

CS561 - AI Mid Sem

ASSIGNMENT-2111cs14

Details of vocabulary of words:

Count : 42

['facial', 'hierarchical', 'widely', 'deep', 'researchers', 'using', 'these', 'fr', 'of', 'dl', 'from', 'architecture', 'an', 'have', 'computer', 'learning', 'made', 'tasks', 'and', 'discriminative', 'for', 'benefit', 'been', 'techniques', 'to', 'enormous', 'face', 'used', 'systems', 'the', 'methods', 'years', 'recent', 'vision', 'various', 'proposed', 'in', 'learn', 'representation', 'leap', 'recognition', 'many']

No of occurrences of the words in documents:

Out[301]:

	facial	hierarchical	widely	deep	researchers	using	these	fr	of	dl	...	recent	vision	various	proposed	in	learn	representation	leap	recognition
0	1	0	0	1	1	1	1	1	0	1	...	1	1	1	1	1	0	0	1	1
1	0	1	0	2	0	0	0	1	1	0	...	0	0	0	0	0	1	1	0	0
2	1	0	1	0	0	0	0	0	0	0	...	0	1	0	0	0	0	0	0	1

Computation of Parameters:

Multinomial:

Probability of class DL: 0.6666666666666666

Probability of class CV: 0.3333333333333333

Probability of word :facial in class doc:DL is 0.02

Probability of word :facial in class doc:CV is 0.04

Probability of word :hierarchical in class doc:DL is 0.02

Probability of word :hierarchical in class doc:CV is 0.02

Probability of word :widely in class doc:DL is 0.01

Probability of word :widely in class doc:CV is 0.04

Probability of word :deep in class doc:DL is 0.05

Probability of word :deep in class doc:CV is 0.02

Probability of word :researchers in class doc:DL is 0.02

Probability of word :researchers in class doc:CV is 0.02

Probability of word :using in class doc:DL is 0.02

Probability of word :using in class doc:CV is 0.02

Probability of word :these in class doc:DL is 0.02

Probability of word :these in class doc:CV is 0.02

Probability of word :fr in class doc:DL is 0.03

Probability of word :fr in class doc:CV is 0.02

Probability of word :of in class doc:DL is 0.02

Probability of word :of in class doc:CV is 0.02

Probability of word :dl in class doc:DL is 0.02

Probability of word :dl in class doc:CV is 0.02

Probability of word :from in class doc:DL is 0.02

Probability of word :from in class doc:CV is 0.02

Probability of word :architecture in class doc:DL is 0.02

Probability of word :architecture in class doc:CV is 0.02

Probability of word :an in class doc:DL is 0.02

Probability of word :an in class doc:CV is 0.02

Probability of word :have in class doc:DL is 0.02

Probability of word :have in class doc:CV is 0.04

Probability of word :computer in class doc:DL is 0.02

Probability of word :computer in class doc:CV is 0.04

Probability of word :learning in class doc:DL is 0.03

Probability of word :learning in class doc:CV is 0.02

Probability of word :made in class doc:DL is 0.02
Probability of word :made in class doc:CV is 0.02

Probability of word :tasks in class doc:DL is 0.02
Probability of word :tasks in class doc:CV is 0.02

Probability of word :and in class doc:DL is 0.02
Probability of word :and in class doc:CV is 0.02

Probability of word :discriminative in class doc:DL is 0.02
Probability of word :discriminative in class doc:CV is 0.02

Probability of word :for in class doc:DL is 0.03
Probability of word :for in class doc:CV is 0.04

Probability of word :benefit in class doc:DL is 0.02
Probability of word :benefit in class doc:CV is 0.02

Probability of word :been in class doc:DL is 0.01
Probability of word :been in class doc:CV is 0.04

Probability of word :techniques in class doc:DL is 0.02
Probability of word :techniques in class doc:CV is 0.02

Probability of word :to in class doc:DL is 0.02
Probability of word :to in class doc:CV is 0.02

Probability of word :enormous in class doc:DL is 0.02
Probability of word :enormous in class doc:CV is 0.02

Probability of word :face in class doc:DL is 0.02
Probability of word :face in class doc:CV is 0.02

Probability of word :used in class doc:DL is 0.01
Probability of word :used in class doc:CV is 0.04

Probability of word :systems in class doc:DL is 0.02
Probability of word :systems in class doc:CV is 0.02

Probability of word :the in class doc:DL is 0.03

Probability of word :the in class doc:CV is 0.02

Probability of word :methods in class doc:DL is 0.03

Probability of word :methods in class doc:CV is 0.04

Probability of word :years in class doc:DL is 0.02

Probability of word :years in class doc:CV is 0.02

Probability of word :recent in class doc:DL is 0.02

Probability of word :recent in class doc:CV is 0.02

Probability of word :vision in class doc:DL is 0.02

Probability of word :vision in class doc:CV is 0.04

Probability of word :various in class doc:DL is 0.02

Probability of word :various in class doc:CV is 0.02

Probability of word :proposed in class doc:DL is 0.02

Probability of word :proposed in class doc:CV is 0.02

Probability of word :in in class doc:DL is 0.02

Probability of word :in in class doc:CV is 0.02

Probability of word :learn in class doc:DL is 0.02

Probability of word :learn in class doc:CV is 0.02

Probability of word :representation in class doc:DL is 0.02

Probability of word :representation in class doc:CV is 0.02

Probability of word :leap in class doc:DL is 0.02

Probability of word :leap in class doc:CV is 0.02

Probability of word :recognition in class doc:DL is 0.02

Probability of word :recognition in class doc:CV is 0.04

Probability of word :many in class doc:DL is 0.02

Probability of word :many in class doc:CV is 0.02

Multinomial Model:

