(1) State V: character is a vowel (A E I O U), State N: character is not a vowel (2) pc-ll for proposed hmm on training data: -2.77501671459, same value for both alpha and beta table

White space: 0.26

“T”: 0.09

“N”: 0.08

“H”: 0.07

“S”: 0.07

“R”: 0.07

“L”: 0.05

“E”: 0.34

“O”: 0.21

“A”:0.20

“I”:0.18

“U”:0.07

Others: 0

0.40

0.89

0.60

0.11

N

V

(3)

(6)

White space: 0.21

“E”: 0.16

“T”: 0.09

“A”: 0.09

“O”: 0.09

“I”: 0.08

“D”: 0.04

“H”: 0.14

“N”: 0.13

White space: 0.13

“R”:0.11

“S”:0.10

“L”:0.05

“M”:0.05

0.55

0.95

0.45

0.05

N

V

(7) Initialized transition probability and emission probability with natural hmm increases pc-ll a little bit: -2.77501671459

(8) Test set pc-ll: -2.77021699807, no significantly over fitting

(9)