# Appendix A

## Pos-Voting

<table>
<thead>
<tr>
<th>3.1.A</th>
<th>One day/when it was nine tiny cousin/uncle who was considered crazy by everybody except me came to my house</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.B</td>
<td>CD NN WPB PRP VBD CD PRP$NN NNP WP VBD$NN JJ IN NN IN PRP VBD TOP PRP$NN</td>
</tr>
<tr>
<td>3.1.C</td>
<td>CD NN WPB PRP VBD CD PRP$NN NNP WP VBD$NN JJ IN NN IN PRP VBD TOP PRP$NN</td>
</tr>
<tr>
<td>3.1.D</td>
<td>CD NN WPB PRP VBD$PRP$NN NNP WP VBD$NN NN** IN NN IN PRP VBD TOP PRP$NN</td>
</tr>
<tr>
<td>3.1.E</td>
<td>CD NN WPB PRP VBD CD PRP$NN NNP WP VBD$NN JJ IN NN IN PRP VBD TOP PRP$NN</td>
</tr>
<tr>
<td>3.1.F</td>
<td>CD NN WPB PRP VBD CD PRP$NN NNP WP VBD$NN JJ IN NN IN PRP VBD TOP PRP$NN</td>
</tr>
<tr>
<td>3.1.G</td>
<td>CD NN WPB PRP VBD CD PRP$NN NNP WP VBD$NN JJ IN NN IN PRP VBD TOP PRP$NN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.8.A</th>
<th>was not meaningful but it was summary and it was light enough to raise was not meaningful</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.8.B</td>
<td>PRP VBD$NN PRB PP PRP$NN NNP PP VBD$NN NN PP VBD$NN PB IN PP TO VBD PRP VBD PRP VBD</td>
</tr>
<tr>
<td>3.8.C</td>
<td>PRP VBD$NN PRB PP PRP$NN NNP PP VBD$NN NN PP VBD$NN PB IN PP TO VBD PRP VBD PRP VBD</td>
</tr>
<tr>
<td>3.8.D</td>
<td>PRP VBD$NN PRB PP PRP$NN NNP PP VBD$NN NN PP VBD$NN PB IN PP TO VBD PRP VBD PRP VBD</td>
</tr>
<tr>
<td>3.8.E</td>
<td>PRP VBD$NN PRB PP PRP$NN NNP PP VBD$NN NN PP VBD$NN PB IN PP TO VBD PRP VBD PRP VBD</td>
</tr>
<tr>
<td>3.8.F</td>
<td>PRP VBD$NN PRB PP PRP$NN NNP PP VBD$NN NN PP VBD$NN PB IN PP TO VBD PRP VBD PRP VBD</td>
</tr>
<tr>
<td>3.8.G</td>
<td>PRP VBD$NN PRB PP PRP$NN NNP PP VBD$NN NN PP VBD$NN PB IN PP TO VBD PRP VBD PRP VBD</td>
</tr>
</tbody>
</table>

Figure A.1: POS voting Result
Appendix B

Śabdasūtra Notation

| notation: | / |
| illustration: | a/b |
| explanation: | a or b; We use / in case of homonymy. |
| example śabdasūtra: | lie: jhūṭa bolanā/leṭanā. |
| meaning of śabdasūtra: | lie: jhūṭa bolanā or leṭanā. |

| notation: | [ ] |
| illustration: | a[b] |
| explanation: | a or b; We use [ ] in case the meanings are related. |
| example śabdasūtra: | when: jaba[kaba]. |
| meaning of śabdasūtra: | when: jaba or kaba. |

| notation: | ~ [ ] |
| illustration: | a~[b] |
| explanation: | a or a~b; |
| example śabdasūtra: | then: taba“to”. |
| meaning of śabdasūtra: | then: taba or taba“to”. |

| notation: | [<] |
| illustration: | a[<b] |
| explanation: | Basic meaning is ‘b’, but the most frequent meaning is ‘a’, and is derived from b. |
| example śabdasūtra: | absorb: sokhanā[<andara khīṃcanā]. |
| meaning of śabdasūtra: | Basic meaning of the English word absorb in Hindi is andara khīṃcanā; but the frequent meaning is sokhanā. |
Appendix B: Śabdaśutra Notation

