Guidelines for the Semantic Analysis of Sanskrit Sentences following Pāṇinian Kāraka theory

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Contents

1   Background

In order to either understand any sentence, or to develop an automatic sentential parser, we need to know answers to the following questions.

1. How does one know which word relates to which other in a sentence?

2. Where is the information of word relations encoded?

3. How is this information encoded?

4. What is the semantics associated with such a relation?

5. Is there any repository of relation names?

6. Do the word meanings have any role to play in establishing the relations?

7. Does the relation between the words have any role in the decision of the word meaning?

8. What is the expressive capacity of a word?

Answers to these questions are found in the Indian theories of verbal cognition. The grammar of Pāṇini was further strengthened by the development of theories of verbal import that provide the structure of sentential meaning mentioning minute details such as what are the sources of information and how the information flows in a sentence. The theories discuss the importance of three factors viz. ākāṅkṣā (expectancy), yogyatā (mutual congruity) and sannidhi (proximity) as essential factors for any verbal understanding. Further these theories also deal with the question of what the meaning of the word `meaning` is? Three levels of signification of words viz. abhidhā (primary), lakṣaṇā (secondary) and vyañjanā (suggestive) are suggested with further subdivisions. In addition, these theories describe minute details such as which part of a sentence expresses what kind of information and how this information relates one word to the other. Vaiyākaraṇas (grammarians), Naiyāyikas (logicians) and Mīmāṃsakas (exegesists) developed their own theories of verbal cognition. Subbarao (1969) provides detailed diagrams showing the śābda-bodhas of all the three schools providing all the details of the sources of information and the information flow in the process of cognition, according to each of these schools. These theories provide a sound base for sentential analysis.

Several relations described in Aṣṭādhyāyī and various other books on the theories of śābdabodha, commentaries thereupon, and various other texts dealing with vyākaraṇa have been compiled and classified by (Ramakrishnamacaryulu, 2009) under the two broad headings, viz. inter sentential and intra sentential relations. Appendix B provides a list of all these relations. These relations were critically examined from the point of view of their usability in an automatic sentential parser (Kulkarni and Ramakrishnamacharyulu, 2013). A subset of a little more than 30 relations from this repository were chosen for developing a parser. While developing an automatic parser, we also came across several relations, that were analysed syntactically and not semantically by Pāṇini and the tradition. We provided the semantics of such relations. Still a few relations such as those related to karmapravacanīya are missing from these guidelines. Appendix C provides a list of these selected relations.

This write-up describes these chosen relations, the semantics associated with these relations, providing relevant Pāṇinian sūtras and their meaning, the syntactic (and semantic) clues for marking these relations followed by examples.

1.1 Convention for marking the relations

The relations are marked between the words. But these are to be understood to be between the meanings represented by the words.

We mark the relations by using a directed labelled arrow. The name of the relation is the role of the head word with respect to the word at its tail. For example, the relation between **रामः** (rāmaḥ 'Rāma') and **पचति** (pacati 'cooks') is marked as **कर्ता** (kartā) and is marked with an arrow from **पचति** (pacati) ending onto **रामः** (rāmaḥ).

The relation between **ओदनं** (odanaṁ) and **पचति** (pacati) is marked as **कर्म** (karma) with an arrow from **पचति** (pacati 'cooks') ending onto **ओदनं** (odanaṁ 'rice'). By convention, the relation names are with nominative (**प्रथमान्त**) case suffix, instead of prātipadikam (nominal stem).

From these diagrams, one can generate the expressions describing verbal cognition (**शाब्दबोध**) following different schools, by focussing on appropriate nodes.
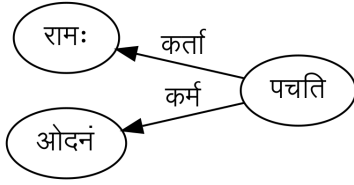
For example, starting with **रामः** (rāmaḥ) covering all nodes, and terminating at the main verb, one gets the **वैयाकरण** (grammarian)'s **शाब्दबोध** (description of the verbal cognition) as **रामकर्तृक-ओदनकर्मक-पाकानुकूलव्यापारः** (an activity conducive of cooking whose doer is Rama and whose goal is the rice). If we traverse the diagram ending in the **प्रथमान्त** (nominative) word **रामः** (rāmaḥ), we get **नैयायिक** **शाब्दबोध** (logician's verbal cognition) as **ओदनकर्मक-पाकानुकूल-कृतिमान् रामः** (Rama the doer of the activity conducive of cooking whose goal is rice). Though one can generate the **शाब्दबोध** (verbal cognition) following different schools, the diagram has one pre-dominant node from where arrows emerge. This node is called a 'root' node and denotes the **मुख्यविशेष्य** (chief qualificand). Since we are following the **वैयाकरण**'s **शाब्दबोध** (grammarian's verbal cognition), it is the main verb in the sentence which is the **मुख्यविशेष्य** (chief qualificand). In case a verb in finite form is absent in a sentence, we insert an appropriate verb **अस्ति/ भवति** (asti/bhavati - a 'be' verb). This is in tune with Patañjali's statement **अस्तिभवन्तीपरः प्रथमपुरुषोऽप्रयुज्यमानोऽप्यस्ति.**[1]

Since for computational purpose we require a text file and not the graphics images, we propose the following scheme of annotation for text.

The words in a sentence are written one word per line and are numbered. The relation of a word with respect to the other is marked by its name followed by a 'to-index' - a number indicating the word with which it is related.

According to the Pāṇini's grammar, the verbal suffix in the finite verbal form marks a kartā in an active voice, and a karma in a passive voice, provided the verb is sakarmaka

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[1]   **महाभाष्यम्** (2.3.1)

(roughly transitive). In the case of akarmaka verbs (roughly intransitive verbs), in passive voice, the verbal suffix denotes an activity.

Hence against the finite verbal form, in the case of an active voice, we mark the relation अभिहित_कर्ता (expressed kartā). Similarly, in the case of transitive verbs in passive voice, the relation अभिहित_कर्म (expressed karma), followed by the index of the kartā/karma is tagged against the finite verbal form. For example,

1 रामः कर्ता 3
2 ओदनं कर्म 3
3 पचति अभिहित_कर्ता,1

1 रामेण कर्ता 3
2 ओदनं कर्म 3
3 पच्यते अभिहित_कर्म,1

In case the अभिहित_कर्ता or the अभिहित_कर्म are absent, as in the case of pro-drop sentences such as गच्छामि ((I) go), we mark the to_index as 0.

1.2 Granularity

The relations proposed by Prof. K V Ramkrishnamacharyulu (2009) are given in the AppendixB. As one can see from these relations, they are very fine-grained, each of the kārakas is being sub-divided into many. Though the fine-grained kāraka-analysis is necessary for deeper analysis, as well to handle cases of divergences between languages, it also needs a good understanding of grammar on the part of an annotator. We suggest 3-tier tagging as follows:

1. Level 1: Coarse grain annotation, as suggested in this draft.
   These are the relations, discussed in Pāṇini's grammar, which have a well defined semantics, and can be marked using a) only syntax, b) bare minimum ontological classification into substance and quality, and c) the feature of animacy.
2. Level 2: Sharing of relations, and fine-grained annotation (This may be done mechanically),
3. Level 3: Deeper Semantic level annotation.

Level 1: In the sentence रामः दुग्धम् पीत्वा शालाम् गच्छति, रामः will be marked as कर्ता of गच्छति at the first level of tagging. In the second level of tagging, the machine will mark the relation between रामः and पीत्वा as कर्ता automatically.

Level 2: In the sentence घटः नश्यति, घटः will be marked as कर्ता at the first level. At the second level, घटः by looking at the verb can be marked as अनुभवी-कर्ता mechanically.

Level 3: In the sentence स्थाली पचति। स्थाली will be marked as a कर्ता in the first level. In the third level, one can then further mark स्थाली as an अधिकरण. However, in order to mark this relation, one needs extra-linguistic information.

In what follows we discuss only the first level of tagging.

1.3 Unit for Tagging

Before we start the discussion on tagging, let us also decide what is the unit for tagging. Since we are now talking about the relations between words, it is natural to think of a **sentence** as a unit. Then, the natural question is how do we define a sentence?

Jaimini in *Mīmāṃsāsūtra* defines a sentence as follows.

> *Arthaikatvāt ekam vākyam sākāṅkṣam cet vibhāge syāt.*
> (MS 2.1.46)
> A group of words forms a sentence
>
>   1. if when separated the words have mutual expectancy, and
>   2. if the group of words denote a single meaning / if it serves a single purpose[2].

In Sanskrit, the texts being continouns, and not split as separate sentences, this definition provides a very good semantic clue for deciding the sentence boundary. However, from computational processing point of view, we assume that the sentences are delimited by either a full stop or a question mark, or an exclimation mark. Here are some examples of sentences:

- रामः वनम् गच्छति।
- रामः प्रतिदिनं शालां गच्छति।
- किन्तु सः पाठं न पठति।
- रामः खादति पिबति च।
- यदि त्वं इच्छसि तर्हि अहं भवतःगृहम् आगमिष्यामि।
- यत्र नार्यः तु पूज्यन्ते रमन्ते तत्र देवताः।

Among these, the first three have only one तिङन्तपदम्, while the rest have more than one तिङन्तपदs.

1.4 Dependency annotation tag-set for Sanskrit

The tags may be broadly classified into two types:

1. वाक्याभ्यन्तरः (Intra-sentential): Each of the तिङन्तपदs will have its own आकाङ्क्षा. The relations within the domain of a तिङन्त are termed as intra-sentential relations.
2. वाक्येतरः (Inter-sentential): Relations which join the two तिङन्तs or the arguments in the domain of one तिङन्त with those of the other are called inter-sentential relations.

Each of these can be further subclassified looking at the lexical category of the words involved, or the semantics of the relations involved.

