

# APPENDICES

## APPENDIX I: CONSONANTS IN GUJARATI CHARACTER SET

Character	Name	Sound	Character	Name	Sound
	ka	kə		dha	ઢ્ઠે
	kha	kʰə		Na	nə
	ga	gə		Pa	pə
	gha	gʰə		pha	pʰə
	ña	ŋə		Ba	bə
	cha	tʃə		bha	bʰə
	chha	tʃʰə		ma	mə
	ja	dʒə		Ya	jə
	jha	dʒʰə		ra	rə
	ña	ɲə		la	lə
	ṭa	ʈə		va	və
	ṭha	ʈʰə		śha	ʃə
	ḍa	ɖə		şa	ʂə
	ḍha	ɖʰə		sa	sə
	ṇa	ɳə		ha	ɦə
	ta	tə		ḷa	ɭə
	tha	tʰə	ઝ	kṣa	kʃə
	da	ɖə	ઙ	gña	ɡɳə

## APPENDIX II: VOWELS IN GUJARATI CHARACTER SET

Independent	Rom.	IPA	Name of diacritic
	A	ə	
	Ā	ä	<i>kāno</i>
	I	i	<i>hrasva-ajju</i>
	Ī		<i>dīrgha-ajju</i>
	U	u	<i>hrasva-varaṛū</i>
	Ū		<i>dīrgha-varaṛū</i>
	e, ε		<i>ek mātra</i>
	Ai	əj	<i>be mātra</i>
	o, ɔ		<i>kāno ek mātra</i>
	Au	əu	<i>kāno be mātra</i>
◌̣	ṁ		<i>anusvār</i>
◌̣:	ḥ		<i>Visarga</i>
	ṛ	ru	
	â	æ	
	ô	ɔ	

## APPENDIX III: DIGITS IN GUJARATI CHARACTER SET

English Numeral	Gujarati Numeral	Name
0		mīṇḍum or shunya
1		ekaṛo or ek
2		bagarō or bay
3		tragarō or tran
4		chogarō or chaar
5		pācharō or paanch
6		chagarō or chah
7		sātarō or sāt
8		āṭharō or āanth
9		navarō or nav

## APPENDIX IV: DIACRITICS IN GUJARATI

Independent	Diacritic	Rom.	IPA	Name of diacritic
		A	ə	
		Ā	ä	<i>kāno</i>
		I	i	<i>hrasva-ajju</i>
		Ī		<i>dīrgha-ajju</i>
		U	u	<i>hrasva-varaṛũ</i>
		Ū		<i>dīrgha-varaṛũ</i>
		e, ε		<i>ek mātra</i>
		Ai	əj	<i>be mātra</i>
		o, ɔ		<i>kāno ek mātra</i>
		Au	əʊ	<i>kāno be mātra</i>
◌̣		ṁ		<i>anusvār</i>
◌̣:		ḥ		<i>visarga</i>
		ṛ	ru	
		Â	æ	
		Ô	ɔ	

## APPENDIX V: EXAMPLE OF CONJUNCTS IN GUJARATI

Conjunct	Characters	Name
૫૫		Khya
૨૫		Tva
૫૫		Gna
૬		Ksha
૬		Gna
		Tra
૫૫		Shva
		Shra

**APPENDIX VI: CONFUSION MATRIX FOR HANDWRITTEN GUJARATI CHARACTER RECOGNITION**

Class no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	238	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	210	36	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0
3	0	18	225	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	234	1	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
5	1	0	0	0	240	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
7	5	0	0	0	0	0	221	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0
8	0	0	0	0	0	0	0	240	0	0	1	0	0	4	0	0	0	0	1	0	0	1	0	0	0	0	0
9	0	0	0	0	0	0	0	0	249	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	189	0	0	0	0	0	0	0	0	0	0	0	1	0	33	0	6	0
11	2	0	0	0	0	0	0	1	0	0	194	2	0	0	0	0	0	0	0	0	0	9	0	2	0	0	0
12	0	0	0	1	0	0	0	0	0	0	0	239	0	0	0	1	1	0	0	0	0	1	0	2	0	1	0
13	0	0	0	0	0	1	0	0	0	0	0	0	235	0	0	0	0	0	0	0	0	1	0	0	1	0	0
14	1	0	0	0	0	0	0	1	0	0	0	0	0	242	0	0	0	0	1	0	0	0	0	0	1	0	0
15	0	1	0	0	0	0	0	0	0	0	0	1	0	0	239	0	0	2	0	1	0	0	0	0	0	0	0
16	0	1	0	2	0	2	0	0	0	0	0	0	0	0	1	226	2	5	0	4	1	0	1	0	0	0	0
17	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	233	0	0	3	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	236	1	3	1	1	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	11	0	0	223	0	0	2	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	234	0	0	0	7	0	0
22	3	1	0	0	0	0	1	0	0	6	13	0	0	0	0	0	0	0	0	0	0	197	0	4	0	4	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	243	0	0	0	0
24	0	0	0	0	0	0	0	0	0	34	3	0	0	0	0	0	0	1	0	0	0	1	0	202	0	1	0
25	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239	0	1
26	0	0	0	0	0	0	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	3	0	2	0	208	0
27	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	243