<table>
<thead>
<tr>
<th>Notation</th>
<th>Illustration</th>
<th>Explanation</th>
<th>Example Śabdaśutra</th>
<th>Meaning of Śabdaśutra</th>
</tr>
</thead>
<tbody>
<tr>
<td>[&gt;]</td>
<td>a[&gt;]b</td>
<td>Basic meaning is ‘a’ and it is also the most frequent meaning, but ‘b’ is derived/extended from ‘a’.</td>
<td>leave: chodanā[&gt;]chuṭṭi.</td>
<td>Basic as well as the most frequent meaning of the English word <em>leave</em> is <em>chodanā</em> in Hindi, and the noun meaning <em>chuṭṭi</em> gets derived from the verb.</td>
</tr>
<tr>
<td>‘</td>
<td>a’</td>
<td>The meaning is almost ‘a’, but there is some difference which is indicated by the mark.</td>
<td>it: vaha’.</td>
<td>There are cases such as dummy it, barring those, the meaning of English <em>it</em> is <em>vaha</em> in Hindi.</td>
</tr>
<tr>
<td>^</td>
<td>a^b</td>
<td>The meaning is neither ‘a’ nor ‘b’, but something which is expressed by both ‘a’ and ‘b’ both.</td>
<td>grandmother: dādi^nānī.</td>
<td>The word <em>grandmother</em> of English neither expresses the meaning of <em>dādi</em> alone nor that of <em>nānī</em> alone (in Hindi), but it expresses both.</td>
</tr>
<tr>
<td>{ }</td>
<td>a{b}</td>
<td>meaning of a is restricted by the meaning of b.</td>
<td>she: vaha{strī}.</td>
<td><em>she</em>, in English, is a 3P pronoun marked for feminine.</td>
</tr>
<tr>
<td>*</td>
<td>nā*</td>
<td>augment the meaning of nā by supplying appropriate suffixes/words in the context.</td>
<td>nā*</td>
<td>the verbal nominaliser suffix <em>nā</em>, in Hindi, may take any of the possible postpositions such as ke_liye, se, ko, etc.</td>
</tr>
<tr>
<td>notation:</td>
<td>$[(-b)&gt;]$</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>illustration:</td>
<td>$a[(-b)&gt;k]$</td>
<td></td>
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<tr>
<td>explanation:</td>
<td>In the absence of ‘b’, the meaning is ‘k’, else it is ‘a’.</td>
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<tr>
<td>example:</td>
<td>few: kucha[(--a)&gt;na_ke_barabara].</td>
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<tr>
<td>meaning of śabdasūtra:</td>
<td>In the presence of a (as in a few), the meaning of the English word few in Hindi is kucha, else the meaning is ‘na_ke_barabara’.</td>
<td></td>
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</tbody>
</table>
Appendix C

Telugu Adverbial Suffix -gā

Telugu adverbial suffix -gā has following meanings

- gā: sā/jaśā/ke_rūpa_meṁ

The Telugu suffix -gā changes an adjective to an adverb. Since Hindi does not have an equivalent suffix, to indicate the lexical gap, we replace it with * in the Hindi output.

Here are some examples illustrating the various usages of the adverbial suffix -gā of Telugu.

Tel: batta tellagā uṁdī.
Anu-Hin: kapadcā sapheda_* hai{3_pu_e}.
Hin: kapadcā sapheda_sā hai.

Tel: bhārata dešāniki uttaraṁgā himālaya parvatālu umnāyi.
Anu-Hin: bhārata deśa_ko' uttara_* himālaya parvata hai{3_non-pu_ba}.
Hin: bhārata deśa_ke uttara_menī himālaya parvata hain.
Appendix C: Telugu Adverbial Suffix -gā

Tel: vādu toīdaragā vellādu.
Anu-Hin: vaha jaldī₃* gayā{3₃pu,e}.
Hin: vaha jaldī₃se gayā.