वाक्याभ्यन्तरः (Intra-sentential)

1. कारक-सम्बन्धः

2. कारकेतर-सम्बन्धः

3. उपपदसम्बन्धः

4. कर्मप्रवचनीयसम्बन्धः [3]

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[2]   The word *artha* is ambiguous between meaning and purpose. Hence two interpretations.
[3]   Not discussed

वाक्येतरः (Inter-sentential)

5. Relations marked by sentence-connecting words.

6. Relations marked by relative pronouns.

2   कारकसम्बन्धाः(Kāraka Relations)

2.1   कर्ता (kartā)

- Semantics and the sūtras

- Syntactic Clues:
  i) If the verbal suffix expresses कर्ता (kartā), it takes the प्रथमा विभक्तिः (nominative case).
  ii) If the verbal suffix expresses कर्म (karma) or भाव (bhāva), then कर्ता (kartā) takes the तृतीया विभक्तिः (instrumental case).
  iii) If the non-finite verbal suffix expresses भाव (activity) then the कर्ता (kartā) of the verb in कृदन्त form (non-finite-verbal form/participials etc) takes षष्ठी विभक्तिः (genitive case).
  iv) When the verb is in सतिसप्तमी (absolute locative), the कर्ता (kartā) takes सप्तमी विभक्तिः (locative case).
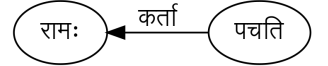
- Examples:

  2.1) Sentence: **रामः पचति।**
  Gloss: Rama{nom} cooks.
  Eng: Rama cooks.
  Analysis:
  1 रामः कर्ता,2
  2 पचति अभिहित_कर्ता,1

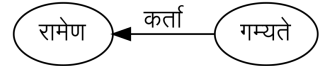 2.2) Sentence: **रामेण गम्यते।**
  Gloss: Rama{ins} is gone.
  Eng: Passive of 'Rama goes'. In English the translation is not natural.
  Analysis:
  1 रामेण कर्ता 2
  2 गम्यते अभिहित_कर्म 0

  2.3) Sentence: **रामस्य गमनं भवति।**
  Gloss: Rama{gen} going happens.
  Gloss: The going of Rama happens.
  Analysis:
  1 रामस्य कर्ता,2
  2 गमनं कर्ता,3
  3 भवति अभिहित_कर्ता,2

  2.4) Sentence: **रामे वनं गच्छति सीता अनुसरति।**
  Gloss: Rama{loc} forest{acc} goes Sita{nom} follows.
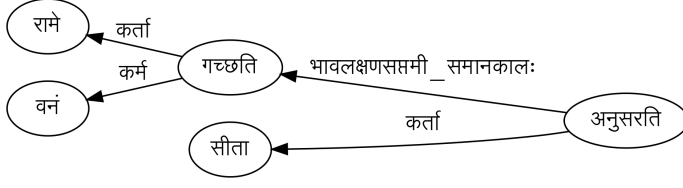 Eng: As Ram goes to the forest, Sita follows.
  Analysis:
  1 रामे कर्ता,3
  2 वनं कर्म,3
  3 गच्छति भावलक्षणसप्तमी_समानकालः,5
  4 सीता कर्ता,5

5 अनुसरति अभिहित_कर्ता,4

2.1.1 प्रयोजककर्ता (causative agent)

- Semantics: In the case of verbs with causative suffix, the कर्ता of the causative activity is termed as प्रयोजककर्ता.

- Syntactic Clue: If the verbal form is in active voice (कर्तरि प्रयोगः) then the प्रयोजककर्ता takes प्रथमाविभक्तिः otherwise it takes तृतीयाविभक्तिः.

- Examples:

2.5) Sentence: देवदत्तः विश्वामित्रेण ओदनं पाचयति।
Gloss: Devadatta{nom} Viśvāmitra{ins} rice{acc} makes cook.
Gloss: Devadatta makes Viśvāmitra cook rice.
Analysis:
1 देवदत्तः प्रयोजककर्ता,4
2 विश्वामित्रेण प्रयोज्यकर्ता,4
3 ओदनं कर्म,4
4 पाचयति अभिहित_कर्ता,1

2.1.2 प्रयोज्यकर्ता (causee)

- Semantics: In the case of verbs with causative suffix, the कर्ता of the non-causative activity is termed as प्रयोज्यकर्ता.

- Syntactic clue: The प्रयोज्यकर्ता takes the तृतीयाविभक्तिः, except in the case of verbs belonging to गति-बुद्धि-प्रत्यवसानार्थ-शब्दकर्मक-अकर्मक (1.4.52) (verbs related to motion, intellect and eating, verbs whose karma is a 'Sabda', and the intransitive verbs), in which case it takes the द्वितीयाविभक्तिः.
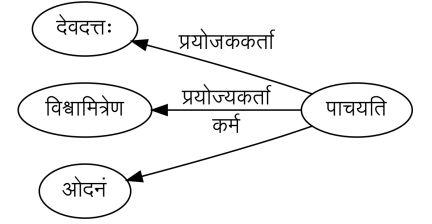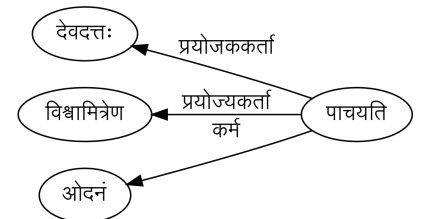
- Examples:

2.5) Sentence: देवदत्तः विश्वामित्रेण ओदनं पाचयति।
Gloss: Devadatta{nom} Viśvāmitra{ins} rice{acc} makes cook.
Gloss: Devadatta makes Viśvāmitra cook rice.
Analysis:
1 देवदत्तः प्रयोजककर्ता,4
2 विश्वामित्रेण प्रयोज्यकर्ता,4
3 ओदनं कर्म,4
4 पाचयति अभिहित_कर्ता,1

2.6) Sentence: **माता बालं क्षीरं पाययति।**
Gloss: Mother{nom} child{acc} milk{acc} feeds.
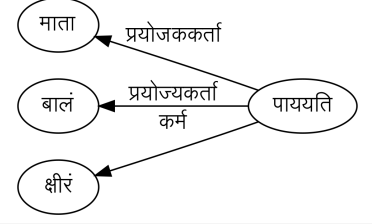Gloss: Mother feeds the child milk.
Analysis:

1 **माता प्रयोजककर्ता**,4
2 **बालम् प्रयोज्यकर्ता**,4
3 **क्षीरम् कर्म**,4
4 **पाययति अभिहित_कर्ता**,1

2.2 कर्म (karma)

- Semantics:

- Syntactic Clue:
  i) If the verbal suffix expresses **कर्म** (karma), it takes the **प्रथमा विभक्तिः** (nominative case).
  ii) If the verbal suffix expresses **कर्ता** (kartā), then **कर्म** (karma) takes the **द्वितीया-विभक्तिः** (accusative case).
  iii) If the non-finite verbal suffix expresses **भाव** (activity) then the **कर्म** (karma) of the **कृदन्त** (kṛdanta verbs) (non-finite) takes **षष्ठी विभक्तिः** (genitive case).

- Example:

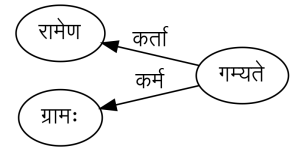2.7) Sentence: **रामेण ग्रामः गम्यते।**
Gloss: Rama{ins} village{acc} is gone.
Eng: In English such construction is not possible.
Analysis:

1 **रामेण कर्ता**,3
2 **ग्रामः कर्म**,3
3 **गम्यते अभिहित_कर्म** 2
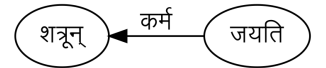

2.8) Sentence: **शत्रून् जयति।**
Gloss:Enemy{acc} wins.
Eng: (He) wins over the enemies.
Analysis:

1 **शत्रून् कर्म**,2
2 **जयति अभिहित_कर्ता**,0

2.9) Sentence: **रामेण प्रजानां शासनं क्रियते।**
Gloss:Rama{ins} people{gen} ruling{acc} is done.
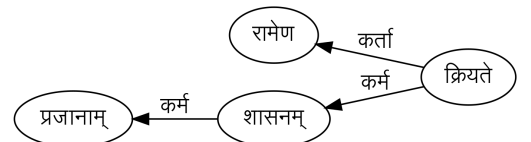Eng:The people were ruled by Rama.
Analysis:

1 **रामेण कर्ता**,4
2 **प्रजानाम् कर्म**,3
3 **शासनम् कर्म**,4
4 **क्रियते अभिहित_कर्म** 1

2.2.1 तुमुनन्त as a कर्म of इष् धातु

. If the कर्म of the verb इष् (desire) is an activity, then the कृदन्त suffix तुमुन् is used with the verb.

2.10) Sentence: **बालकः पठितुम् इच्छति।**
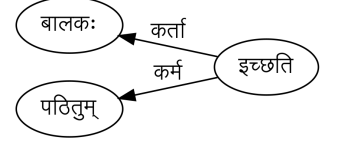Gloss: Child{nom} to read desires.
Eng: The child desires to read.
Analysis:

1 बालकः कर्ता,3

2 पठितुम् कर्म,3

3 इच्छति अभिहित_कर्ता,1

The कर्मसंज्ञा in this sentence is justified by the सन्-विधायकसूत्र ``धातोः कर्मणः समानकर्तृकादिच्छायाम् वा" (3.1.7).

2.2.2 गौणकर्म (secondary karma) and मुख्यकर्म (primary karma)

In Sanskrit there are certain verbs mentioned in the following कारिका—
दुह्-याच्-पच्-दण्ड्-रुधि-प्रच्छि-चि-ब्रू-शासु-जि-मथ्-मुषाम्।
कर्मयुक् स्याद्-अकथितं तथा स्यात् नी-हृ-कृष्-वहाम्॥ [4]
which are द्विकर्मकs. Out of the two, one कर्म is गौण and the other is प्रधान/मुख्य. We decided to mark them as गौणकर्म and मुख्यकर्म, instead of just कर्म. This is to ensure that only द्विकर्मकs have more than one कर्म, and no other धातुs allow more than one कर्म. Further the information of गौण and मुख्य is also useful in transforming an active sentence to passive.

2.11) Sentence: **गोपालः गां दुग्धं दोग्धि।**
Gloss: cowherd{nom} cow{acc} milk{acc} milches.
Eng: The cowherd milches the milk from/of the cow.
Analysis:

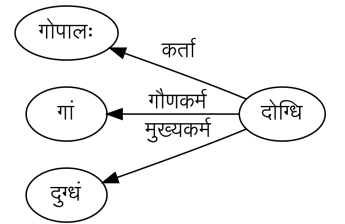1 गोपालः कर्ता,4

2 गां गौणकर्म,4

3 दुग्धं मुख्यकर्म,4

4 दोग्धि अभिहित_कर्ता,1

2.12) Sentence: **गोपालेन गौः दुग्धम् दुह्यते।**
Gloss: cowherd{ins} cow{nom} milk{acc} is milched.
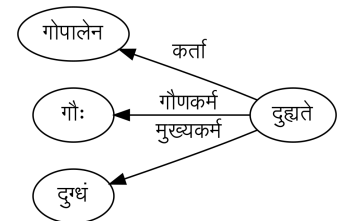Gloss: The cow is milched by the cowherd for milk.
Analysis:

1 गोपालेन कर्ता,4

2 गौः गौणकर्म,4

3 दुग्धं मुख्यकर्म,4

4 दुह्यते अभिहित_कर्म 1

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[4]   सिद्धान्तकौमुदी, अकथितं च (1.4.51) इति सूत्रव्याख्याने

2.13)Sentence: **तेन अजा ग्रामं नीयते।**
Gloss: He{ins} goat{nom} village{acc} is taken.
Eng: A goat is taken to a village by him.
Analysis:
1 **तेन कर्ता**,4
2 **अजा मुख्यकर्म**,4
3 **ग्रामं गौणकर्म**,4
4 **नीयते अभिहित_कर्म** 1
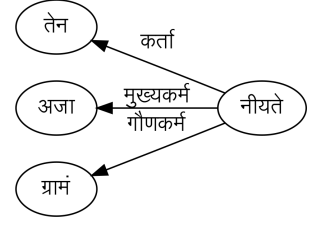
2.2.3   गतिकर्म

2.14)Sentence: **रामः ग्रामाय गच्छति।**
Gloss: Rama village{dat} goes.
Eng: Rama goes to a village.
Analysis:
1 **रामः कर्ता**,3
2 **ग्रामाय गतिकर्म**[5],3
3 **गच्छति अभिहित_कर्ता**,1
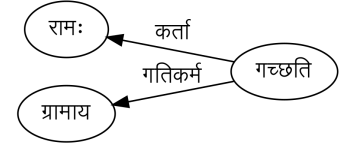
2.2.4   वाक्यकर्म(**Quotative marker इति**)