Class no	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
1	0	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	2	0	0	0	0	3	0	0	0	6	0	0	0	0	0	0	0	0	0
5	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	1	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
7	1	0	3	2	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	6	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
10	5	0	0	5	0	0	0	0	3	0	0	0	4	0	0	3	0	0	0	0	0	0	1	0	0	0	0
11	1	0	3	30	0	0	0	0	0	0	0	1	3	0	0	1	0	0	0	0	0	0	1	0	0	0	0
12	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1
13	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	7	1	1	0	0	0
14	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	1	0	1	1
16	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
17	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	5	1	1	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
19	0	0	0	0	0	4	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	1
21	0	4	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
22	2	0	1	12	0	0	0	0	0	0	0	1	0	2	0	1	0	0	0	0	0	1	1	0	0	0	0
23	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
24	2	0	0	2	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0
25	0	0	1	0	0	0	0	0	2	0	0	0	0	0	1	0	1	0	1	2	0	1	0	0	0	0	0
26	0	0	0	5	0	0	0	0	6	0	0	0	9	0	0	0	0	0	0	0	0	0	11	0	0	0	1
27	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0

Class no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
28	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	4	0	0	0	0	1	0
30	2	0	0	0	0	0	2	0	0	1	2	0	0	0	0	0	0	0	0	0	0	6	0	0	1	0	0
31	1	0	0	2	0	0	0	0	0	2	33	0	0	1	0	0	0	0	3	0	0	7	0	4	0	15	0
32	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	2
33	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	3	1	0	0	8	3	2
37	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
39	1	0	0	0	0	0	4	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1
40	0	0	0	0	0	0	9	0	0	0	2	0	0	0	0	0	0	0	0	0	4	0	4	0	7	0	
41	0	0	2	0	0	1	0	0	0	0	0	0	0	4	0	0	1	0	3	0	0	5	2	0	0	5	
42	0	0	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
43	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
46	0	0	0	0	1	0	0	0	0	1	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
49	0	1	1	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	1	0	6	0	0	3	1	0	0	0	0	0	0	0	0	1	0	2	0	0	0	13	0
51	0	0	0	1	0	7	0	0	0	0	0	0	1	0	0	3	1	0	0	1	0	0	0	0	0	0	0
52	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	2	0	0	0	0
54	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Class no	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	
28	242	0	0	0	0	1	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	238	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
30	0	2	221	0	0	0	0	0	0	0	0	5	3	0	0	2	1	0	0	0	0	2	0	0	0	0	0	
31	0	0	3	173	0	0	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	
32	0	0	0	0	201	0	0	0	0	0	3	0	1	0	0	0	0	0	0	38	0	0	0	0	0	0	0	
33	1	2	0	0	0	241	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	
34	0	0	0	0	0	0	235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	
35	0	0	0	0	0	0	0	250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
36	1	1	0	1	0	0	0	1	211	0	1	0	2	0	1	3	3	0	1	1	0	0	2	0	0	0	0	
37	0	0	0	0	0	0	0	0	0	246	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
38	0	0	0	1	1	0	0	0	1	0	230	0	0	2	0	0	0	0	0	9	0	1	0	0	1	0	0	
39	0	0	3	1	0	1	0	0	0	1	0	227	4	0	0	2	1	0	0	0	0	0	0	0	0	0	0	
40	1	0	1	4	0	0	0	0	1	0	0	0	212	1	0	1	0	0	0	0	0	0	3	0	0	0	0	
41	0	0	0	0	5	0	0	0	0	0	1	0	0	213	0	0	0	1	0	2	2	0	0	3	0	0	0	
42	1	1	0	0	0	0	0	0	1	1	0	0	0	2	235	0	0	0	1	0	0	1	0	0	1	0	0	
43	0	0	0	0	0	0	0	0	0	2	2	6	2	0	0	231	2	0	0	0	0	0	0	0	0	0	1	
44	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	248	0	0	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	239	0	0	0	0	0	0	1	1	2	
46	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	1	238	1	0	0	1	0	0	0	0	
47	0	0	0	0	21	0	0	0	0	0	7	0	0	1	0	0	0	0	2	216	0	0	0	0	0	0	0	
48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247	0	0	1	1	0	0	
49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	237	0	0	0	2	0	
50	0	0	0	2	0	0	0	1	2	0	0	0	4	0	1	0	0	0	0	0	0	0	213	0	0	0	0	
51	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	232	2	0	0	
52	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	0	0	1	1	238	0	0	
53	0	0	0	0	0	0	13	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	231	0	
54	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	241	