

Contemporary Data Processing Technology (CCOD)

Lab 10 (October 28, 2016)

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In this work I took the 10 Russian letters: **с, а, ч, ц, ш, л, р, ф, о, ю.**

$$\alpha = 0.5$$

Table of similarity percentage of letters

R0:

	с	а	ч	ц	ш	л	р	ф	о	ю
с	1	0.8	0.1	0.1	0.1	0.1	0.4	0.3	0.9	0.3
а	0.8	1	0.1	0.1	0.1	0.2	0.4	0.4	0.8	0.4
ч	0.1	0.1	1	0.5	0.5	0.2	0.1	0.1	0.1	0.1
ц	0.1	0.1	0.5	1	0.7	0.1	0.1	0.1	0.1	0.1
ш	0.1	0.1	0.5	0.7	1	0.1	0.1	0.1	0.1	0.1
л	0.1	0.2	0.2	0.1	0.1	1	0.1	0.1	0.1	0.1
р	0.4	0.4	0.1	0.1	0.1	0.1	1	0.7	0.7	0.6
ф	0.3	0.4	0.1	0.1	0.1	0.1	0.7	1	0.7	0.8
о	0.9	0.8	0.1	0.1	0.1	0.1	0.7	0.7	1	0.7
ю	0.3	0.4	0.1	0.1	0.1	0.1	0.6	0.8	0.7	1

Three steps of modifying this table:

R1:

	с	а	ч	ц	ш	л	р	ф	о	ю
с	1	0.8	0.1	0.1	0.1	0.2	0.7	0.7	0.9	0.7
а	0.8	1	0.2	0.1	0.1	0.2	0.7	0.7	0.8	0.7
ч	0.1	0.2	1	0.5	0.5	0.2	0.1	0.1	0.1	0.1
ц	0.1	0.1	0.5	1	0.7	0.2	0.1	0.1	0.1	0.1
ш	0.1	0.1	0.5	0.7	1	0.2	0.1	0.1	0.1	0.1
л	0.2	0.2	0.2	0.2	0.2	1	0.2	0.2	0.2	0.2
р	0.7	0.7	0.1	0.1	0.1	0.2	1	0.7	0.7	0.7
ф	0.7	0.7	0.1	0.1	0.1	0.2	0.7	1	0.7	0.8
о	0.9	0.8	0.1	0.1	0.1	0.2	0.7	0.7	1	0.7
ю	0.7	0.7	0.1	0.1	0.1	0.2	0.7	0.8	0.7	1

R2:

	с	а	ч	ц	ш	л	р	ф	о	ю
с	1	0.8	0.2	0.2	0.2	0.2	0.7	0.7	0.9	0.7
а	0.8	1	0.2	0.2	0.2	0.2	0.7	0.7	0.8	0.7
ч	0.2	0.2	1	0.5	0.5	0.2	0.2	0.2	0.2	0.2
ц	0.2	0.2	0.5	1	0.7	0.2	0.2	0.2	0.2	0.2
ш	0.2	0.2	0.5	0.7	1	0.2	0.2	0.2	0.2	0.2
л	0.2	0.2	0.2	0.2	0.2	1	0.2	0.2	0.2	0.2
р	0.7	0.7	0.2	0.2	0.2	0.2	1	0.7	0.7	0.7
ф	0.7	0.7	0.2	0.2	0.2	0.2	0.7	1	0.7	0.8
о	0.9	0.8	0.2	0.2	0.2	0.2	0.7	0.7	1	0.7
ю	0.7	0.7	0.2	0.2	0.2	0.2	0.7	0.8	0.7	1

R3:

	с	а	ч	ц	ш	л	р	ф	о	ю
с	1	0.8	0.2	0.2	0.2	0.2	0.7	0.7	0.9	0.7
а	0.8	1	0.2	0.2	0.2	0.2	0.7	0.7	0.8	0.7
ч	0.2	0.2	1	0.5	0.5	0.2	0.2	0.2	0.2	0.2
ц	0.2	0.2	0.5	1	0.7	0.2	0.2	0.2	0.2	0.2
ш	0.2	0.2	0.5	0.7	1	0.2	0.2	0.2	0.2	0.2
л	0.2	0.2	0.2	0.2	0.2	1	0.2	0.2	0.2	0.2
р	0.7	0.7	0.2	0.2	0.2	0.2	1	0.7	0.7	0.7
ф	0.7	0.7	0.2	0.2	0.2	0.2	0.7	1	0.7	0.8
о	0.9	0.8	0.2	0.2	0.2	0.2	0.7	0.7	1	0.7
ю	0.7	0.7	0.2	0.2	0.2	0.2	0.7	0.8	0.7	1

In the final table, where all values less than α and main diagonal will become zeros.

Final table:

	с	а	ч	ц	ш	л	р	ф	о	ю
с	0	0.8	0	0	0	0	0.7	0.7	0.9	0.7
а	0.8	0	0	0	0	0	0.7	0.7	0.8	0.7
ч	0	0	0	0	0	0	0	0	0	0
ц	0	0	0	0	0.7	0	0	0	0	0
ш	0	0	0	0.7	0	0	0	0	0	0
л	0	0	0	0	0	0	0	0	0	0
р	0.7	0.7	0	0	0	0	0	0.7	0.7	0.7
ф	0.7	0.7	0	0	0	0	0.7	0	0.7	0.8
о	0.9	0.8	0	0	0	0	0.7	0.7	0	0.7
ю	0.7	0.7	0	0	0	0	0.7	0.8	0.7	0

$$1) I = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \quad C_1 = \{\}$$

$$a_{19} = a_{91} = 0.9 \quad C_1 = \{1, 9\}$$

$$Max\ sum_2 \rightarrow C_1 = \{1, 9, 2\}$$

$$Max\ sum_7 \rightarrow C_1 = \{1, 9, 2, 7\}$$

$$Max\ sum_8 \rightarrow C_1 = \{1, 9, 2, 7, 8\}$$

$$Max\ sum_{10} \rightarrow C_1 = \{1, 9, 2, 7, 8, 10\}$$

	с	а	ч	ц	ш	л	р	ф	о	ю
с	0	0.8	0	0	0	0	0.7	0.7	0.9	0.7
а	0.8	0	0	0	0	0	0.7	0.7	0.8	0.7
ч	0	0	0	0	0	0	0	0	0	0
ц	0	0	0	0	0.7	0	0	0	0	0
ш	0	0	0	0.7	0	0	0	0	0	0
л	0	0	0	0	0	0	0	0	0	0
р	0.7	0.7	0	0	0	0	0	0.7	0.7	0.7
ф	0.7	0.7	0	0	0	0	0.7	0	0.7	0.8
о	0.9	0.8	0	0	0	0	0.7	0.7	0	0.7
ю	0.7	0.7	0	0	0	0	0.7	0.8	0.7	0

2) $I = \{3, 4, 5, 6\}$ $C_2 = \{\}$

$a_{54} = a_{45} = 0.7$ $C_2 = \{4, 5\}$

	ч	ц	ш	л
ч	0	0	0	0
ц	0	0	0.7	0
ш	0	0.7	0	0
л	0	0	0	0

3) $I = \{3, 6\}$

	ч	л
ч	0	0
л	0	0

Matrix contain only 0, we can decide that these two letters belong to different classes.

$C_3 = \{3\}$

$C_4 = \{6\}$

$C = \{\{1, 2, 7, 8, 9, 10\}, \{4, 5\}, \{3\}, \{6\}\}$

OR

$C = \{\{с, а, р, ф, о, ю\}, \{ш, ц\}, \{ч\}, \{л\}\}$