2.15)Sentence: **अहं गृहं गमिष्यामि इति सः अवदत्।**
Gloss: I home{acc} will go thus he said.
Eng: He said that he will go home.
Analysis:
1 **अहं कर्ता**,3
2 **गृहं कर्म**,3
3 **गमिष्यामि वाक्यकर्म**,6;**अभिहित_कर्ता**,1
4 **इति वाक्यकर्म_द्योतकः**,3
5 **सः कर्ता**,6
6 **अवदत् अभिहित_कर्ता**,5

2.3   करणम् (instrument)

- Semantics:

- Syntatctic Clue:

---

[5]   Not marked in the parser

- Example:

2.16)Sentence: **बालः कुञ्चिकया तालम् उद्घटते।**
Gloss: Child{nom} key{ins} lock{acc} opens.
Eng: The child opens a lock with a key.
Analysis:
1 बालः कर्ता,4
2 कुञ्चिकया करणम्,4
3 तालम् कर्म,4
4 उद्घटते अभिहित_कर्ता,1
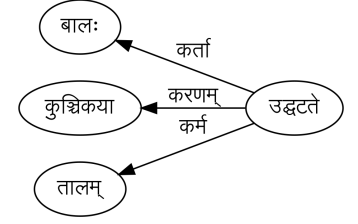
2.4 सम्प्रदानम् (beneficiary)

- Semantics:

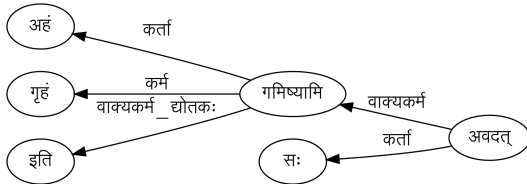- Syntatctic Clue:

- Example:

2.17)Sentence: **देवदत्तः ब्राह्मणाय गां ददाति।**
Gloss: Devadatta{nom} brahman{dat} cow{acc} gives.
Eng: Devadatta gives a cow to a Brahmin.
Analysis:
1. देवदत्तः कर्ता,4
2. ब्राह्मणाय सम्प्रदानम्,4
3. गाम् कर्म,4
4. ददाति अभिहित_कर्ता,1
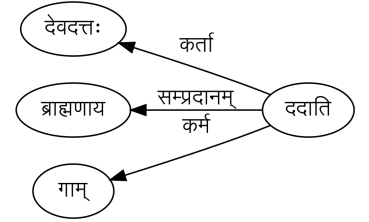
2.18)Sentence: **उपाध्यायः शिष्याय चपेटां ददाति।**
Gloss: Teacher{nom} student{dat} slap gives.
Eng: Teacher slaps the student.
Analysis:
1 उपाध्यायः कर्ता,4
2 शिष्याय सम्प्रदानम्,4
3 चपेटां कर्म,4
4 ददाति अभिहित_कर्ता,1
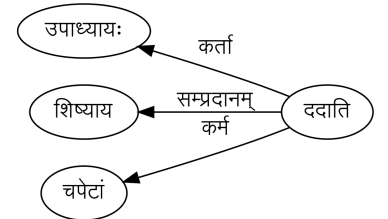
2.5 अपादानम् (source of separation)

- Semantics:

- Syntatctic Clue:

- Example:

2.19)Sentence:**वृक्षात् पर्णं पतति।**
Gloss: tree{abl} leaf{nom} falls.
Eng: Leaf falls from the tree.
Analysis:
1. **वृक्षात् अपादानम्**,3
2. **पर्णम् कर्ता**,3
3. **पतति अभिहित_कर्ता**,2

2.6 अधिकरणम् (location)

- Semantics: The locus where the activity is happening, or where the fruit of the action resides, is termed as an **अधिकरणम्**.

- Syntatctic Clue: It is always marked with the locative case.

- Example:

2.20)Sentence:**वानरः वृक्षे वसति।**
Gloss: Monkey{nom} tree{loc} resides.
Eng: Monkey resides on a tree.
Analysis:
1 **वानरः कर्ता**,3
2 **वृक्षे अधिकरणम्**,3
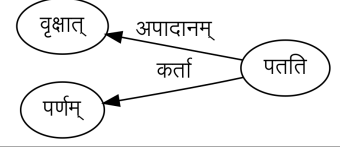3 **वसति अभिहित_कर्ता**,1
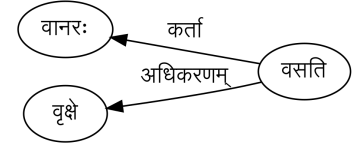
2.6.1 कालाधिकरणम् (location of time)

- Semantics: The location of time is called **कालाधिकरणम्** (location of time). The associated meaning of the word, in this case, denotes the time.

- Syntatctic Clue: This being an **अधिकरणम्** is in locative case.

- Example:

2.21)Sentence:**त्रेता-युगे रामः आसीत्।**
Gloss: Treta-yuga{loc}Rama was.
Eng: Rama existed in Treta-yuga.
Analysis:
1 **त्रेता-युगे कालाधिकरणम्**,3
2 **रामः कर्ता**,3
3 **आसीत् अभिहित_कर्ता**,2

2.6.2 देशाधिकरणम् (location of space)

- Semantics: The location of space is called **देशाधिकरणम्** (location of space). The associated meaning of the word, in this case, denotes the space.

- Syntatctic Clue: This being an **अधिकरणम्** is in locative case.

- Example:

2.22)Sentence:**रामः अयोध्यायाम् आसीत्।**
Gloss: Rama{nom} Ayodhya{loc} is.
Eng: Rama is in Ayodhya.
Analysis:

1. **रामः कर्ता**,3
2. **अयोध्यायाम् देशाधिकरणम्**,3
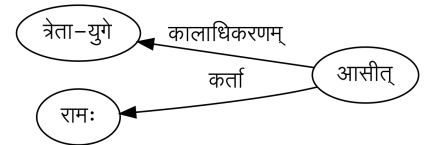3. **आसीत् अभिहित_कर्ता**,1
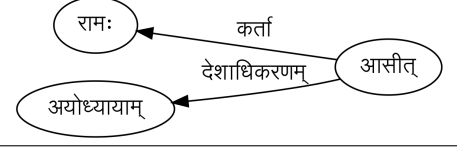
2.6.3 विषयाधिकरणम् (subject/topic)

- Semantics: The word which denotes the subject / topic of the desire / study etc. then it is termed as **विषयाधिकरणम्**.

- Syntatctic Clue: These words satisfy the expectancy of words such as **कुशल**, **इच्छा**, etc. that expect subject / topic, etc.

- Example:

2.23)Sentence:**मोक्षे इच्छा अस्ति।**
Gloss: liberation{loc} desire exists.
Eng: (His) Desire is in liberation.
Analysis:

1. **मोक्षे विषयाधिकरणम्**,2
2. **इच्छा कर्ता**,3
3. **अस्ति अभिहित_कर्ता**,2
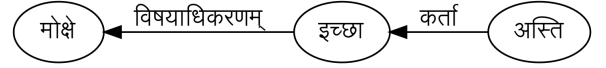
In case machine cannot decide the subtype, it marks the relation as **अधिकरणम्**.

3 कारकेतरसम्बन्धाः

3.1 क्रियाक्रियासम्बन्धाः

3.1.1 पूर्वकालः (preceeding activity)

An action denoted by a word with **कृदन्त** suffix **क्त्वा**, indicates the precedence relation with respect to another verb. Such relations are marked as **पूर्वकालः**.

3.1) Sentence: **रामः दुग्धं पीत्वा शालां गच्छति**
Gloss: Rama{nom} milk{acc} drink{abs} school{acc} goes.
Eng: Rama, having drunk milk, goes to school.
Analysis:
1 **रामः कर्ता**,5
2 **दुग्धम् कर्म**,3
3 **पीत्वा पूर्वकालः**,5
4 **शालाम् कर्म**,5
5 **गच्छति अभिहित_कर्ता**,1
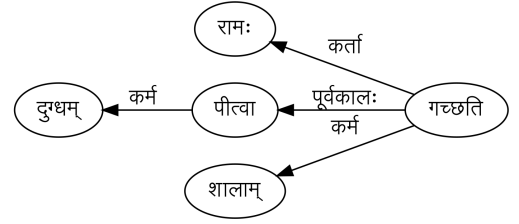
3.2) Sentence: **रामः शालां आगत्य पाठं पठति**
Gloss: Rama{nom} school{acc} arrive{abs} lesson{acc} reads.
Eng: Having arrived the school, Rama reads a lesson.
Analysis:
1 **रामः कर्ता**,5
2 **शालाम् कर्म**,3
3 **आगत्य पूर्वकालः**,5
4 **पाठं कर्म**,5
5 **पठति अभिहित_कर्ता**,1
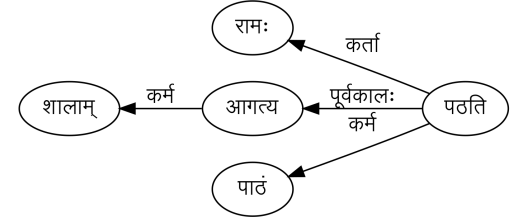
3.1.2 वर्तमानसमानकालः (Simultaneity)

An action denoted by a word with **कृदन्त** suffix **शतृ/ शानच्** indicating a present tense denotes simlutaneity with respect to the action denoted by the main verb. Hence the relation here is called **वर्तमानसमानकालः**.

3.3) Sentence: **बालकः पाठं पठन् गानं श्रृणोति**
Gloss: Child{nom} lesson{acc} reading song{acc} listens.
Eng: Child while reading a lesson listens to a song.
Analysis:
1 **बालकः कर्ता**,4
2 **पाठं कर्म**,3
3 **पठन् वर्तमानसमानकालः**,5
4 **गानं कर्म**,4
5 **श्रृणोति अभिहित_कर्ता**,1
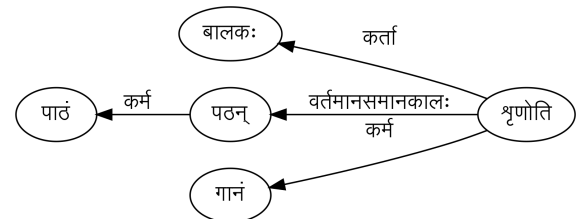
3.4) Sentence: बालकः शयानः हसति
Gloss: Child{nom} sleeping smiles.
Eng: Child smiles while in sleep.
Analysis:

1 बालकः कर्ता,3

2 शयानः वर्तमानसमानकालः,3

3 हसति अभिहित_कर्ता,1
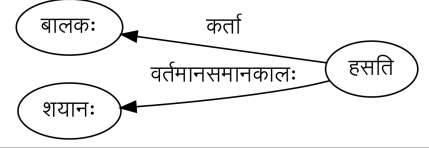
3.1.3 अन्तरकालः (following activity)

A word with **कृदन्त** suffix **शतृ/ शानच्** used in the sense of future tense is related with the main verb by the relation **अनन्तरकालः**, as it denotes simlutaneity in future.