Tel: nīvu einduku ālasyaṅgā vaccāvu?
Anu-Hin: tuma kyoṁ dera₃* āyā{3,e}?
Hin: tuma kyoṁ deri₃se āye?

Tel: ī lekka cālā gajibijigā unīdi.
Anu-Hin: yaha- hisāba bahuta gaḍabaḍī₃* hai{3_non-pu,e}.
Hin: yaha hisāba bahuta gaḍabaḍī hai.

Tel: ī nimmapaṁdu pullagā unīdi.
Anu-Hin: yaha- niṁbū khattā₃* hai.
Hin: yaha niṁbū khattā₃sā hai.

Tel: vāḍu kopāṅgā unnādu.
Anu-Hin: vaha{pu.} gussā₃* hai{3₃pu,e}.
Hin: vaha gusse₃meṁh hai.

Tel: vārī kutuṁbaṁ ārthikariṅgā venakabaḍhīndī.
Anu-Hin: unakā kutumba ārthika₃* pichada,gayā.
Hin: unakā kutumba ārthika₃drṣṭī₃ se pichada,gayā.

Tel: vāru nāku tāṁḍrigā unnāru.
Anu-Hin: vaha{honorific ba.} mujhe₃* pitā₃* hai{3₃pu,bahu}.

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Appendix C: Telugu Adverbial Suffix -gā

Hin: ve mujhe pitaṁ samāna hain.

Tel: narasimharāva pradhānamaṁtri gā pani cesādu.
Anu-Hin: narasimharāva pradhānamaṁtri kāma kiyā{3₃puₑ}.
Hin: narasimharāva pradhānamaṁtri ke rūpaṁ kāma kiyā.

Tel: māṁtriādu pillavāнni kukkanā cesādu.
Anu-Hin:jādūgara ne bacce ko kuttā kiyā{3₃puₑ}.
Hin:jādūgara ne bacce ko kuttē ke jaisā kiyā.

Tel: māṁtriādu pillavāнni kukkanā mārcādu.
Anu-Hin:jādūgara ne bacce ko kutte kiyā{3₃puₑ}.
Hin:jādīgara ne bacce ko kutte ke rūpaṁ badalā.

Below we give features which trigger various meanings in Hindi.

- gā + umdi -> sthitī meṁ hone ki viśeṣatā
- gā + pani ceyyi -> ke rūpa meṁ kāma karanā
- words indicating direction + gā -> meṁ hai
Appendix D

Macmillan’s Phrasal Dictionary: sample entry

The Macmillon Phrasal Verbs Plus\(^1\) provides special entries on the 12 most common particles (away, back, down, out etc) explain how they contribute to the meaning of phrasal verbs. Here we produce a diagram explaining how the different senses of the phrasal verbs with particle ‘away’ emerge from the ‘core meaning’ of the word ‘away’. Such a diagram helps a new learner to absorb the meaning quickly and also get a holistic view of the different connections.

\(^1\)http://www.macmillandictionaries.com/about/PhrasalVerbs/phrasalverbs.htm
Appendix D: Macmillan’s Phrasal Dictionary: sample entry

Common Particles: away

Away has several different meanings when it is used as part of a phrasal verb. Some of those meanings are literal, but many are figurative. This diagram shows how all these meanings are connected, and how the figurative meanings develop from the literal ones.

- Avoid becoming involved in an activity, organization, etc., or stop being involved in it.
- Avoid getting near someone or something.
- Move farther from a person, place, or thing.
- Get rid of something, use all of it, or destroy it.
- Put something in a safe or a secret place.
- Make someone or something move farther from a person, place, or thing.
- Make someone or something move.
- Continuous action: do something continuously or with a lot of effort, especially something boring or difficult.
Appendix E

Śabdasūtra for ‘as’

Various senses of the English word as are shown below, with the appropriate Hindi meanings in the context. The sentences with similar Hindi meanings are grouped together.

