Inquisition the Prospect of Ranking Cloud Service Provider using Distinctive Algorithms

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Abstract: Selecting services in cloud computing platform varies in several ways, where in fact the service quality is assessed by the cloud customer part and the negotiation issues was forwarded by CSB to avail the utmost throughput. The initiation to start CSB pivot role shows that CSB was characterized as the intermediation of services between CC and CSP. This research work incorporates with three participants CC, CSP, CSB, presents the scenario of supporting ranking viewpoint of CSP by CSB as the CC was associated with his regular attached work. The successful implementations of three algorithms are being used for ranking are grey method implementing strategy, back propagation methodology and pivot attribute selection with selective user condition methodology. We derive above three algorithms on rank of CSP with an execution and result focused procedure. Many rank methods was produced from statistical methodologies but almost all of them are impractical and novelty. Our effect oriented procedure display in striking the goals of calculating CSP ranking in cloud computing platform

Keywords: Cloud Computing, CSB prioritization, Service distribution, Ranking algorithms, Grey ranking and back propagation approach

I. INTRODUCTION

The computing system invokes in the analysis of several service delivery models, which effects in the incrimination of cloud computing architectures. Many acceptances by the cloud consumer gets the services from the CSP side are created with many baseline concepts as elasticity of services, coordinal relationship with the management and customer and resource of information planning.

The service level commitments between consumer and CSP was determined and tagged with SLA’s to triumph over the miss conceptions of services. A recognized more demands from client were forwarded to the provider by making use of resource and decision making CSB. The SLA life pattern was incorporated to create an objective management for the prediction of services support towards the client. The constraints require in ranking of CSP continues to be unjustifiable to hundred percent because of the dynamic variation in the cloud market.

II. LITERATURE SURVEY

CONCLUSION

The doubt in the information collection causes many troubles in figuring out corrective decision making. The applicability of grey analysis emphasizes the product quality and performance methodology in the service sector, where in fact the doubt can be sliced up somewhat. The need for grey system was possible and effective weighed against the traditional ways of ranking. A relational level was determined for the given group of attributes of CSP’s gives the dissimilarities between traits and their affects. This statistical method can closely used for ranking of CSP for our problem. [1]

Many uncertain problems can be fixed by neural networks for decision making. The initialization of these methodologies was successful in classification and mining of data in several layers involved with neural networks. A supervised learning strategy in neural systems was embossed with back propagation algorithm for the analysis of uncertain conditions in results display.

The structure of neural systems was biologically framed with soma, axon, synapse, and dendrite. These elements have functionalities in having of signals with related to the human mind activities.
The technique of back propagation algorithm constituted with at least three layers input layer, hidden layer, and output layer. The problem size is explored by basing on different nodes used for learning. The idea of arranging weights in neural network, supervised learning deploys the required end result from the determined output. An activation function was computed in the hidden layer to keep the non-linearity where in fact the weights are changed to acquire the targeted required output. [2]

Pivot attribute computation ranking be a new strategy that was based on basic line beliefs of Garrett’s rank procedure. The Garrett rating technique establishes the influencing factor and these influencing factors are percent and modulated with results. The most important pivot attribute in distinguishing of responded CSP was examined with Garrett rank with the formulation by position the respondent service provider attributes and the number of attributes raked. Garrett ranking strategy was generally used at medical stream for locating the abnormalities within an unstable ambiguity situation. [3]

III. PROBLEM FORMULATION

From the above literature ranking of CSP is a targeted problem and this targeted problem was aimed with list of service providers and each of them distribute their service offerings are availability, reliability, cost and response time. These are the preliminary service offering attributes of CSP to discuss about the quality of service in cloud computing platform by cloud client. The pivot role of CSB is that to intermediate the services between cloud client and service provider which enhances the service utilization and cost benefit approach towards client and provider. To get an optimal solution, the CSB assign weights for the CSP offered attributes are availability (0.306), reliability (0.26), cost (0.197) and response time (0.231). I had choose c language compiler for calculation in support of inquisition the prospect of ranking Cloud Service Provider using distinctive algorithms. At the positive side C is a compiler oriented language having variety of data types, operators and functions, which necessarily supports to this framework. As the programming code is too longer, we supposed to show the screenshots for the source code output.