3.5) Sentence:बालकः पाठं पठिष्यन् स्वप्स्यति।
Gloss: Child{nom} lesson{acc} reading will sleep.
Eng: Child will go to sleep while reading a lesson.
Analysis:

1 बालकः कर्ता,4

2 पाठम् कर्म,3

3 पठिष्यन् अनन्तरकालः,4

4 स्वप्स्यति अभिहित_कर्ता,1
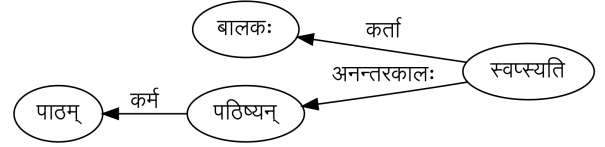
3.6) Sentence:बालकः ग्रन्थं अधीष्यमाणः स्वप्स्यति।
Gloss: Child{nom} book{acc} reading will sleep.
Eng: Child will go to sleep while reading a book.
Analysis:

1 बालकः कर्ता,4

2 ग्रन्थं कर्म,3

3 अधीष्यमाणः अनन्तरकालः,4

4 स्वप्स्यति अभिहित_कर्ता,1
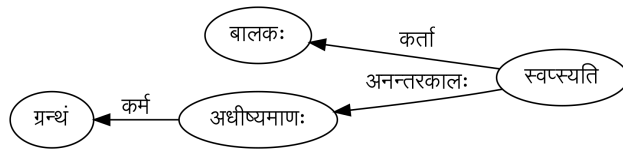
3.1.4 भावलक्षणसप्तमी_अनन्तरकालः (absolute locative in future)

A word ending in **शतृ** or **शानच्** suffix in future tense, followed by the seventh case (locative) suffix indicates an action which will take place later with respect to another action, typically denoted by the main verb. The relation between these two actions is called **भावलक्षणसप्तमी_अनन्तरकालः**.

3.7) Sentence:गोषु घोक्ष्यमाणासु रामः गतः।
Gloss: cow{loc} milching{loc} Rama{nom} went.
Eng: Rama went while milching of the cows was to commence.
Analysis:

1 गोषु कर्म,2

2 घोक्ष्यमाणासु भावलक्षणसप्तमी_अनन्तरकालः,4
3 रामः कर्ता,4
4 गतः अभिहित_कर्ता,3
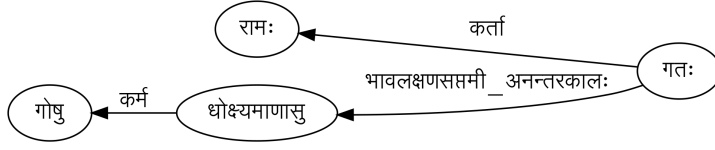
3.1.5 भावलक्षणसप्तमी_पूर्वकालः (absolute locative in past)

A word ending in a क्त suffix followed by a seventh case (locative) suffix precedes the action denoted by the main verb. This relation is marked as भावलक्षणसप्तमी_पूर्वकालः.

3.8) Sentence: रामे वनं गते सति दशरथः खिन्नः अभवत्।
Gloss: Rama{loc} forest{acc} went Dasharatha sad became.
Eng: As Ram went to forest, Dasharatha became sad.
Analysis:
1 रामे कर्ता,3
2 वनं कर्म,3
3 गते_सति भावलक्षणसप्तमी_पूर्वकालः,6
4 दशरथः कर्ता,6
5 खिन्नः कर्तृसमानाधिकरणम्,6
6 अभवत् अभिहित_कर्ता,4
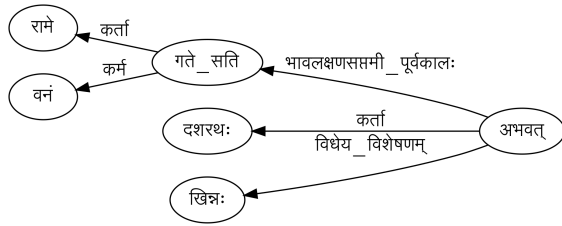
Here the relation of गते_सति with अभवत् is marked as भावलक्षणसप्तमी_पूर्वकालः. The word सति may be absent, as in -

textbfरामे वनं गते दशरथः खिन्नः अभवत्।
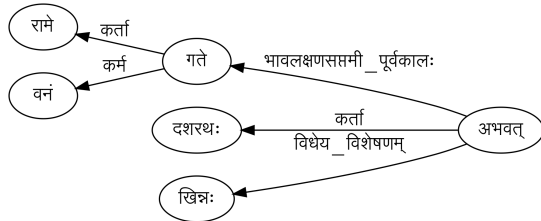
3.1.6 भावलक्षणसप्तमी_समानकालः (absolute locative in present)

A word ending in शतृ or शानच् followed by a seventh case (locative) suffix indicate the simultaneity of the activity with the main activity. This relation is marked as भावलक्षणसप्तमी_समानकालः.

3.9) Sentence: **रामे वनं गच्छति सीता अनुसरति।**

Gloss: Rama{loc} forest{acc} goes Sita follows.

Eng: While Rama goes to forest, Sita follows (him).

Analysis:

1 **रामे कर्ता**,3

2 **वनं कर्म**,3

3 **गच्छति भावलक्षणसप्तमी_समानकालः**,5

4 **सीता कर्ता**,5

5 **अनुसरति अभिहित_कर्ता**,4
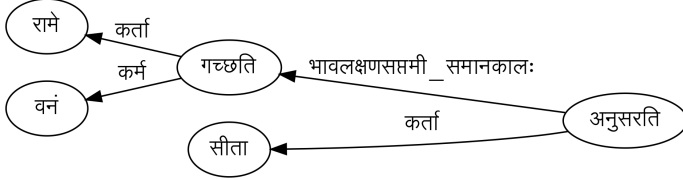
Note: We have introduced above two sets of relations. The one consisting of **भावलक्षणसप्तमी_पूर्वकालः**, **भावलक्षणसप्तमी_समानकालः** and **भावलक्षणसप्तमी_अनन्तरकालः**, where the **कृदन्त** word takes the locative case, and the other set consisting of **पूर्वकालः**, **समानकालः** and **अनन्तरकालः**, where the **कृदन्त** word takes the nominative case. The main difference between these two sets is that, in the case of first set where the **कृदन्त प्रातिपदिकम्** is in locative case, the **कर्ता** for both the activities are different, whereas in the second set of cases, the **कर्ता** of the main activity is the same as that of the sub-ordinate one.

3.1.7 सहायकक्रिया (auxiliary verb)

सः गन्तुं शक्नोति

1 **सः कर्ता**,3

2 **गन्तुं सहायकक्रिया**,3

3 **शक्नोति अभिहित_कर्ता**,1
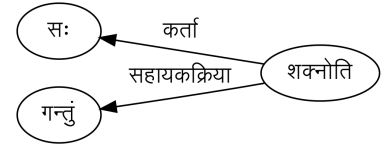
3.2 क्रियासम्बन्धाः

3.2.1 सम्बोध्यः (vocative)

The relation of a word in **सम्बुद्धि** is marked as **सम्बोध्यः** of the corresponding verb. Words such as **भो, अयि, हे, अरे** etc. are the indicators of this relations and hence are marked as **सम्बोधन_द्योतकः** (vocative marker).

भो राम माम् उद्धर।

1 **भो सम्बोधन_द्योतकः**,2

2 **राम सम्बोध्यः**,4

3 **माम् कर्म**,4

4 **उद्धर अभिहित_कर्ता**,1
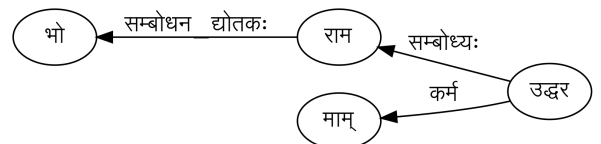
3.2.2 हेतुः (reason/cause)

The relation of 'cause'/ 'reason' is marked by हेतुः, Sanskrit uses either तृतीया or पञ्चमीविभक्ति to mark this relation.

3.10) Sentence: **विद्यार्थी अध्ययनेन विद्यालये वसति।**
Gloss: Student studies{ins} school{loc} stays.
English: Because of his studies, the student stays in the school.
Analysis:
1 विद्यार्थी कर्ता,4
2 अध्ययनेन हेतुः,4
3 विद्यालये अधिकरणम्,4
4 वसति अभिहित_कर्ता,1
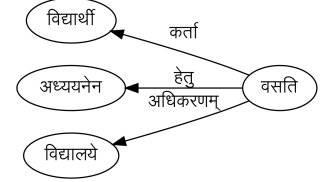
The student is staying in the school, because he has to complete his studies.

3.11) Sentence: **जाड्यात् मूर्खः बद्धः।**
Gloss: ignorance{abl} fool bound.
Eng: Because of the ignorance the fool got tied.
Analysis:
1 जाड्यात् हेतुः,3
2 मूर्खः कर्ता,3
3 बद्धः अभिहित_कर्ता,2
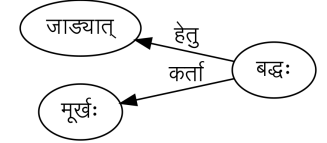
The ignorance is the cause for a fool getting tied.

3.12) Sentence: **दण्डेन घटः अस्ति।**
Gloss: stick{ins} pot{nom} exists.
Eng: The pot exists because of the stick.
Analysis:
1 दण्डेन हेतुः 3
2 घटः कर्ता 3
3 अस्ति अभिहित_कर्ता,2
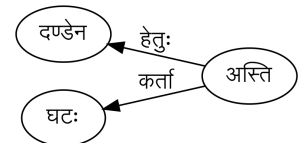
Since a stick is used to make a pot, the stick becomes the reason for its existence.

3.2.3 प्रयोजनम् (purpose)

A kṛdanta verb in **तुमुन्** suffix is used to indicate the **प्रयोजनम्** (purpose).

The verbs in kṛt suffixes indicating an activity (**भावार्थकप्रत्यय**) take **चतुर्थी विभक्ति** or join with the word 'अर्थ' to indicate the **प्रयोजनम्**.

