Homework2_ReadMe

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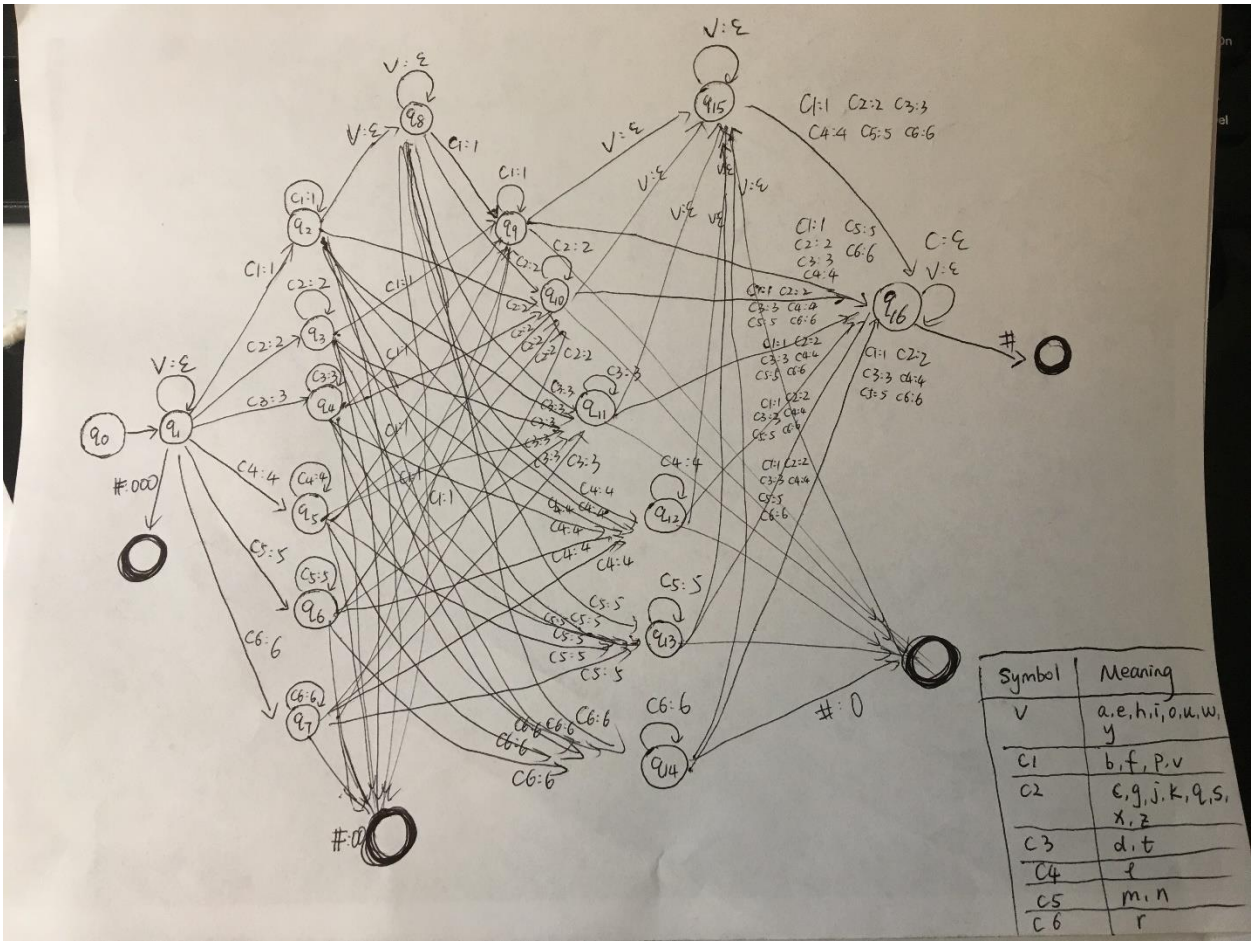
Q1:

Here are some symbols.