Screenshot. 1 (Frame work developed in C language)

The first screenshot exhibit with three options 1) taking the input of cloud service provider’s data 2) implementing cloud service providers data with provided distinctive algorithms and the option 3) exit from our framework system. When the option in the first screenshot was given as 1, it opens module 1 (screenshot 2) is enabled for taking input text of Cloud Service Provider data with five attributes entering CSP ID, response time, cost, availability and reliability. Here there is a specific option entering the data or exit

Screenshot. 2 (Module 1 Entering of data)

The screenshot 3 exhibits the list of potential Service Provider which was input in the Screenshot 2. The list of Service Providers is stored in text file as inp.txt.

Screenshot. 3 (List of Service Providers)

Before introspecting with proposed listing to algorithms, I planned to depict a pictograph basing on the input of list of cloud service providers.
factor is provided by the XCSP023 and the lowest availability was provided by ACSP001 CSP.

In the same way the graph 2 shows the variation between response time and cost. The highest response time provider is ACSP001 and the lowest response time provider is BCSP001 among different CSP’s. The highest cost exhibitor is DCSP004 and the lowest is LCSP012.

IV. IMPLEMENTATION OF THE PROBLEM FORMULATION

The implementation of our problem formulation was enabled by our C program which supports for this framework seen in Screenshot 4 as module 2. This frame consists of options which we may choose the application of the following algorithms. The implementation of these algorithms takes the input file inp.txt.

Screenshot. 4 (Module 2 choice of algorithms)

Inquisition the prospect of Ranking Cloud Service Provider (CSP)

Module 2: Implement (CSP) data with algorithms

1. Grey approach
2. Back propagation Technique
3. Garrett method
4. Exit

Enter the Option for Implement (1, 2, 3, and 4)

Grey Approach: This approach analyse the influence factors of attributes which are offered by CSB. The involvement of the Grey system undertake many process as generation, modelling, predicting, decision making and analysing the relational variability. The system was formulated with two factors benefit and deflect factor. Where the benefit factor is formulated as

$$X_i^b(k) = X_i(k) - \text{min} X_i(k)$$

$$\text{max} X_i(k) - \text{min} X_i(k)$$

Where $X_i^b(k)$ is represented as service provider’s cost offered

min $X_i(k)$ represents the minimum cost from the list of the service providers

max $X_i(k)$ represents the maximum cost from the list of the service providers

deflect factor is formulated as

$$X_i^d(k) = \frac{\text{max} X_i(k) - X_i(k)}{\text{max} X_i(k) - \text{min} X_i(k)}$$
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$X_i(k)$ represents the service providers offered response time max $X_i(k)$ represents the maximum response time value from the service providers list
min $X_i(k)$ represents the minimum response time value from the service provider list.

The below Screenshot 5 exhibits the calculation of Grey approach with benefit factor, deflect factor and the total of both

**Screenshot. 5 (Grey approach results)**

![Screenshot 5](image)

**Back Propagation approach:** The utility of neural networks solves many problems in decision making. The list of service providers are supervised with back propagation algorithm, where the service providers are tuned with CSB weights which is pass on to the network for calculated output and back propagated to get the desired output with the following formulas

$$X_i = \sum_{i=1}^{n} w_i a_i$$

$w_i$ represents the weight of each offered attribute of CSB.
$a_i$ represents normalized attribute value.

A sigmoid function is calculated from the above formula and an error value if calculated with the following formulas

$$E = \frac{1}{2} \sum (y_i - d_i)^2$$

Where $y_i$ is the actual output and $d_i$ is the desired output. From the above a back propagation formula was represented as error rate $E$.

$$E = \frac{1}{2} \sum (y_i - x_i)^2$$

The below Screenshot 6 exhibits the calculation of Back Propagation approach, by choosing the actual output, desired output and error occurrence rate.

**Screenshot. 6 (Back Propagation results)**

![Screenshot 6](image)

The advantage of this algorithm shows the accurate values in negative side, where as this algorithm is a time consuming process as the rearranging of weights to the network for the desired output is a hurdle some. This algorithm cannot go for non-linearity approach whereas, we can also refine the result of $E$ to further more process with mathematical formulas

**Garrett’s Approach:** This approach initiates the priority given by the CSB and converted into the formula for the elevation of ranking to service providers. The base line of this formula was acquired from Garrett's ranking and utilized in ranking of service provider.