3.13) Sentence: **अहं योग-शास्त्रं पठितुम् विद्यालयं गच्छामि**
Gloss: I yoga-śāstra to_study school{acc} go.
Eng: I go to school to study the Yoga-Śāstra.
Analysis:

1 अहम् कर्ता,5

2 योग-शास्त्रम् कर्म,3

3 पठितुम् प्रयोजनम्,5

4 विद्यालयम् कर्म,5

5 गच्छामि अभिहित_कर्ता,1
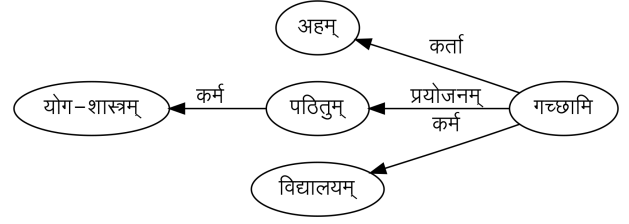
3.14) Sentence: **अहं भवन्तं मम गृहे भोक्तुं आह्वयामि**
Gloss: I you{acc} my house{loc} to_eat invite.
Eng: I invite you to my house for lunch/dinner.
Analysis:

1 अहम् कर्ता,6

2 भवन्तम् कर्म,6

3 मम षष्ठीसम्बन्धः,4

4 गृहे अधिकरणम्,6

5 भोक्तुम् प्रयोजनम्,6

6 आह्वयामि अभिहित_कर्ता,1
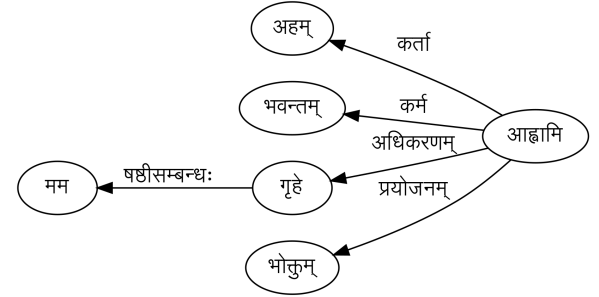
3.15) Sentence: **छात्रः अध्ययनाय विद्यालये वसति।**
Gloss: Student to_study school{loc} stays.
Eng: Student stays in the school to study.
Analysis:

1 छात्रः कर्ता,4

2 अध्ययनाय प्रयोजनम्,4

3 विद्यालये अधिकरणम्,4
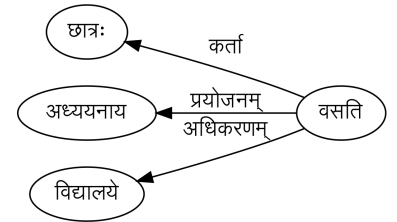
4 वसति अभिहित_कर्ता,1

3.16) Sentence: **छात्रः अध्ययन-अर्थं विद्यालये वसति।**
Gloss: Student for_the_purpose_of_study school{loc} stays.
Eng: Student stays in the school for study-purpose.
Analysis:

1 छात्रः कर्ता,4

2 अध्ययन-अर्थं प्रयोजनम्,4

3 विद्यालये अधिकरणम्,4
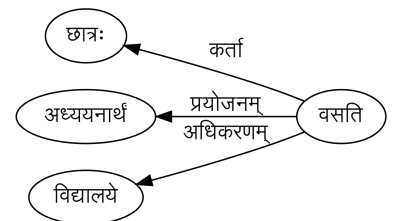
4 वसति अभिहित_कर्ता,1

3.17) Sentence: **सा क्रयणाय आपणम् गच्छति।**
Gloss: She to_purchase shop{acc} goes.
Eng: She goes to the shop to purchase (sth).
Analysis:
1 **सा कर्ता**,4
2 **क्रयणाय प्रयोजनम्**,4
3 **आपणम् कर्म**,4
4 **गच्छति अभिहित_कर्ता**,1
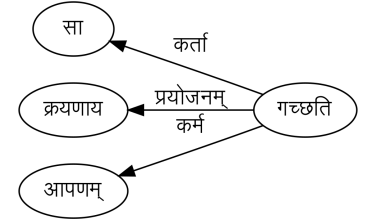
Note: Compare the sentences **छात्रः अध्ययनेन/अध्ययनाय विद्यालये वसति**. With the **तृतीया विभक्तिः**, it is marked as a **हेतुः** and with the **चतुर्थी विभक्तिः** it is marked as **प्रयोजनम्**. Let us try to understand the difference between the two. Let us take a case where the student has joined the school. And there is a vacation. But some students do not want to go home, since they have some backlog and want to continue their studies during the vacation. In such a case, the reason for the student's stay in the school is to complete the backlog by continuing the studies. Hence in such a case an instrumental case is used to mark the relation of **हेतुः**. Now consider another situation where the student has decided to go for further education, and hence he decides to go and stay in the school. Thus, here the purpose os his stay is to study, and a dative case marker is used to mark the relation of **प्रयोजनम्**.

Sometimes the activity which is the purpose for another activity is elided (**लुप्**). In such cases, the **कर्म** of the elided verb takes a dative case marker by the **सूत्र ``क्रियार्थोपपदस्य च कर्मणि स्थानिनः''** (2.3.14). In such cases also we mark the relation as **प्रयोजनम्**. For example, instead of saying **रामः फलं आहर्तुं याति** (Rama goes to bring a fruit), if one says **रामः फलेभ्यः याति** (Rama goes for a fruit), the activity which was the purpose of the main action, is omitted in the verbal expression.

3.18) Sentence: फलेभ्यः याति।
Gloss: fruits{dat} goes.
Eng: (He) goes for fruits.
Analysis:
1 **फलेभ्यः प्रयोजनम्**,2
2 **याति अभिहित_कर्ता**,1
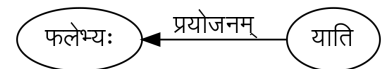
3.19) Sentence: युद्धाय गच्छति।
Gloss: war{dat} goes.
Eng: (He) goes for a war.
Analysis:
1 **युद्धाय प्रयोजनम्**,2
2 **गच्छति अभिहित_कर्ता**,1
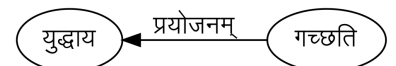
3.2.4   कर्मसमानाधिकरणम् (co-referent of karma)

3.20) Sentence: अहं त्वां मूढं मन्ये
Gloss: I you{acc} fool{acc} consider.
Eng: I consider you a fool.
Analysis:
1 अहं कर्ता,4
2 त्वां कर्म,4
3 मूढं कर्मसमानाधिकरणम्,4
4 मन्ये अभिहित_कर्ता,1
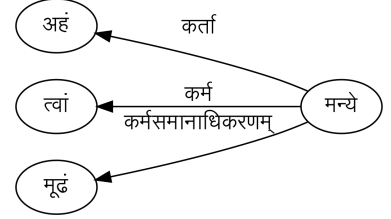
Here the referent of 'you' and 'a fool' are the same.

3.21) Sentence: बालं शयानं पश्य।
Gloss: boy{acc} sleeping{acc} see.
Eng: See the boy sleeping (while in sleep).
Analysis:
1 बालं कर्म,3
2 शयानं कर्मसमानाधिकरणम्,3
3 पश्य अभिहित_कर्ता,1
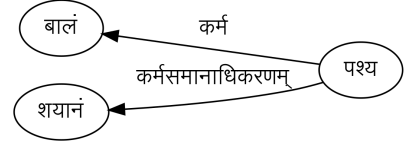
3.2.5   क्रियाविशेषणम् (adverb)

When a word qualifies either an action or the result of an activity, then it is marked as a क्रियाविशेषणम् .

3.22) Sentence: हस्ती मार्गे मन्दं गच्छति।
Gloss: Elephant path{loc} slowly goes.
Eng: Elephant goes slowly on his way.
Analysis:
1 हस्ती कर्ता,4
2 मार्गे अधिकरणम्,4
3 मन्दम् क्रियाविशेषणम्,4
4 गच्छति अभिहित_कर्ता,1
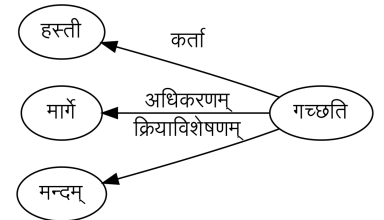
3.23) Sentence: मृगः वेगेन धावति।
Gloss: Deer speed{ins} runs.
Eng: Deer runs with speed (fast).
Analysis:
1 मृगः कर्ता 3
2 वेगेन क्रियाविशेषणम् 3
3 धावति अभिहित_कर्ता,1
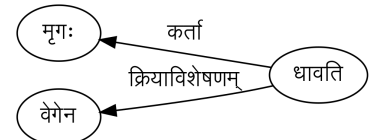
3.24) Sentence: **ब्राह्मणवत् रामः अधीते।**

Gloss: Like a Brahman Rama studies.

Eng: Rama studies like a brahman.

Analysis:

1. **ब्राह्मणवत् क्रियाविशेषणम्**,3

2. **रामः कर्ता**,3

3. **अधीते अभिहित_कर्ता**,2
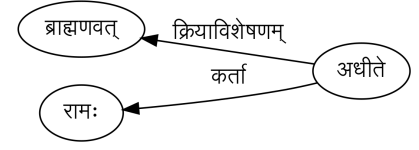
3.2.6 प्रतिषेधः (negation)

In case of a negation, we mark the relation of **न** with the verb as **प्रतिषेधः** as shown below.

3.25) Sentence: **घटः न अस्ति।**

Gloss: Pot not exists.

Eng: Pot does not exist.

Analysis:

1 **घटः कर्ता**,3

2 **न प्रतिषेधः**,3

3 **अस्ति अभिहित_कर्ता**,1
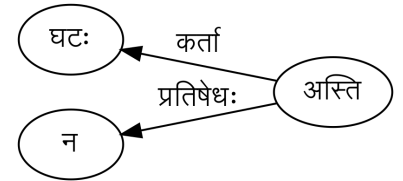
3.3 नामपदसम्बन्धाः

3.3.1 विशेषणम् (adjective)

विशेषणs are of two types - those qualifying the **उद्देश्य**(subject) and the other ones which are **विधेय** (predicate). The **विशेषण**s which qualify the **उद्देश्य** are called **विशेषण**s, and the **विशेषण**s which act as **विधेय**s (predicate) are marked as **विधेय_विशेषणम्** (predicative adjectives). Here are examples.

3.26) Sentence: **दाशरथिः रामः वनं गच्छति।**

Gloss: Dasharathi Rama forest{acc} goes.

Eng: Dasharathi Rama goes to a forest.

Analysis:

1 **दाशरथिः विशेषणम्**,2

2 **रामः कर्ता**,4

3 **वनं कर्म**,4

4 **गच्छति अभिहित_कर्ता**,2
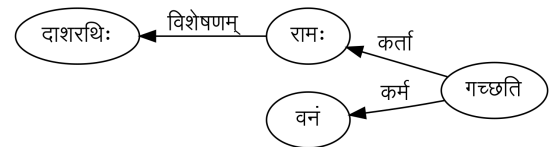
3.27) Sentence: **शयानं बालं पश्य।**

Gloss: Sleeping{acc} boy{acc} see.

Eng: See the sleeping boy.

Analysis:

1 **शयानं विशेषणम्**,2

2 **बालं कर्म**,3

3 **पश्य अभिहित_कर्ता**,0
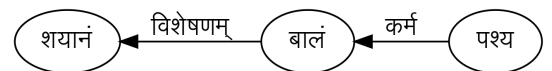
Compare this with **बालं शयानं पश्य** or with **बालः शयानः हसति।** [3.1.2].

3.3.2 विधेय_विशेषणम् (predicative adjective)

3.28) Sentence: **देवदत्तः अध्यापकः अस्ति।**
Gloss: Devadatta teacher is.
Eng: Devadatta is a teacher.
Analysis:
1 देवदत्तः कर्ता,3
2 अध्यापकः विधेय_विशेषणम्, 3
3 अस्ति अभिहित_कर्ता,1
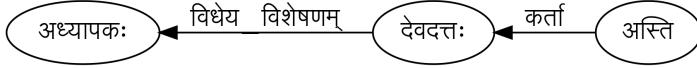
3.29) Sentence: **बालः शयानः अस्ति।**
Gloss: Child sleeping is.
Eng: Child is sleeping.
Analysis:
1 बालः कर्ता,3
2 शयानः विधेय_विशेषणम्, 3
3 अस्ति अभिहित_कर्ता,1
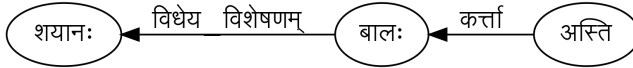
3.30) Sentence: **रामः अध्यापकः भूत्वा छात्रान् पाठं पाठयति।**
Gloss: Rama{nom} teacher{nom} having_become students{acc} lesson{acc} teaches.
Eng: Rama, having become a teacher, teaches students a lesson.
Analysis:
1 रामः प्रयोजककर्ता,6
2 अध्यापकः विधेय_विशेषणम्,3
3 भूत्वा पूर्वकालः,6
4 छात्रान् प्रयोज्यकर्ता,6
5 पाठं कर्म,6
6 पाठयति अभिहित_कर्ता,1
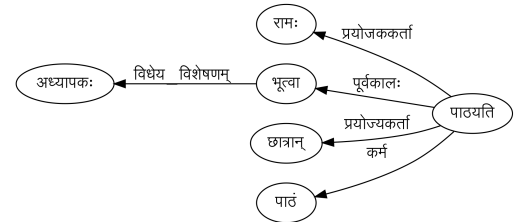
3.3.3 तीव्रतादर्शी (intensifier)

The words such as **बहु**, **अधिकं**, etc that act as an intensifier for the adjectives/adverbs are marked as intensifiers of the adjectives or adverbs.

