HMM to break a simple substitution ciphertext message, using 200 iterations of the Baum-Welch re-estimation algorithm

SHIFT =3

From the final B matrix, determined the ciphertext letters that correspond to consonants and vowels

Since my plaintext has space included I have denoted it by *.

PT: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z *
CT: d e f g h i j k l m n o p q r s t u v w x y z * a b c

Final value of pi matrix
0.0   1.0

Final value of b matrix

0.036776	|	0.000000	y	A
0.000000	|	0.000000	z	B
0.000000	**|**	**0.352434**	*	**C**
0.008040	**|**	**0.182117**	**a**	**D**
0.030969	|	0.000000	b	E
0.030144	|	0.017470	c	F
0.061939	|	0.000000	d	G
0.000000	**|**	**0.149266**	**e**	**H**
0.032905	|	0.000000	f	I
0.063675	|	0.000213	g	J
0.096774	|	0.000005	h	K
0.000000	**|**	**0.130608**	**I**	**L**
0.000000	|	0.000000	j	M
0.019356	|	0.000000	k	N
0.073838	|	0.005914	l	O
0.040647	|	0.000000	m	P
0.121942	|	0.000000	n	Q
0.000000	**|**	**0.120242**	**o**	**R**
0.040641	|	0.000007	p	S
0.001936	|	0.000000	q	T
0.079359	|	0.000000	r	U
0.086289	|	0.000870	s	V
0.110046	|	0.014814	t	W

0.008593	**0.026040**	**u**	**X**
0.009678	0.000000	v	Y
0.042583	0.000000	w	Z
0.003871	0.000000	x	*

So,the state 1 corresponds to vowel and white space(highlighted ones) and state 2 corresponds to consonants.

I tested all with caesers cipher since it is convenient to validate.
Caesers cipher(shift of 3)
Hence Plaintext to Cipher text mapping is:

Pt: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z *
CT: d e f g h i j k l m n o p q r s t u v w x y z * a b c

Since my plaintext has space included I have denoted it by *.

Length of observation_Sequence=1000
Restarts=500

Final value of b matrix
P=a------> C=d-------->0.9927955494132692
P=b------> C=e-------->0.7183487515788692
P=c------> C=f-------->0.5828768572911597
P=d------> C=g-------->0.8213678630288404
P=e------> C=h-------->0.8012835217752436
P=f------> C=i-------->0.7389033141341376
P=g------> C=j-------->1.0
P=h------> C=k-------->0.9079583914662778
P=i------> C=l-------->0.9998648803901087
P=j------> C=e-------->0.7868851252251595
P=k------> C=n-------->0.9114261089236971
P=l------> C=o-------->1.0
P=m------> C=p-------->0.9272160689077378
P=n------> C=q-------->0.9074093344215488
P=o------> C=r-------->0.8219909144612054
P=p------> C=s-------->0.8810987640871363
P=q------> C=t-------->0.8467481856591311
P=r------> C=u-------->0.8816658777850984

P=s------> C=v-------->0.7777555475021002
P=t------> C=w-------->0.7690977114753413
P=u------> C=x-------->0.8398643382273491
P=v------> C=y-------->0.5394133780283057
P=w------> C=z-------->0.8218218137103867
P=x------> C=u-------->0.7242472875704583
P=y------> C=a-------->0.871521928386287
P=z------> C=p-------->0.6846940953880006
P=*------> C=c-------->0.9999999573519239 c

So apart from the highlighted ones,rest plaintext ciphertext mappings are predicted correctly.
Hence accuracy=24/27