Here the CSB calculates the percent position of service provider which is cross examined with Garrett’s table.100 or any value less than it $(U_i)$ user integer value on utility driven attributes from the list.

The formula is $CSB$ on SP = $U_i(R_{ij} - 0.5) / N_j$ Where $R_{ij}$ is rank given for the ith variable of CSB’s jth respondent
Where $N_j$ is the n.o of CSB ranked variable to the jth respondent.

The formula was oriented on the list of service providers, where the maximum value is taken as 99.9 and ranked as one, as it is in the Garrett’s table. The second highest value of calculated table was taken and compare to the Garrett’s table and assign the rank as two and so on for the whole service provider list. The prioritization of attribute ranking which is a base line from Garrett techniques, where the results are obtained as shown in the screen shot below. The pivot role of CSB is that where the CSP offered Cost driven attributes are ranked ie., Cost and Response time as in screen shot below. The cost and response time attributes are tuned with the formula to obtain the final output $U_i$. The highest value of $U_i$ is ranked as one and so on.

The below Screenshot exhibit the idea on calculation, here the highest cost Cloud Service Provider exhibitor was incorporated with highest value and the lowest response time was prioritized with the lowest value. Finally $U_i$ value was calculated by basing on the formula

**Screen Shot. 7 (Garrett approach results)**

<table>
<thead>
<tr>
<th>CSP-Id</th>
<th>Cost Rank</th>
<th>Response Time Rank</th>
<th>N.o of attributes Rank</th>
<th>$U_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACSP001</td>
<td>6</td>
<td>5</td>
<td>0.9185</td>
<td>91.84908</td>
</tr>
<tr>
<td>BCSP002</td>
<td>23</td>
<td>1</td>
<td>2.131</td>
<td>213.0979</td>
</tr>
<tr>
<td>CCSP003</td>
<td>2</td>
<td>2</td>
<td>0.178</td>
<td>17.79862</td>
</tr>
<tr>
<td>DCSP004</td>
<td>24</td>
<td>2</td>
<td>2.346</td>
<td>234.4977</td>
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<tr>
<td>ECSP005</td>
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<td>3</td>
<td>0.4905</td>
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</tr>
<tr>
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<td>10</td>
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<tr>
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<tr>
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<td>LCSP012</td>
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<td>NCSP014</td>
<td>3</td>
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<td>XCSP024</td>
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<td>188.6461</td>
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</table>

**V. DEPICTION OF ABOVE ALGORITHMS RESULTS IN GRAPHS**

**Graph. 3 Depicts the Grey Approach**

**Graph. 4 Depicts the Back Propogation Technique**
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Graph 5 Depicts the Garrett’s method

Our Framework is very much supported for acquiring results by basing on proposed algorithms. Each algorithm output values are picture in graph for clear and standing to justify the title of the paper. The graph 3 represent grey approach, where the list of cloud service providers are toss with deflect factor and Benefit factor on the provided input attributes. The total value is showing least to the CCSP003 and highest to the GCSP007. The graph 4 represents back propagation approach, where the list of service providers are attached to the network for learning for finding the actual output and error rate of it. The Redline shows the error rate and the blue line shows the actual output. The Graph 5 represents Garrett method where fully concentrated on the specific attributes which gives more variations are cost and response time. The final value of euro is calculated where GCSP007 has the highest value and ACSP001 considering as the lowest.

VI. CONCLUSION

The situation of uncertainty lies in justification of service providers was really a daunting problem. A quantitative analysis with grey approach, supervised learning with back propagation approach and prioritizing attributes with cross reference to the Garret’s table was deployed in our paper. The above implementation method provides accurate and subjective data for solving this kind of specific problem in discrete situation at cloud computing platform. The above methods are implemented with mathematical formulas and values are tabulated. Based on this research paper the future scope ranking of CSB can also be carried by using meta-heuristic algorithms or by non linear equation using game theory. In the next coming article i want to take a research base paper on ranking of the CSP’s and implement with these and some other algorithms in comparative way.

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