3.31) Sentence: **सः अतीव सुन्दरं बालकं पश्यति**
Gloss: He very beautiful child sees.
Eng: He sees a very beautiful child.
Analysis:
1 **सः कर्ता**, 5
2 **अतीव तीव्रतादर्शी**,3
3 **सुन्दरं विशेषणम्**, 4
4 **बालकं कर्म**,5
5 **पश्यति अभिहित_कर्ता**,1
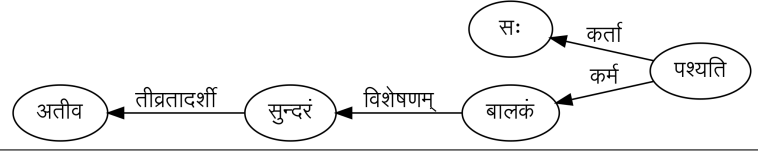
3.3.4 षष्ठीसम्बन्धः (genitive)

The words with **षष्ठीविभक्ति** which do not indicate **कारकविभक्ति**s, are marked simply as **षष्ठीसम्बन्धः**.

3.32) Sentence: **अध्यापकस्य पुस्तकं छात्राः पठन्ति।**
Gloss: Teacher{gen} book students read.
Eng: Students read a teacher's book.
Analysis:
1 **अध्यापकस्य षष्ठीसम्बन्धः**,2
2 **पुस्तकम् कर्म**,4
3 **छात्राः कर्ता**,4
4 **पठन्ति अभिहित_कर्ता**,3
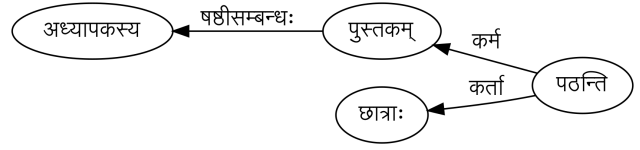
3.3.5 अङ्गविकारः (body deformity)

3.33) Sentence: **बालः अक्ष्णा काणः वर्तते।**
Gloss: child eye{ins} blind is.
Eng: The child is blind with one eye.
Analysis:
1 **बालः कर्ता**,4
2 **अक्ष्णा अङ्गविकारः**,3
3 **काणः विधेय_विशेषणम्**,4
4 **वर्तते अभिहित_कर्ता**,1
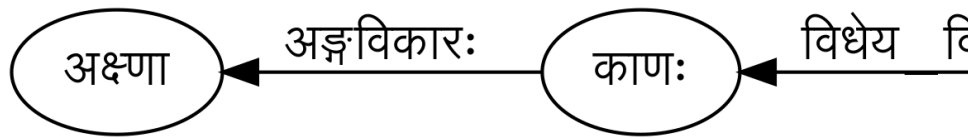
अङ्गम्	विकारः	अङ्गम्	विकारः	अङ्गम्	विकारः	अङ्गम्	विकारः
अक्षिन्	काण	नेत्र	काण	नयन	काण	चक्षुस्	काण
पाद	खञ्ज	चरण	खञ्ज	पाद	कुणि	चरण	कुणि
हस्त	कुण्ठ	पाणि	कुण्ठ	कर	कुण्ठ	चर्म	कुष्ठ
त्वच्	कुष्ठ	पृष्ठ	कुब्ज	कर्ण	बधिर	श्रोत्र	बधिर

3.3.6 वीप्सा (repetition)

When there is a repetition of a word, either to indicate pervasion, or repetition of an action, or to indicate the continuous action, the relation of the first word with its

repetition as second is marked as **वीप्सा** and the relation of second word will have a natural **कारक/अकारकसम्बन्ध** as the case may be. Here are some examples.

3.34) Sentence: **रामः कस्मै कस्मै ददाति।**
Gloss: Rama to whom to whom gives.
Eng: To whom all does Rama give?
Analysis:

1 **रामः कर्ता**,4
2 **कस्मै वीप्सा**,3
3 **कस्मै सम्प्रदानम्**,4
4 **ददाति अभिहित_कर्ता**,1
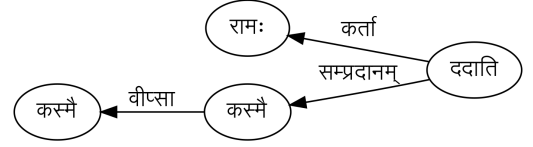
3.35) Sentence: **रामः किं किं ददाति।**
Gloss: Rama what what gives.
Eng: What all does Rama give?
Analysis:

1 **रामः कर्ता**,4
2 **किं वीप्सा**,3
3 **किं कर्म**,4
4 **ददाति अभिहित_कर्ता**,1
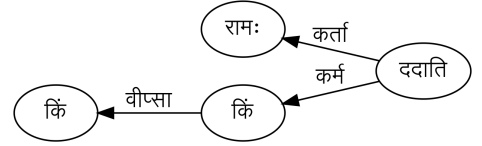
3.36) Sentence: **हस्ती मन्दं मन्दं चलति।**
Gloss: Elephant slow slow walks.
Eng: The elephant walks slowly.
Analysis:

1 **हस्ती कर्ता**,4
2 **मन्दं वीप्सा**,3
3 **मन्दं क्रियाविशेषणम्**,4
4 **चलति अभिहित_कर्ता**,1
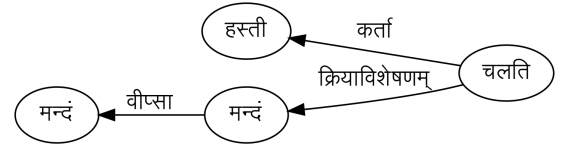
There are two more usages, where the word is repeated but with different **विभक्ति**s. These are

- **अपादान_वीप्सा** (repetition with ablative case)
  In this case the word is used in **पञ्चमी विभक्तिः** followed by the same word in **द्वितीया विभक्तिः**. The word in **पञ्चमी विभक्तिः** represents the source of separation, and the following word in **द्वितीया विभक्तिः** gives the sense of repetition of this activity.

  3.37) Sentence: **वानराः वृक्षात् वृक्षम् कूर्दन्ति।**
  Gloss: Monkeys{nom} tree{abl} tree{acc} jump.
  Eng: Monkeys jump from one tree to another.
  Analysis:

  1 **वानराः कर्ता** 4
  2 **वृक्षात् अपादान_वीप्सा**,3
  3 **वृक्षम् कर्म**,4
  4 **कूर्दन्ति अभिहित_कर्ता**,1
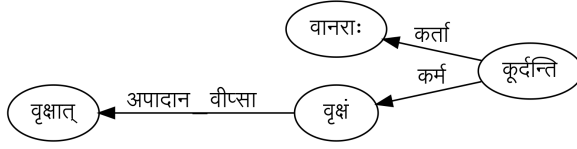
- **करण_वीप्सा** (repetition with instrumental case)
  In this case the word is used in **तृतीया विभक्तिः** case followed by in **द्वितीया विभक्तिः** The word in **तृतीया विभक्तिः** gives the sense of means by which the activity is achieved, and the following word in **द्वितीया विभक्तिः** gives the sense of repetition of this activity.

  3.38) Sentence: **रामः वनेन वनं गच्छति**
  Gloss: Rama{nom} forest{ins} forest{nom} goes.
  Eng: Rama goes from one forest to the other.
  Analysis:
  1 **रामः कर्ता** 4
  2 **वनेन करण_वीप्सा**,3
  3 **वनं कर्म**,4
  4 **गच्छति अभिहित_कर्ता**,1
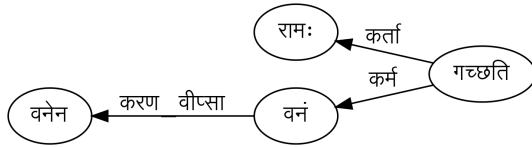
3.3.7 विभक्तम् (separated)

3.39) Sentence: **माथुराः पाटलीपुत्रकेभ्यः आढ्यतराः सन्ति।**
Gloss: The dwellers of Mathura the dwelllers of Pataliputra{abl} richer are.
Eng: The residents of Mathura are richer than the residents of Pataliputra.
Analysis:
1 **माथुराः कर्ता** 4
2 **पाटलीपुत्रकेभ्यः विभक्तम्**,3
3 **आढ्यतराः विधेय_विशेषणम्**,4
4 **सन्ति अभिहित_कर्ता**,1

3.3.8 ल्यप्कर्माधिकरणम्

6

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6   Not handled by the current parser.
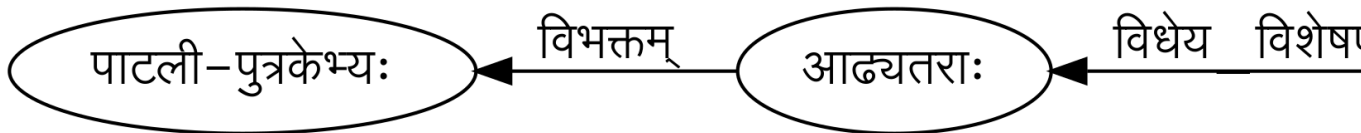
प्रासादात् प्रेक्षते।	

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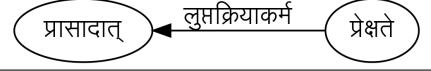
or

</div>

आसनात् प्रेक्षते।	
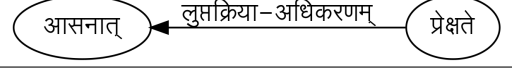
Here the words **प्रासादात्** or **आसनात्** do not have any direct relation with **प्रेक्षते**. So in order to have a proper **शाब्दबोध** of these sentences, it is necessary to supply the missing verb such as **आरुह्य** or **उपविश्य**. After supplying this missing **क्रिया**, sentences change to **प्रासादम् आरुह्य प्रेक्षते** or **आसने उपविश्य प्रेक्षते** and then the relation of **प्रासादम्** with **ल्यबन्त** word **आरुह्य** is that of **कर्म** . Similarly the relation of **आसने** with **उपविश्य** is that of **ल्यप्-अधिकरणम्**. Whenever **ल्यप्** word is missing in a sentence we mark the relation of **आसनात्** with **प्रेक्षते** as **ल्यप्कर्माधिकरणम्** following the **वार्तिक ` ल्यब्लोपे कर्मण्यधिकरणे च'**.