• (tulanā) [utanā] ... jitanā / ke jitanā
  I like this jacket better than that one, but it costs twice as much.
  twice as much: dugune kī jitanā
  They live in the same town as my parents.
  same town as: usī śahara meṁ jisa meṁ
  I’d never seen him looking so miserable as he did that day.
  so miserable as: utanā duḥkhī jitanā

• (sāmya) ke rūpa meṁ/kī taraha
  He went to the fancy-dress party dressed as a banana.
  as a banana: kele kī taraha
  As a child, Mary had lived in India.
  As a child: bacce ke rūpa meṁ → bacapana meṁ
Appendix E: Śabdasūtra for ‘as’

- (sāmya) kī taraha / ke jaise
  It could be used as evidence against him.
  as evidence: kī taraha

- (tulanā) kāla → (kāraṇa) cūmki
  As it was getting late, I decided to book into a hotel.
  as: cūmki
  You can go first as you’re the oldest.
  as: cūmki

- (sāmya) kāla jaise / jaba
  As I was getting into the car, I noticed a piece of paper on the floor.
  as: jaise/jaba
  He gets more attractive as he gets older.
  as: jaise/jaba

- (sāmya) kāla → ke bāvajūda
  Angry as¹ he was, he couldn’t help smiling
  as: ke bāvajūda

- (sāmya) vyavahāra → jaisā
  Do as I say!
  as: jaisā

¹Note that here the information is in position.
Compare it with
As he was angry, he shouted at her.
In this example, as is used in the sense of because.
When I arrived at the party, someone else was dressed exactly as I was.

\textit{as: jaisā}

He got divorced, (just) as his parents had done years before.

\textit{as: jaisā}

\begin{itemize}
  \item \textit{(sāmya) anurūpa → jaisā ki}
    
    As I thought, Danny was to blame.
    
    \textit{as: jaisā ki}
\end{itemize}

Thus we observe that \textit{as} basically is used when there is a comparison between two similar things. Hindi uses different words to express comparison at various levels such as behaviour, look, place, time, etc. From these examples, the meaning of \textit{as} may be summarised as follows.

\[
\begin{array}{c}
| - \text{rūpa} \\
| - \text{vyavahāra} \\
\text{sāmya} \{ \text{tulanā} \} -| - \text{deśa} \\
| - \text{kāla → kāraṇa → ke bāvajūda}
\end{array}
\]

which shows the thread running through various senses.

The concise formula may be:

\begin{itemize}
  \item \textit{as: sāmya / tulanā}
\end{itemize}
Appendix F

Śabdasūtra for ‘Case’

Look at the following sentences illustrating the uses of case, along with its Hindi meaning in each case.

1. It was obviously a case of blackmail. \(\text{māmalā}\)
2. Keep the ornaments in the jewellery case. \(\text{ḍibbā}\)
3. I need three pillow cases. \(\text{khola}\)
4. Objects in the museum have been displayed in big glass cases. \(\text{almārī}\)
5. Write your name in the upper case. \(\text{bāde ākṣara}\)

Other examples of the word case are as in compounds, such as ‘hot-case, suit-case, brief-case’. Looking at these and the one in the second example, the meaning ḍibbā seems to be closer. But we know that English has another word ‘box’ for ḍibbā. We observe one speciality in these usage of case that, the boxes it refers to actually are the boxes specially designed according to the special requirement of the object for which it is meant for. The ‘glass case’ is also a special type of case which is designed to be suitable for the display of items in the museum. ‘Pillow case’ is also a special
type of cover that suits the shape of the pillow.

The Compact Oxford English dictionary\(^1\) has two entries for the word ‘case’ as shown below.

- **entry 1**
  - **noun** 1 an instance of a particular situation or set of circumstances. 2 an instance of a disease, injury, or problem. 3 an incident under official investigation by the police. 4 a legal action that is to be or has been decided in a court of law. 5 a set of facts or arguments supporting one side of a debate or lawsuit. 6 a person or their situation as a subject of medical or welfare attention. 7 Grammar an inflected form of a noun, adjective, or pronoun expressing the semantic relation of the word to other words in the sentence: the possessive case.

