





and out links to that link of page. The algorithm also considers the number of time the user visits the in links of any webpages. It is also include normalization in page rank algorithm.

The  $W_{(v,u)}^{in}$  and  $W_{(v,u)}^{out}$  are used to record the popularity (weight) of the in links and out links based on the in links and out links of that link. The mathematical equation of weight are given as follows.

$$W_{(v,u)}^{in} = \frac{I_u}{\sum_{p=R(v)} I_p} \quad (a)$$

$$W_{(v,u)}^{out} = \frac{O_u}{\sum_{p=R(v)} O_p} \quad (b)$$

The value of this equation is used for calculating PR.

The equation for the proposed algorithm is as follows.

$$PR(u) = (1 - d) + d \sum_{v \in B(u)} \frac{(V_u * x * W_{(v,u)}^{in} + y * W_{(v,u)}^{out}) PR(v)}{TL(v)} \quad (1)$$

Where PR(u) and PR(v) are ranking of the web pages u and v respectively, d is the dampening factor,  $V_u$  is the number of visits of link which points from v to u, TL(v) is the total number of visits of all links present on v, B(u) are the pages which points to webpage u,  $W_{(v,u)}^{in}$  is the weight of inlinks of connecting page v and u,  $W_{(v,u)}^{out}$  is the weight of out links of connecting page v and u.

Algorithm: how actually page rank works as follows.

**Step 1:** Take the link structure of the retrieved webpages from crawler.

**Step 2:** Obtain the webgraph from the link structure of the retrieved webpages.

**Step 3:** Assign 1 as initial ranking to all the webpages.

**Step 4:** Calculate the weights of inlinks and outlinks using equation (a) and (b).

**Step 5:** Apply the proposed algorithm as in the equation (1).

**Step 6:** Calculate mean value of all page rank by following formula:

Summation of page rank of all webpages / number of webpages

**Step 7:** Then Normalize the page rank of each page.

Norm PR(u) = PR(u) / mean value

Where norm PR(u) is Normalized page rank of page u and PR(u) is page rank of page u.

**Step 8:** Assign PR(u) = Norm(u).

**Step 9:** Iteratively repeat process until ranks of all webpages are stable i.e. same in two consecutive iteration.

This algorithm reduce the problem of theme drift which is present on every link structure based algorithms. This results retrieved are efficient and relevant as per user's query.

## 4. Experimental Analysis

For experimental purpose, we have taken four pages in our database which are crawled by crawler and the figure shows the web graph and links among the four web pages:

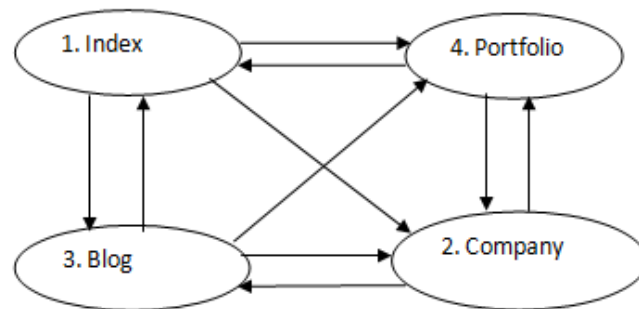


Figure 2: Sample Web Graph

We have applied original pagerank algorithm and our proposed algorithm on this web graph and search one sentence. All four pages are retrieved in search results but according to algorithms the rank value of each page is different and hence the page which is top of the search results by original pagerank algorithm is different by proposed algorithm which is shown in below table:

Table 1: Comparison between the rank values by original pagerank and our proposed algorithm

Id	Webpages	Pagerank Algorithm	Our Proposed algorithm
1	Index	1.1239	0.1680
2	Company	0.8758	0.3586
3	Blog	1.1239	0.1619
4	Portfolio	0.8758	0.2155

## 5. Conclusion

In this paper we have analyzed various pageranking algorithms for getting efficient and relevant search results as per user's query. We have implemented basic pagerank algorithm. Then we have understood that the algorithms have the main challenge of theme drift. In our proposed algorithm we use web structure mining and Normalization Technique for calculating pagerank values of webpages. After comparing of algorithms we conclude that the our proposed pagerank algorithm provides the better results than the standard page ranking algorithm in terms of the better relevancy and ranking based on the non visited webpages on the basis of the outlink and provides more efficient and relevant search results as per user's query than original pagerank algorithm because when we will get maximum comparison strings in one webpage as per query by user and we will get best relevant results as per user's query.

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