

NBC:

	class	document
0	spam	free,online,!!!,results,free
1	ham	results,repository,online,deadline,!!!
2	spam	!!!,online,paper,free,!!!,paper
3	spam	!!!,conference,registration,online,!!!,deadline
4	spam	free,call,free,registration,online
5	ham	conference,call,paper,registration,conference
6	ham	submission,deadline,conference,paper,call,dead...

16

22

38

	word	ham	spam
0	results	0.074074	0.060606
1	repository	0.074074	0.030303
2	online	0.074074	0.151515
3	deadline	0.148148	0.060606
4	!!!	0.074074	0.181818
5	conference	0.148148	0.060606
6	call	0.111111	0.060606
7	paper	0.111111	0.090909
8	registration	0.074074	0.090909
9	submission	0.074074	0.030303
10	free	0.037037	0.181818

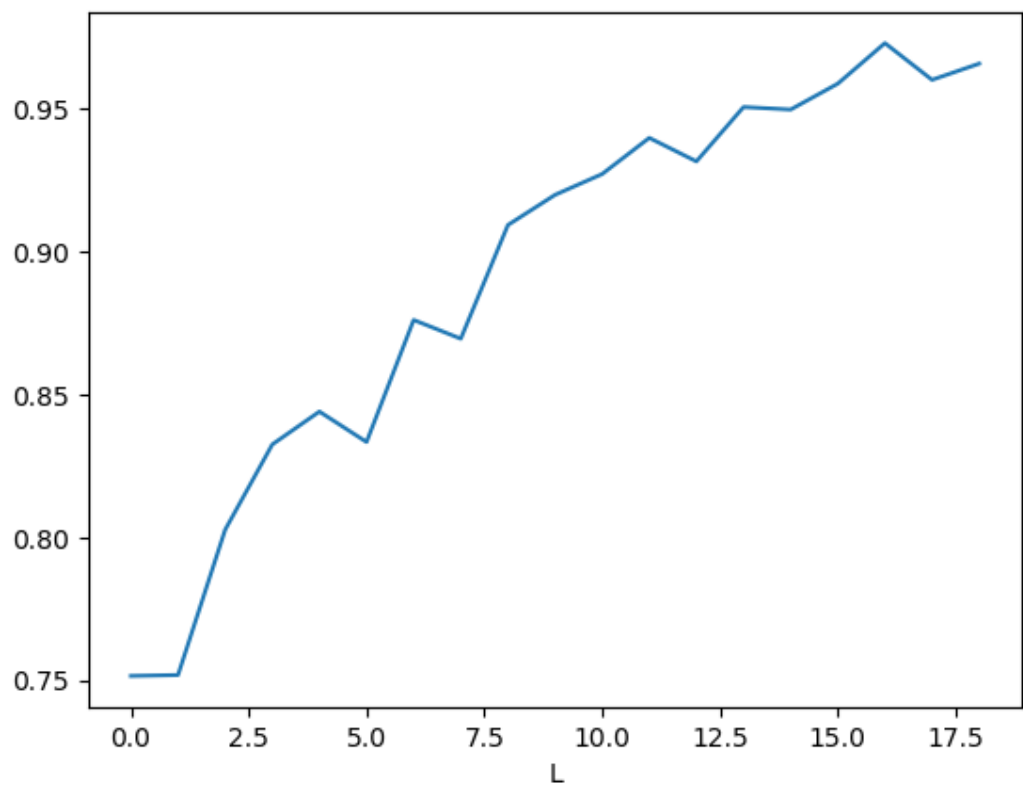
1.0

1.0

	doc	hamprob
0	free,online,!!!,results,free	0.026791
1	results,repository,online,deadline,!!!	0.214329
2	!!!,online,paper,free,!!!,paper	0.008930
3	!!!,conference,registration,online,!!!,deadline	0.031752
4	free,call,free,registration,online	0.040187
5	conference,call,paper,registration,conference	0.964482
6	submission,deadline,conference,paper,call,dead...	0.142886

	doc	hamprob	spamprob	class
0	free,submission,online,!!!	0.068299	0.931701	spam
1	conference,paper,submission,deadline	0.929553	0.070447	ham

	doc	hamprob	spamprob	class
0	online,submission,free,conference,conference	0.518108	0.481892	ham



HMMs:

$X_{t+1} \ X_t \ P(X_{t+1} \mid X_t)$

0 a a 0.296296

1 a b 0.222222

2 b a 0.222222

3 b b 0.259259

$E \ X \ P(E \mid X)$

0 A a 0.178571

1 H a 0.321429

2 A b 0.285714

3 H b 0.214286

initial transition states: {'a': 0.75, 'b': 0.25}

acid_seq = ["HAHAHA", "HAAAHH"]

Forward:

[{'a': 0.2410714285714286, 'b': 0.05357142857142857}, {'a': 0.014880952380952384, 'b': 0.019274376417233563}, {'a': 0.002793974732750243, 'b': 0.0017794154698916602}, {'a': 0.0002184410759348671, 'b': 0.00030920377445230765}, {'a': 4.288989588324741e-05, 'b': 2.757994346647108e-05}, {'a': 3.3637488615397207e-06, 'b': 4.7661267678812906e-06}]

[{'a': 0.2410714285714286, 'b': 0.05357142857142857}, {'a': 0.014880952380952384, 'b': 0.019274376417233563}, {'a': 0.0015522081848612461, 'b': 0.002372553959855547}, {'a': 0.0001762763838493601, 'b': 0.00027429763839318836}, {'a': 3.63809154899287e-05, 'b': 2.363287120514666e-05}, {'a': 5.15291132321797e-06, 'b': 3.045361836314276e-06}]

Backwards:

[{'a': 3.398311314835706e-05, 'b': 3.0094717322618998e-05}, {'a': 0.00024071665003169875, 'b': 0.00023221207605210074}, {'a': 0.0022055853499542083, 'b': 0.0019532994463707484}, {'a': 0.015621063240110858, 'b': 0.015075165868816659}, {'a': 0.14285714285714285, 'b': 0.12698412698412698}, {'a': 1, 'b': 1}]

[{'a': 2.8984668740119574e-05, 'b': 2.5695140385712587e-05}, {'a': 0.00020463172323955823, 'b': 0.0001994145970633946}, {'a': 0.0017836646710418437, 'b': 0.0017365624151548394}, {'a': 0.015621063240110858, 'b': 0.015075165868816659}, {'a': 0.14285714285714285, 'b': 0.12698412698412698}, {'a': 1, 'b': 1}]

Posteriors:

[{'a': 0.835564819514651, 'b': 0.16443518048534897}, {'a': 0.4445477694332098, 'b': 0.5554522305667902}, {'a': 0.6393751769169671, 'b': 0.36062482308303295}, {'a': 0.42264792581447497, 'b': 0.5773520741855251}, {'a': 0.6362976130711171, 'b': 0.36370238692888296}, {'a': 0.41375157688350495, 'b': 0.586248423116495}]

[{'a': 0.8354206490558317, 'b': 0.1645793509441683}, {'a': 0.44204448780132927, 'b': 0.5579555121986707}, {'a': 0.40190690751407626, 'b': 0.5980930924859238}, {'a': 0.3997302491470886, 'b': 0.6002697508529115}, {'a': 0.63394736187528, 'b': 0.3660526381247199}, {'a': 0.6285361835286749, 'b': 0.371463816471325}]

Viterbi:

('The steps of states are ', 'a a a a a b')

('The steps of states are ', 'a a b b a a')