WEB MINING LAB

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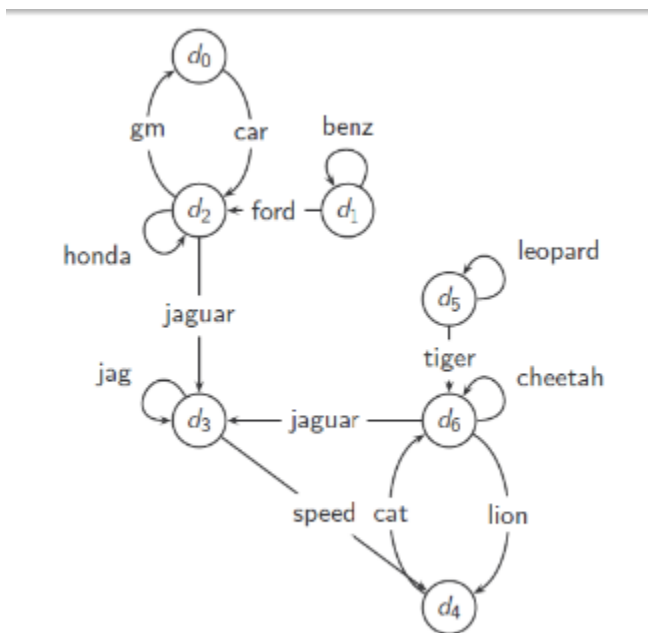LAB6
DATE: 28TH SEPT 2021

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Aim: To implement and understand page rank algo

1. Form the adjacency graph of this **IGNORING SELF LOOPS with the following principles**

a. **dx-dy entry is 1 if there is a link**

b. **dx-dy entry is 0 if there is no link**

c. Calculate the Page rank using the Page rank algorithm for this graph **IGNORING SELF LOOPS** by writing a program in python. Perform 25 iterations and print out the final values of Page rank for all nodes.

Code:

```python
def calculate_PageRank(outlinks):
    d = 0.85
    size = len(outlinks[0])
    page_ranks = [1/size for i in range(size)]
    out_degrees = []
    for i in range(size):
        sums = 0
        for j in range(size):
            sums += outlinks[j][i]
        out_degrees.append(sums)


    print('Initial page ranks:')
    print(page_ranks)

    for _ in range(25):
        dup = page_ranks[:]
        for i in range(size):
            temp = 0
            for j in range(size):
                if outlinks[i][j] == 1:
                    temp += dup[j] / out_degrees[j]
            temp *= d
            temp += (1-d)
            page_ranks[i] = round(temp, 2)

    return page_ranks

outlinks=[[0,0,1,0,0,0,0],
          [0,0,0,0,0,0,0],
          [1,1,0,0,0,0,0],
          [0,0,1,0,0,0,1],
          [0,0,0,1,0,0,1],
          [0,0,0,0,0,0,0],
          [0,0,0,0,1,1,0]]


page_ranks = calculate_PageRank(outlinks)
print()
print('The converged page rank is:')
print(page_ranks)
print()
sums = 0
for i in page_ranks:
    sums += i
print('The sum of page ranks is: ', round(sums, 2))
```

OutPut:

```
Initial page ranks:
[0.14, 0.14, 0.14, 0.14, 0.14, 0.14, 0.14]

The converged page rank is:
[0.42, 0.15, 0.63, 1.3, 2.14, 0.15, 2.09]

The sum of page ranks is:  6.88
(venv) apple@Apples-MacBook-Pro lab1 %
```

2 Form the adjacency graph of this INCLUDING SELF LOOPS with the following principles.

a.dx-dy entry is 1 if there is a link

b.dx-dy entry is 0 if there is no link

c.Calculate the Page rank using the page rank algorithm for this graph **INCLUDING SELF LOOPS** by writing a program in python**.** Perform 25 iterations and print out the final values of Page rank for all nodes.

Same code changing adj matrix:

```
Initial page ranks:
[0.14, 0.14, 0.14, 0.14, 0.14, 0.14, 0.14]

The converged page rank is:
[0.38, 0.26, 0.81, 1.67, 1.44, 0.26, 2.06]

The sum of page ranks is:  6.88
(venv) apple@Apples-MacBook-Pro lab1 %
```

	d_0	d_1	d_2	d_3	d_4	d_5	d_6
d_0	0	0	1	0	0	0	0
d_1	0	1	1	0	0	0	0
d_2	1	0	1	2	0	0	0
d_3	0	0	0	1	1	0	0
d_4	0	0	0	0	0	0	1
d_5	0	0	0	0	0	1	1
d_6	0	0	0	2	1	0	1

3. Calculate the Page rank score for this graph **INCLUDING SELF LOOPS** by writing a program in python. Perform 25 iterations and print out the final values of Hub score and authority score for all nodes.

iii)Changing adj matrix

```
Initial page ranks:
[0.14, 0.14, 0.14, 0.14, 0.14, 0.14, 0.14]

The converged page rank is:
[0.31, 2.03, 0.57, 0.31, 0.25, 1.65, 0.36]

The sum of page ranks is:  5.48
(venv) apple@Apples-MacBook-Pro lab1 %
```

ISRO moon water mars DRDO Missile figher IAF

                 1   1

HAL manufactured JAGUAR fighter planes for IAF in India. Doc-9 MIRAGE 2000 is a fighter plane bought by IAF from France.