  **ORIGIN** Latin *casus* ‘fall, occurrence, chance’.

- **entry 2**
  - **noun** 1 a container or protective covering. 2 Brit. a suitcase. 3 a box containing twelve bottles of wine or other drink, sold as a unit. 4 each of the two forms, capital or minuscule, in which a letter of the alphabet may be written or printed.
  - **verb** 1 enclose within a case. 2 informal reconnoitre (a place) before carrying out a robbery.

  **ORIGIN** Old French *casse*, from Latin *capsa* ‘box, receptacle’; sense 4 derives from a container for holding type in printing; two cases were set on a stand, the higher one for capitals (upper case) and the lower for minuscule (lower case).

Thus this etymology captures the fifth sense also. Now regarding the first example above, according to Oxford’s dictionary, is a separate entry, which originates from the Latin *casus*, meaning ‘fall, occurrence, chance’.

So one may come up with a sūtra: *māmalā / dībé väśsea*

\(^1\)accessed in June 2009 from the web http://www.askoxford.com/dictionaries/compact_oed/?view=uk
If we give an another thought, we may see a distant link between the two senses. The meaning of ‘case’ in case of printing press refers to the notion of classification. The ‘case’ in the first example is an

an instance of a particular situation or set of circumstances

In fact the ‘case’ used in the domain of law, medicine, and even in Grammar, fall under same sense. All these may be considered as an extension of the notion of classification. This then makes mānalā a special meaning derived from ḍēbā viṣeṣa. And hence the modified sūtra may be expressed as:

mānalā[← ḍēbā viṣeṣa]
Appendix G

Stanford Parser Outputs

- He is a doctor

  dep(doctor-7, width-1)
  dep(100-3, =-2)
  ccomp(width-1, 100-3)
  nsubj(doctor-7, He-4)
  cop(doctor-7, is-5)
  det(doctor-7, a-6)

- I saw the man you love.

  nsubj(saw-2, I-1)
  det(man-4, the-3)
  dobj(saw-2, man-4)
  nsubj(love-6, you-5)
  rcmod(man-4, love-6)

- The snake the mongoose attacked hissed loudly.

  det(snake-2, The-1)
  nsubj(attacked-5, snake-2)
  det(mongoose-4, the-3)
  dep(snake-2, mongoose-4)
  dep(loudly-7, hissed-6)
  advmod(attacked-5, loudly-7)
Appendix G: Stanford Parser Outputs

- I need a cup of tea.
  
  nsubj(need-2, I-1)  
  det(cup-4, a-3)  
  dobj(need-2, cup-4)  
  prep_of(cup-4, tea-6)

- The growth of software industry in recent years is unbelievable.
  
  det(growth-2, The-1)  
  nsubj(unbelievable-10, growth-2)  
  nn(industry-5, software-4)  
  prep_of(growth-2, industry-5)  
  amod(years-8, recent-7)  
  prep_in(industry-5, years-8)  
  cop(unbelievable-10, is-9)

- the door was opened by him.
  
  det(door-2, The-1)  
  nsubjpass(opened-4, door-2)  
  auxpass(opened-4, was-3)  
  agent(opened-4, him-6)

- The door was opened by this key.
  
  det(door-2, The-1)  
  nsubjpass(opened-4, door-2)  
  auxpass(opened-4, was-3)  
  det(key-7, this-6)  
  agent(opened-4, key-7)
Appendix H

Link parser outputs

Figure H.1: copula sentence link parser output
Appendix H: Link parser outputs

---

Figure H.2: wh drop sentence link parser output

---

Figure H.3: wh drop sentence link parser output

---

Figure H.4: semantic head example1
LEFT-WALL the growth of software industry in recent years is unbelievable.

Figure H.5: semantic head example2

LEFT-WALL the door was opened by him.