3.40) Sentence: **रामः आसनात् प्रेक्षते**
Gloss: Rama seat{loc} watches.
Eng: Rama watches from his seat.
Analysis:
1 **रामः कर्ता** 3
2 **आसनात् ल्यप्कर्माधिकरणम्,**3
3 **प्रेक्षते अभिहित_कर्ता,**1
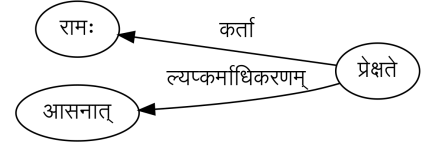
3.3.9   निर्धारणम् (determiner)

3.41) Sentence: **रामः क्षत्रियेषु शूरः अस्ति।**
Gloss: Rama kshatriya{loc} brave is.
Eng: Among the Kshatriyas, Rama is brave.
Analysis:
1. **क्षत्रियेषु निर्धारणम्,**2
2. **शूरः विधेय_विशेषणम्,**3
3. **रामः कर्ता,**4
4. **अस्ति अभिहित_कर्ता,**1
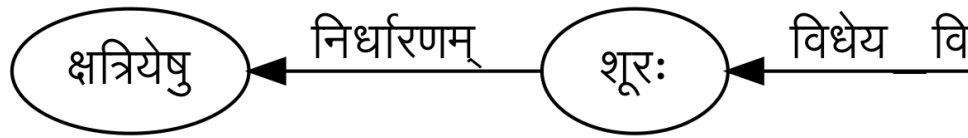
3.3.10   अत्यन्तसंयोगः (continuous)

When a **कालवाचि** (a word denoting time) and **अध्ववाचि** (a word denoting the path) takes an accusative case-marker, we mark the relation of such words with the verb as **अत्यन्तसंयोगः**. The semantics associated is – the activity denoted by the verb is continued throughout the time period / along the path, continuously/uniformly/regularly. 'Continuously' means 'without any break'.

3.42) Sentence: **रामः मासं अधीते।**
Gloss: Rama month{acc} sudies.
Eng: Rama studies continuously for a month.
Analysis:
1. **रामः कर्ता**,3
2. **मासम् अत्यन्तसंयोगः**,3
3. **अधीते अभिहित_कर्ता**,1
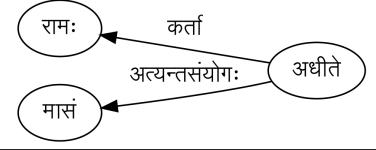
3.42a) Sentence: **रामः क्रोशं स्वपिति।**
Gloss: Rama one kilometer sleeps.
Eng: Rama sleeps (during travel) throughout one kilometer.
Analysis:
1. **रामः कर्ता**,3
2. **क्रोशं अत्यन्तसंयोगः**,3
3. **स्वपिति अभिहित_कर्ता**,1
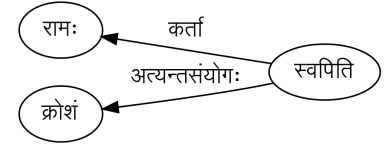
3.3.11 अपवर्ग_सम्बन्धः (completion)

When a **कालवाचि** and **अध्ववाचि** takes an instrumental cases, we mark the relation of such words with the verb as **अपवर्गः**. It just indicates the time period / space required to complete the activity. Unlike the earlier case, here the activity need not be carried out without any break.

3.43) Sentence: **रामः मासेन अधीते।**
Gloss: Rama month{ins} studies.
Eng: Rama studies within a month.
Analysis:
1. **रामः कर्ता**,3
2. **मासेन अपवर्गः**,3
3. **अधीते अभिहित_कर्ता**,1
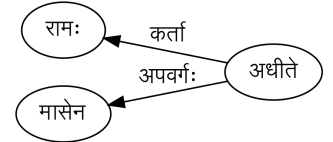
3.3.12 उपमानम् (analogy)

A word which provides an analogy for the other one, one which resembles the other one, one which is used for comparing the other one, is called an **उपमानम्**. The word **इव** acts as an indicator of this relation, and hence is called as **उपमान_द्योतकः**.

3.44) Sentence: **चन्द्रम् इव मुखं पश्य।**
Gloss: Moon like face{acc} see.
Eng: See the moon like face. (as beautiful as moon)
Analysis:
1 **चन्द्रम् उपमानम्**,3
2 **इव उपमान_द्योतकः**,1
3 **मुखं कर्म**,4
4 **पश्य अभिहित_कर्ता**,1
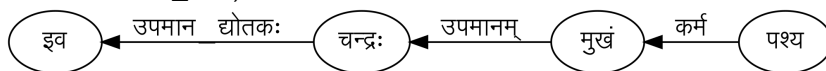
3.3.13 सञ्ज्ञा (Name)

The names marked with the word **नाम** are labeled as **सञ्ज्ञा**. The word **नाम** is marked as a **सञ्ज्ञा_द्योतकः**.

3.45) Sentence: **मारीचः नाम राक्षसः आसीत्**
Gloss: Mārīca{nom} name daemon{nom} be{past}
Eng: There was a daemon by name Mārīca
Analysis:
1 मारीचः, सञ्ज्ञा,3
2 नाम सञ्ज्ञा_द्योतकः,1
3 राक्षसः कर्ता,4
4 आसीत् अभिहित_कर्ता,3
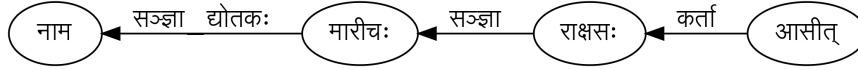
3.3.14 घटकः (member)

The list of names marked with the word **इति** are labeled as **घटकः**. The word **इति** is marked as a **घटक_द्योतकः**.

3.46) Sentence: **तस्य बहु-शक्तिः उग्र-शक्तिः अनन्त-सक्तिः च इति त्रयः पुत्राः आसन्**
Gloss: His Bahu-Sakti Ugra-Sakti Anant-Sakti and namely three sons bepast.
Eng: He had three sons viz. Bahu-Sakti Ugra-Sakti and Ananta-Sakti.
Analysis:
1 तस्य, षष्ठीसम्बन्धः,3
2 बहु-शक्तिः घटकः,7
3 उग्र-शक्तिः घटकः,7
4 अनन्त-शक्तिः घटकः,7
5 इति घटक_द्योतकः,7
6 त्रयः विशेषणम्,7
7 पुत्राः कर्ता,8
8 आसन् अभिहित_कर्ता,7
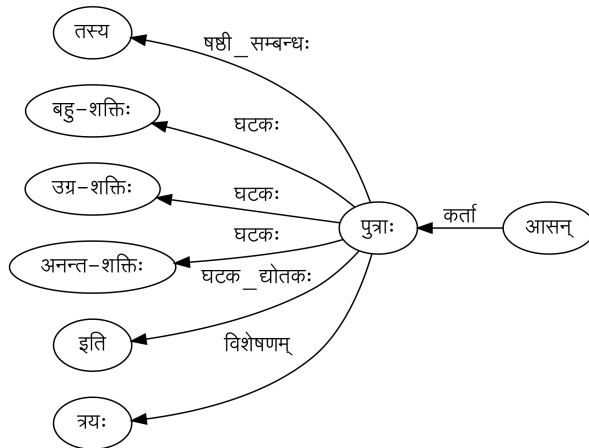
3.4 सम्बन्धः (relation)

There are certain words such as **स्म, एव** etc. whose relations are decided by the meaning of these words. There is no other suffix indicating their relations. For example, the word **स्म** indicates the past tense. The word **एव** indicates **अवधारण** (emphasis). We mark the relation of such words with its relata as **सम्बन्धः** (sambandhaḥ). The word **सम्बन्धः** here stands for **यत्-पदम्-तत्-योग्य-सम्बन्ध**. That is, if the relation is with **एव**, then it is **एव-योग्य-सम्बन्धः**.

1. स्म

3.47) Sentence: **कृष्णः मथुरायां वसति स्म।**
Gloss: Krishna{nom} mathura{loc} stays past_tense_marker.
Eng: Krishna stayed in Mathura.
Analysis:
1 कृष्णः कर्ता,4
2 मथुरायां अधिकरणम्,3
3 वसति अभिहित_कर्ता,1
4 स्म सम्बन्धः,3
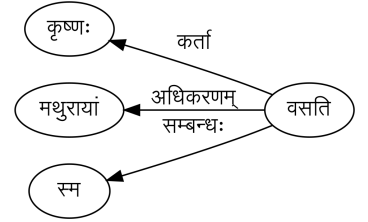
2. एव

3.48) Sentence: **रामः एव सुन्दरः अस्ति।**
Gloss: Rama only beautiful is.
Eng: Only Rama is beautiful.
Analysis:
1 रामः कर्ता,4
2 एव सम्बन्धः,1
3 सुन्दरः विधेय_विशेषणम्,4
4 अस्ति अभिहित_कर्ता,1
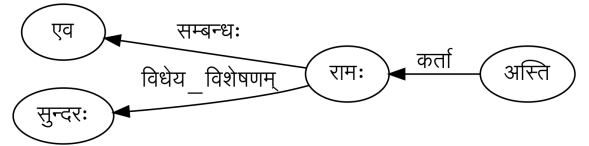
3.49) Sentence: **रामः सुन्दरः भवति एव।**
Gloss: Rama beautiful is indeed.
Eng: Indeed, Rama is beautiful.
Analysis:
1 रामः कर्ता,3
2 सुन्दरः विधेय_विशेषणम्,3
3 भवति अभिहित_कर्ता,1
4 एव सम्बन्धः,4
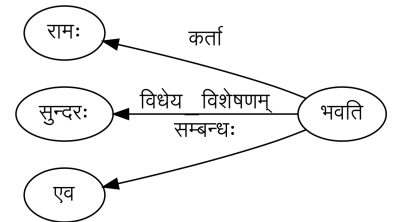
3.50) Sentence: **रामः सुन्दरः एव भवति।**
Gloss: Rama beautiful emphatic_marker is.
Eng: Rama is really/truly beautiful.
Analysis:
1 रामः कर्ता,4
2 सुन्दरः विधेय_विशेषणम्,4
3 एव सम्बन्धः,2
4 भवति अभिहित_कर्ता,1
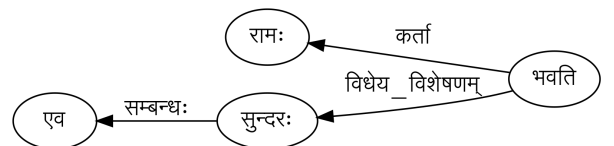
3. अपि

3.51) Sentence: **सीता अपि वनं गच्छति।**
Gloss: Sita also forest{acc} goes.
Eng: Sita also goes to the forest.
Analysis:
1 सीता कर्ता,4
2 अपि सम्बन्धः,1
3 वनं कर्म,4
4 गच्छति अभिहित_कर्ता,1
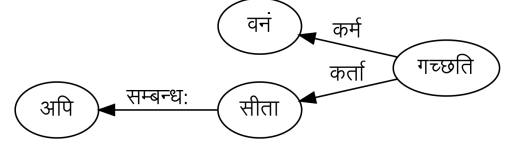
In case, there is any doubt regarding what the correct relation is, we mark it just as a **सम्बन्धः**, without specifying any further sub-type.

4 उपपदसम्बन्धाः (Upapada-Relations)

The word placed near or an adjoining word is called an *upapada*. An *upapada* governs the case marker of the accompanying word. These case markers are termed as *upapada-vibhkati*s (case marker due to adjoining word).

Thus there is a morpho-syntatctic relation between an *upapada* and the accompanying word whose case marker is goverened by it. These **उपपद**s are related to other nouns or verbs by specific relations such as **कारक** relation or **विशेषण** etc.

