Solution to Homework 4(CS 422)

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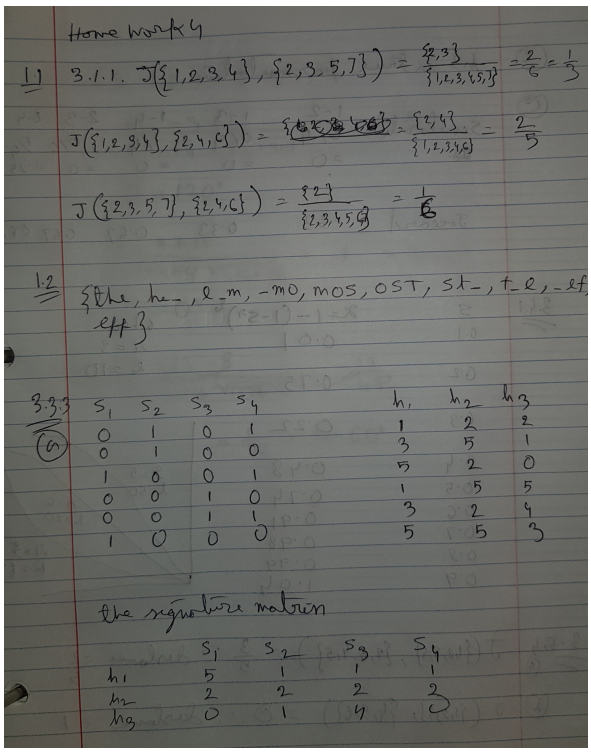


Home work 4

1) 3.1.1. $J(\{1,2,3,4\},\{2,3,5,7\}) = \frac{\{2,3\}}{\{1,2,3,4,5,7\}} = \frac{2}{6} = \frac{1}{3}$

$J(\{1,2,3,4\},\{2,4,6\}) = \frac{\{2,4\}}{\{1,2,3,4,6\}} = \frac{2}{5}$

$J(\{2,3,5,7\},\{2,4,6\}) = \frac{\{2\}}{\{2,3,4,5,6,7\}} = \frac{1}{6}$

1.2 {the, he_, e_m, _mo, mos, OST, st_, t_e, _ef, eff}

3.3.3 (a)

S_1	S_2	S_3	S_4
0	1	0	1
0	1	0	0
1	0	0	1
0	0	1	0
0	0	1	1
1	0	0	0

h_1	h_2	h_3
1	2	2
3	5	1
5	2	0
1	5	5
3	2	4
5	5	3

the signature matrix

	S_1	S_2	S_3	S_4
h_1	5	1	1	1
h_2	2	2	2	2
h_3	0	1	4	0

(a) h3 is true permutation

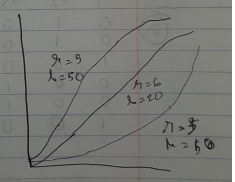
(c)

	1-2	1-3	1-4	2-3	2-4	3-4
Similarity	0/4	0/4	1/4	0/6	1/4	1/4
	=0	=0	=0	=0	=.25	=.25
Jaccard	.33	0.33	0.67	0.67	0.67	0.67

3.4.1

s	$x = 1-(1-s^r)^b$
0.1	0.01
0.2	0.75
0.3	0.22
0.4	0.48
0.5	0.74
0.6	0.91
0.7	0.98
0.8	0.99
0.9	1.04

when
$r = 3$
$b = 10$



3.5.4 (a) $J(\{1,2,3,4\}, \{2,3,4,5\}) = \frac{3}{5}$ ∴ distance $= \frac{2}{5}$

(b) $J(\{1,2,3\}, \{4,5,6\}) = 0$ ∴ distance $= 1$

3.5.5 (a) $(3,-1,2) \propto (-2,3,1)$

$$= \frac{-6-3+2}{\sqrt{9+1+4} \times \sqrt{4+9+1}} = -0.5$$

$\therefore \theta = 120°$

(b) $$\frac{2+8+18}{\sqrt{1+4+9}\,\sqrt{4+6+36}} = 1 = \cos 0°$$

$\theta = 0°$

(c) $$\cancel{\frac{0.5+0-8}{\sqrt{25+0+16}\,\sqrt{1+36+4}} = \frac{-13}{49}}$$

(d) $$\frac{1}{\sqrt{4}} = \frac{1}{2} = \cos 60°$$

$\theta = 60°$