Symbol	Meaning
V	a, e, h, i, o, u, w, y
C1	b, f, p, v
C2	c, g, j, k, q, s, x, z
C3	d, t
C4	l
C5	m, n
C6	r



Q2:

The code and result are in the fold named “Q2”

I use perl5 and the operation system is ubuntu14(64 bit)

Running command: chmod 755 letterLangId.pl

./letterLangId.pl

The output is in the file named “BigramLetterLangId.out”

Q3:

The code and result are in the fold named “Q3”

I use perl5 and the operation system is ubuntu14(64 bit)

Running command: chmod 755 BigramWordLangId-AO.pl

./BigramWordLangId-AO.pl

The output is in the file named “BigramWordLangId-AO.out”

Q4:

The code and result are in the fold named “Q4”

I use perl5 and the operation system is ubuntu14(64 bit)

Running command: chmod 755 BigramWordLangId-GT.pl

./BigramWordLangId-GT.pl

The output is in the file named “BigramWordLangId-GT.out”

Q5:

The code and result are in the fold named “Q5”

I use perl5 and the operation system is ubuntu14(64 bit)

Running command: chmod 755 TrigramWordLangId-KBO.pl

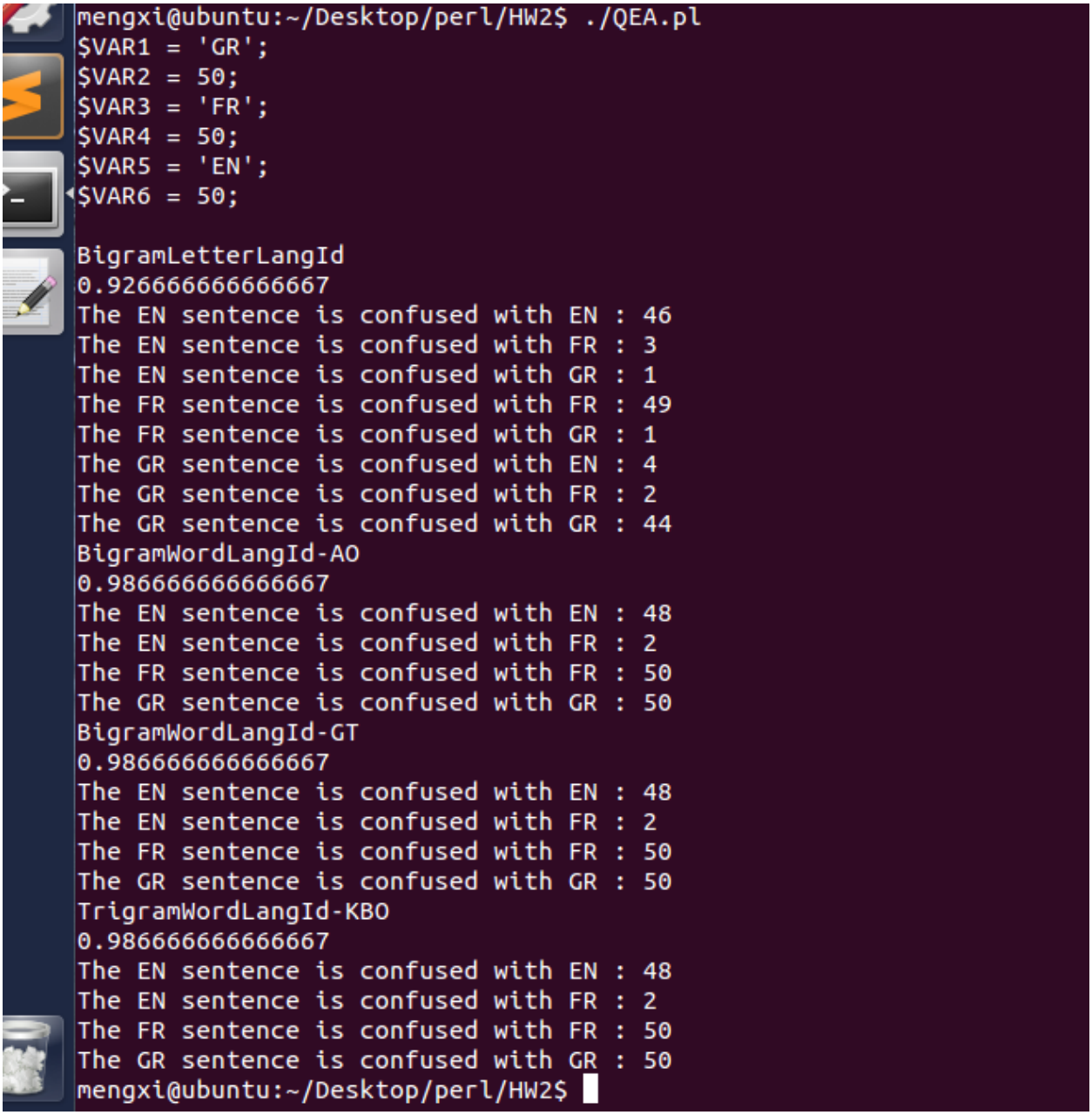
./TrigramWordLangId-KBO.pl

The output is in the file named “TrigramWordLangId-KBO.out”

