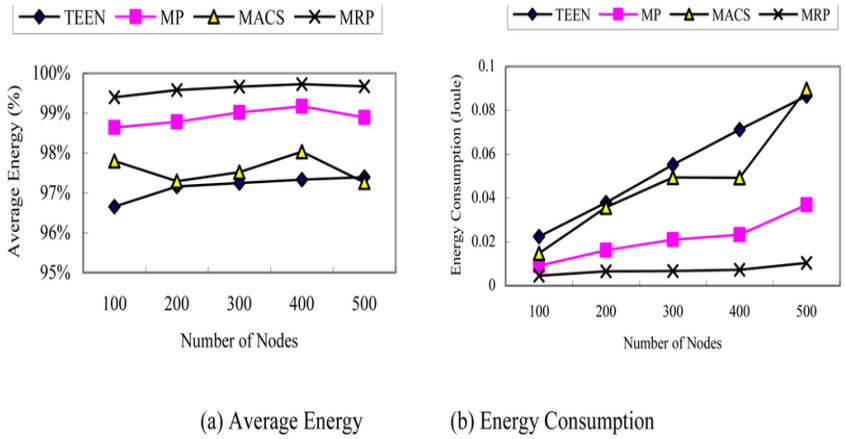


**Fig. 4.** Graphical representation for the average energy and energy consumption in ACO

The main characteristics of this class of algorithms are a general comparison, a stochastic nature, complexity, inherent parallelism, and positive response or outcome. Ants have evolved a highly efficient method of solving the difficult in TSP. Even the Ant Colony Optimization can be applied to many other NP-complete and unsolvable problems. The ant colony optimization algorithm (ACO) is a probabilistic technique for solving computational problems which can be reduced to finding good paths through graphs.

Several ways are there to extract the content but ant colony optimization is an optimized way of solving a large cluster. The overall webpage and the suggested websites mainly consist of large amount of web data so all the HTML tags are categorized or gathered or grouped under a several clusters [8].

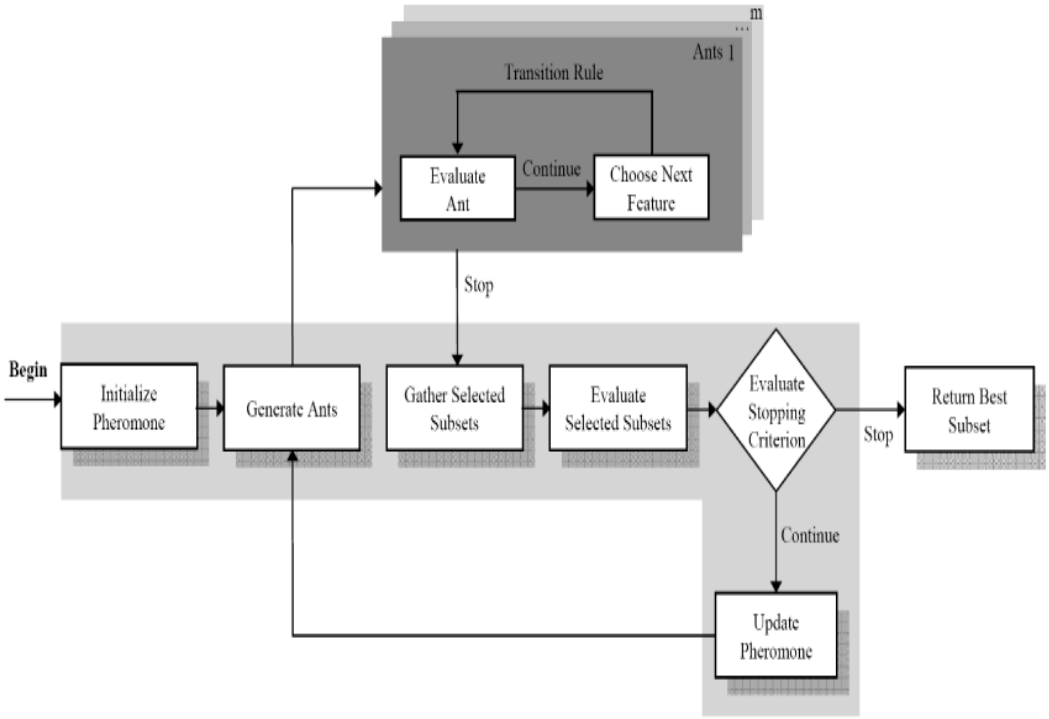


**Fig. 5.** Systematic control of ant colony optimization

And those clusters are maintained in the form of trinity pattern. Such patterns are presented in clustering way so that the value or the results are examined in the proposal of ACO. Initially ACO are applied in the prototype that the simple trinitized patterns are encrypted and then clustering pattern is identified. Initially the website pattern or structures are recognized then simultaneously the corresponding clusters are recognized. The collection of clusters is obtained with the prefix suffix and the separator. The ant colony technique is applied and in it operates in each and every obtained cluster. And finally by the specified algorithm will generate the optimized result for the mentioned problem [10]. The optimized result will be produced with the minimized product with the comparison of all the content which is available in that website and depicts the ultimate product with the optimized expose of data to the required users. Therefore ant colony optimization is an efficient way or method or technique in order to solve all types of NP-complete problems in order to get the optimized outcomes.

## V. Conclusion

In this proposed system fuzzy logic is designed for a multi perspective crawling mechanism in multiple websites. Genetic algorithm defined for multiple websites and load into the trinity structure has an automated process to remove unwanted stuffs of extraction. A multi perspective crawling mechanism in fetching the information from Admin defined multiple websites. An effective Trinity structure defining from multiple websites and load into the system[10]. After fetching the website structure an automated stemming process to remove unwanted stuffs surrounding the conceptual data is removed. After fetching the data from a website an automatic manipulation is processed and the data will be formatted based on users requirement and a comparative analysis followed by an Ant colony algorithm technique to suggest an optimized cost effective best solution for the buyers.It also over comes the NP-complete problem and so achieves accurate data [11]. Finally an "Ant colony optimization" algorithm is used to obtain effective structure.

## VI. Future Enhancement

In future the proposed system can be enhanced by giving the web content in comparison way and then it can be displayed by 3-dimensional images of the product with the extracted web content. Time computation can be reduced and cost of production can be decreased. Algorithm are used in less usage in order reduce the space and it results in efficient way of extracting the multiple web content from multiple crawled web pages.

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