Figure H.6: passive voice example1
Figure H.7: passive voice example2

LEFT-WALL the door.n was.v opened.v by this.d key.n.
Appendix I

Pāṇinian Interface outputs

Figure I.1: samaanaadhikarana: PG
Appendix I: Pāṇinian Interface outputs

Figure I.2: relative clause: example1; PG

Figure I.3: agent: example1; PG
Appendix I: Pāñinian Interface outputs

Figure I.4: agent:example2; PG

Figure I.5: relative clause: example2; PG
Appendix J

IAST Map table

<table>
<thead>
<tr>
<th>a</th>
<th>ã</th>
<th>i</th>
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</tbody>
</table>
Appendix K

Extended-Devanagari

The following two charts show the new consonant and vowel symbols added to the Devanāgarī script to represent the vowels and consonants in other Indian scripts faithfully through Devanāgarī.
VOWELS
अ आ इ ई उ ऊ ऋ ऌ ए ऐ ऒ ओ औ 
A A I I U U R R I I E E O O O O

CONSONANTS
The Five Vargs
क ख ग घ ङ
ka kha ga gha na

ca cha ja jha na

ta tha da dha na

sa sha tha tha na na

pa pha ba bha na

Non-Vargs
ष ष ट ठ ड ढ
ya ya ra ga la ja

व व श ष
va va ka ga sa ha

Figure K.1: Extended-devanagari alphabet (courtesy: ISI Bulletin)
Appendix K: Extended-Devanagari

IS 13194:1991 (Refer to the Note on covering page)

Nukta Consonants

\[
\begin{array}{ccccccc}
\text{k} & \text{k} & \text{t} & \text{t} & \text{d} & \text{d} & \text{q} \\
\text{qa} & \text{kha} & \text{gha} & \text{za} & \text{da} & \text{dha} & \text{qa} \\
\end{array}
\]

Vowel Modifiers

Chandrabindu \( \dot{\text{e}} \) \( \dot{\text{e}} \)
Visarg \( \text{v} \) \( \text{v} \)
Anuswar \( \text{\ } \) \( \text{\ } \)
before \( \text{k} \) varg \( \text{h} \) \( \text{h} \)
before \( \text{ch} \) varg \( \text{h} \) \( \text{h} \)
before \( \text{t} \) varg \( \text{h} \) \( \text{h} \)
before \( \text{n} \) varg \( \text{h} \) \( \text{h} \)
before \( \text{p} \) varg \( \text{h} \) \( \text{h} \)
otherwise \( \text{h} \) \( \text{h} \)

Notes:

\( \text{\ } \), \( \text{\ } \), \( \text{\ } \) are used only in Sanskrit.
\( \text{\ } \) = short \( \text{\ } \) in Southern scripts.
\( \text{\ } \) = short \( \text{\ } \) in Southern scripts.
\( \text{\ } \) = new vowel in Devanagari, as in "hat".
\( \text{\ } \) = new vowel in Devanagari, as in "ball".
\( \text{\ } \) = \( \text{\ } \) in Tamil.
\( \text{\ } \) = \( \text{\ } \) in Bengali and Oriya, while \( \text{\ } \) = \( \text{\ } \).
\( \text{\ } \) = Tamil (\( \text{\ } \)), Telugu (\( \text{\ } \)), & Malayalam (\( \text{\ } \)).
\( \text{\ } \) = \( \text{\ } \) in Marathi.
\( \text{\ } \) = used in Marathi.
\( \text{\ } \) = Tamil (\( \text{\ } \)), Malayalam (\( \text{\ } \)), Telugu (\( \text{\ } \)), & Kannada (\( \text{\ } \)).
\( \text{\ } \) = Tamil (\( \text{\ } \)), Malayalam (\( \text{\ } \)).

Figure K.2: Extended-devanagari alphabet (courtesy: ISI Bulletin)
Appendix L

Urdu-Alphabet

Figure L.1: Urdu Alphabet: Courtesy: en.wikipedia.org/wiki/Urdu_alphabet