Q6:

I use the perl5 to do the error analysis and the code in the file named “QEA.pl”. Besides, the operation system is ubuntu14(64 bit).

The result is as follows:



- **Accuracy**

For “BigramLetterLangID”:

The sum of wrong choices is 3 + 1 + 1 + 4 + 2 = 11.

The sum of sentences is 150.

The accuracy is (150 – 11) / 150 = 92.67%, as the result shown in the picture.

For “BigramLetterLangID-AO”:

The sum of wrong choices is 2.

The sum of sentences is 150.

The accuracy is (150 – 11) / 150 = 98.67%, as the result shown in the picture.

For “BigramLetterLangID-GT”:

The sum of wrong choices is 2.

The sum of sentences is 150.

The accuracy is (150 – 11) / 150 = 98.67%, as the result shown in the picture.

For “BigramLetterLangID-KBO”:

The sum of wrong choices is 2.

The sum of sentences is 150.

The accuracy is (150 – 11) / 150 = 98.67%, as the result shown in the picture.

Experimental Condition	**Overall Accuracy %**
BigramLetterLangID	92.67%
BigramLetterLangID-AO	98.67%
BigramLetterLangID-GT	98.67%
BigramLetterLangID-KBO	98.67%

- **Confusion Matrix**

For “BigramLetterLangID”:

In English, the sum of wrong choices is 4.

In French, the sum of wrong choices is 1.

In German, the sum of wrong choices is 6.

There are 3 EN sentences are confused with FR and the percentage is 3 / 4 = 75%.

There is 1 EN sentences are confused with GR and the percentage is 1 / 4 = 25%.

There is 1 FR sentence is confused with GR and the percentage is 1 / 1 = 100%.

There are 4 GR sentences are confused with EN and the percentage is 4 / 6 = 66.7%.

There are 2 GR sentences are confused with FR and the percentage is 2 / 6 = 33.3%.

BigramLetterLangID	**EN**	**FR**	**GR**
EN			66.7%
FR	75%		33.3%
GR	25%	100%	

For “BigramLetterLangID-AO”:

In English, the sum of wrong choices is 2.

There are 2 EN sentences are confused with FR and the percentage is 2 / 2 = 100%.

BigramLetterLangID-AO	EN	FR	GR
EN			
FR	100%		
GR			

For “BigramLetterLangID-GT”:

In English, the sum of wrong choices is 2.

There are 2 EN sentences are confused with FR and the percentage is 2 / 2 = 100%.

BigramLetterLangID-GT	EN	FR	GR
EN			
FR	100%		
GR			

For “BigramLetterLangID-KBO”:

In English, the sum of wrong choices is 2.

There are 2 EN sentences are confused with FR and the percentage is 2 / 2 = 100%.

BigramLetterLangID-KBO	EN	FR	GR
EN			
FR	100%		
GR			

- **Perplexity of Test Set**

Experimental Condition	EN	FR	GR
BigramLetterLangID	3.54186570274e+13	3.29804661082187e+13	4.82475250112298e+13
BigramLetterLangID-AO	3.43170673211e+12	3.99804661082187e+11	3.61999613720754e+11
BigramLetterLangID-GT	3.29600089683e+12	3.86153675671303e+11	3.33842836130829e+11
BigramLetterLangID-KBO	3.23552399825e+12	3.64393851958562e+11	3.28391846554303e+11

Because I use the *log* probability and when comes to a new word in the test, I use add (-999999999) to deal with this situation. Therefore, the perplexity of each experimental condition is very large. These models have a good performance at judging a German sentence.

BigramLetterLangID-AO, BigramLetterLangID-GT and BigramLetterLangID-KBO have a bad performance when comes to judging a sentence is an English sentence.