Probability of document belonging to CV class: 3.495253333333334e-15

Probability of document belonging to DL class: 2.88e-17

Doc	predicted_multinomial
0 Deep learning based computer vision methods ha...	CV

Multivariate:

Probability of class DL: 0.6666666666666666

Probability of class CV: 0.3333333333333333

Probability of word :facial in class doc:DL is 0.5

Probability of word :facial in class doc:DL is 0.67

Probability of word :hierarchical in class doc:DL is 0.5

Probability of word :hierarchical in class doc:DL is 0.33

Probability of word :widely in class doc:DL is 0.25

Probability of word :widely in class doc:DL is 0.67

Probability of word :deep in class doc:DL is 0.75

Probability of word :deep in class doc:DL is 0.33

Probability of word :researchers in class doc:DL is 0.5

Probability of word :researchers in class doc:DL is 0.33

Probability of word :using in class doc:DL is 0.5

Probability of word :using in class doc:DL is 0.33

Probability of word :these in class doc:DL is 0.5

Probability of word :these in class doc:DL is 0.33

Probability of word :fr in class doc:DL is 0.75

Probability of word :fr in class doc:DL is 0.33

Probability of word :of in class doc:DL is 0.5

Probability of word :of in class doc:DL is 0.33

Probability of word :dl in class doc:DL is 0.5

Probability of word :dl in class doc:DL is 0.33

Probability of word :from in class doc:DL is 0.5

Probability of word :from in class doc:DL is 0.33

Probability of word :architecture in class doc:DL is 0.5

Probability of word :architecture in class doc:DL is 0.33

Probability of word :an in class doc:DL is 0.5

Probability of word :an in class doc:DL is 0.33

Probability of word :have in class doc:DL is 0.5

Probability of word :have in class doc:DL is 0.67

Probability of word :computer in class doc:DL is 0.5

Probability of word :computer in class doc:DL is 0.67

Probability of word :learning in class doc:DL is 0.75

Probability of word :learning in class doc:DL is 0.33

Probability of word :made in class doc:DL is 0.5

Probability of word :made in class doc:DL is 0.33

Probability of word :tasks in class doc:DL is 0.5

Probability of word :tasks in class doc:DL is 0.33

Probability of word :and in class doc:DL is 0.5

Probability of word :and in class doc:DL is 0.33

Probability of word :discriminative in class doc:DL is 0.5

Probability of word :discriminative in class doc:DL is 0.33

Probability of word :for in class doc:DL is 0.5
Probability of word :for in class doc:DL is 0.67

Probability of word :benefit in class doc:DL is 0.5
Probability of word :benefit in class doc:DL is 0.33

Probability of word :been in class doc:DL is 0.25
Probability of word :been in class doc:DL is 0.67

Probability of word :techniques in class doc:DL is 0.5
Probability of word :techniques in class doc:DL is 0.33

Probability of word :to in class doc:DL is 0.5
Probability of word :to in class doc:DL is 0.33

Probability of word :enormous in class doc:DL is 0.5
Probability of word :enormous in class doc:DL is 0.33

Probability of word :face in class doc:DL is 0.5
Probability of word :face in class doc:DL is 0.33

Probability of word :used in class doc:DL is 0.25
Probability of word :used in class doc:DL is 0.67

Probability of word :systems in class doc:DL is 0.5
Probability of word :systems in class doc:DL is 0.33
Probability of word :the in class doc:DL is 0.5
Probability of word :the in class doc:DL is 0.33

Probability of word :methods in class doc:DL is 0.75
Probability of word :methods in class doc:DL is 0.67

Probability of word :years in class doc:DL is 0.5
Probability of word :years in class doc:DL is 0.33

Probability of word :recent in class doc:DL is 0.5
Probability of word :recent in class doc:DL is 0.33

Probability of word :vision in class doc:DL is 0.5

Probability of word :vision in class doc:DL is 0.67

Probability of word :various in class doc:DL is 0.5

Probability of word :various in class doc:DL is 0.33

Probability of word :proposed in class doc:DL is 0.5

Probability of word :proposed in class doc:DL is 0.33

Probability of word :in in class doc:DL is 0.5

Probability of word :in in class doc:DL is 0.33

Probability of word :learn in class doc:DL is 0.5

Probability of word :learn in class doc:DL is 0.33

Probability of word :representation in class doc:DL is 0.5

Probability of word :representation in class doc:DL is 0.33

Probability of word :leap in class doc:DL is 0.5

Probability of word :leap in class doc:DL is 0.33

Probability of word :recognition in class doc:DL is 0.5

Probability of word :recognition in class doc:DL is 0.67

Probability of word :many in class doc:DL is 0.5

Probability of word :many in class doc:DL is 0.33

Multivariate Model:

Probability of document belonging to CV class: 1.9739578287322718e-07

Probability of document belonging to DL class: 9.592326932761353e-12

Multinomial Time: 0.08836579322814941

Out[312]:

	Doc	predicted_multinomial	predicted_multivariant	predicted_multivariate
0	Deep learning based computer vision methods ha...	CV	CV	CV

Discussion between multinomial and multivariate:

In this exercise, we have a small number of documents so multivariate performs better than multinomial.

Empirical comparisons provide evidence that the multinomial model tends to outperform the multi-variate Bernoulli model if the vocabulary size is relatively large.

If we consider the efficiency of performance then multinomial is better as this model considers the occurrences of a word other than simply presence of word in a document in case of multivariate.