Upapadas may be classified in two different ways.

- **विभक्त्याधारित** (Based on their morpho-syntactic properties)
- **अर्थाधारित** (Based on the semantics they express)

Pāṇini's sūtras provide information about which case marker is assigned by which upapadas under what condition. For tagging we look at the semantic information associated with the words with whom the upapadas are related.

Here are some examples:

4.1 सन्दर्भ_बिन्दुः (Reference point for direction)

Consider the sentence
ग्रामं परितः वृक्षाः सन्ति।
The *upapada* '*paritaḥ*' (surrounding) has an expectancy for a reference point viz. 'surrounding what?'. And *grāma* (village) acts as a reference point for the word *paritaḥ*. Hence we call this relation a reference point for direction, and analyse sentence as shown below.

4.1) Sentence: **ग्रामं परितः वृक्षाः सन्ति।**
Gloss: village{acc} surrounding trees exist.
English: There are trees surrounding the village.
Analysis:

1. ग्रामं सन्दर्भ_बिन्दुः,2
2. परितः अधिकरणम्,4
3. वृक्षाः कर्ता,4
4. सन्ति अभिहित_कर्ता,3
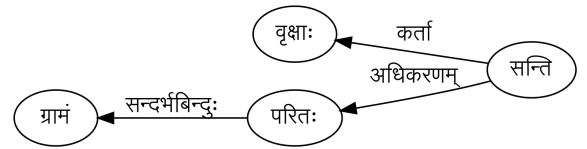
4.1.1 तुलना_बिन्दुः (Reference point for comparison)

Now consider the sentence
श्यामेन तुल्यः रामः अस्ति।
Here the *upapada* '*tulyaḥ*' (comparable) has an expectancy for a reference for comparison. And Śyāma acts as a point of reference for comparison. Hence the relation of *tulyaḥ* with *Śyāmena* is marked as a reference point of comparison.

4.2) Sentence: **श्यामेन तुल्यः रामः अस्ति।**
Gloss: Syama{ins} comparable Rama is.
Eng: Rama is comparable to Syama.
Analysis:
1. **श्यामेन तुलना_बिन्दुः**,2
2. **तुल्यः विधेय_विशेषणम्**,4
3. **रामः कर्ता**,4
4. **अस्ति अभिहित_कर्ता**,3
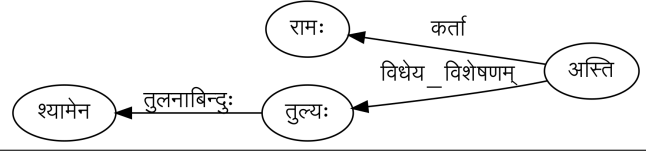
4.1.2 सहार्थः (Association)

In the sentence
रामेण सह सीता वनं गच्छति ।
rāma receives an instrumental case marker due to the presence of the *upapada* '*saha*'.

In this sentence the agreement of the verb is with *Sītā*, and not with *Rāma*. According to the sūtra *sahayukte'pradhāne*(2.3.19), "*saha* is used with the *apradhāna* (sub-ordinate)-*kāraka*". Thus in this example, *Sītā* is the *kartā* of the action associated with the verb *gacchati* and *Rāma* is the *saha-kartā*(associative agent). The *upapada* '*saha*' does not have any semantic role, unlike the *upapada* '*paritaḥ*' in the previous example.

4.3) Sentence: **रामेण सह सीता वनं गच्छति ।**
Gloss: Rama{ins} with Sita forest{acc} goes.
Eng: Sita goes to the forest with Rama.
Analysis:
1 **रामेण सहार्थः**,5
2 **सह सहार्थ_द्योतकः:**,1
3 **सीता कर्ता**,5
4 **वनं कर्म**,5
5 **गच्छति अभिहित_कर्ता**,3
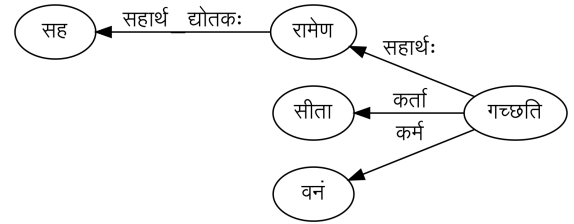
4.1.3 विनार्थः (Dis-association)

4.4) Sentence: **रामेण विना श्यामः वर्तते ।**
Gloss: Rama{ins} without Syama exists.
Eng: Syama exists without Rama.
Analysis:
1 **रामेण विनार्थः**,4
2 **विना विनार्थ_द्योतकः:**,1
3 **श्यामः कर्ता**,3
4 **वर्तते अभिहित_कर्ता**,3
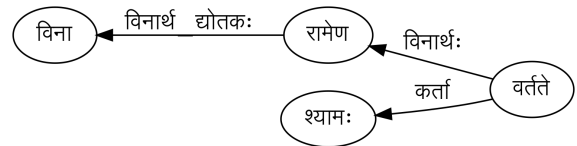
List of upapadas governing various vibhaktis

द्वितीयाविभक्तिः	चतुर्थीविभक्तिः	ऋते	समीपे
अधरेण	अर्थः	दक्षिणम्	समीपेन
अधोघः	अलम्	दक्षिणा	
अधोऽधः	आयुष्यम्	दक्षिणा	षष्ठीविभक्तिः
अध्यधि	कुशलम्	दक्षिणान्	अग्रतः
अन्तरा	चिरञ्जीवितम्	दक्षिणे	अधः
अन्तरेण	नमः	दूरा	अधरात्
अभितः	निरामयम्	दूरात्	अधरेण
उत्तरेण	भद्रम्	दूरान्	अधस्तात्
उपर्युपरि	मद्रम्	दूरे	अधिपतिः
उभयतः	वषट्	दूरेण	अन्तः
दक्षिणेन	शाम्	नाना	अन्तिकम्
धिक्	सुखम्	निकटम्	अन्तिकात्
नाना	स्वधा	निकटात्	अन्तिकान्
निकषा	स्वस्ति	निकटान्	अन्तिके
परितः	स्वाहा	निकटे	अन्तिकेन
पृथक्	हितम्	निकटेन	अभ्याशः
यावत्		पश्चिमं	अभ्याशम्
विना	पञ्चमीविभक्तिः	पश्चिमा	अभ्याशा
समया	अन्तिकम्	पश्चिमान्	अभ्याशात्
सर्वतः	अन्तिकात्	पूर्व	अभ्याशान्
हा	अन्तिकान्	पूर्वा	अभ्याशे
	अन्तिके	पूर्वान्	अभ्याशेन
तृतीयाविभक्तिः	अन्तिकेन	पृथक्	अर्थः
अलम्	अन्यः	प्रतीची	अर्थे
उत्सुक	अन्या	प्रत्यक्	अवः
उत्सुका	अभ्याशः	प्रत्यञ्च	अवरतः
तुल्य	अभ्याशाम्	प्रभृति	अवरतः
तुल्या	अभ्याशा	प्राक्	अवरस्तात्
नाना	अभ्याशात्	प्राची	अवस्तात्
पृथक्	अभ्याशान्	प्राञ्च	आयुष्यम्
प्रसित	अभ्याशे	बहिः	ईश्वर
प्रसिता	अभ्याशेन	भिन्न	उत्तरतः
युक्त	अवाची	भिन्ना	उत्तरात्
विना	अवाच्	विना	उत्तरेण
सदृक्ष	आरभ्य	विप्रकृष्टम्	उपरि
सदृक्षा	आरात्	विप्रकृष्टा	उपरिष्टात्
सदृक्षी	इतर	विप्रकृष्टात्	कुशलम्
सदृश	इतरा	विप्रकृष्टान्	कृते
सदृशा	उत्तरम्	विप्रकृष्टे	चिरञ्जीवितम्
समम्	उत्तरा	विप्रकृष्टेन	तुल्य
समा	उत्तरान्	विलक्षण	तुल्या
समान	उत्तराहि	विलक्षणा	दक्षिणतः
समाना	उत्तरे	समीपम्	दक्षिणात्
सह	उदक्	समीपात्	दक्षिणाहि
साकम्	उदच्	समीपान्	दक्षिणेन
साधर्म्	उदीची		दायाद

दूरम्	भद्रम्	समीपे	उत्सुका
दूरा	मद्रम्	समीपेन	कुशल
दूरात्	विना	साक्षिणं	कुशला
दूरान्	विप्रकृष्टम्	साक्षिणी	दायाद्
दूरे	विप्रकृष्टा	साक्षिन्	निपुण
दूरेण	विप्रकृष्टात्	सुखम्	निपुणा
निकटम्	विप्रकृष्टान्	स्वामिनी	प्रतिभू
निकटात्	विप्रकृष्टे	स्वामिन्	प्रसितः
निकटान्	विप्रकृष्टेन	हितम्	प्रसिता
निकटे	शम्		प्रसूत
निकटेन	सदृक्ष	सप्तमीविभक्तिः	प्रसूता
निरामयम्	सदृक्षा	अधिपतिः	लग्न
परतः	सदृक्षी	अनुरक्त	लग्ना
परस्तात्	सदृश	अनुरक्ता	साक्षिणी
पश्चात्	सदृशा	असाधु	साक्षिन्
पुरः	समा	आयुक्त	साधु
पुरतः	समान	आयुक्ता	स्वामिनी
पुरस्तात्	समाना	आसक्त	स्वामिन्
प्रतिभू	समीपम्	आसक्ता	
प्रसूतः	समीपात्	ईश्वर	
प्रसूता	समीपान्	उत्सुक	

List of upapadas classified with the associated semantics

सन्दर्भबिन्दुः	परस्तात्	दक्षिणाहि
आरात्	परतः	दक्षिणान्
अभितः	परितः	दक्षिणात्
अभ्याशा	प्राञ्च	दक्षिणम्
अभ्याशान्	प्राची	दक्षिणतः
अभ्याशात्	प्रतीची	दक्षिणे
अभ्याशः	प्रत्यञ्च	दक्षिणेन
अभ्याशम्	प्रत्यक्	
अभ्याशे	पुरः	तुलनाबिन्दुः
अभ्याशेन	पुरस्तात्	भिन्ना
अधः	पुरतः	भिन्न
अधरात्	समीपान्	अन्या
अधरेण	समीपात्	अन्यः
अधस्तात्	समीपम्	समा
अधोघः	समीपे	समाना
अधोऽधः	समीपेन	समान
अध्यधि	समया	सदृशा
अग्रतः	सर्वतः	सदृश
अन्तः	उभयतः	सदृक्षा
अन्तिकान्	उपरि	सदृक्षी
अन्तिकात्	उपरिष्टात्	सदृक्ष
अन्तिकम्	उपर्युपरि	विलक्षणा
अन्तिके	उत्तरा	विलक्षण
अन्तिकेन	उत्तराहि	तुल्या
अवाच्	उत्तरान्	तुल्य
अवाची	उत्तरात्	
अवः	उत्तरम्	विषयाधिकरणम्
अवरस्तात्	उत्तरतः	आसक्ता
अवरतः	उत्तरे	आसक्त
अवस्तात्	उत्तरेण	आयुक्ता
बहिः	उदीची	आयुक्त
इतरा	उदच्	अनुरक्ता
इतर	उदक्	अनुरक्त
निकषा	विप्रकृष्टा	असाधु
निकटान्	विप्रकृष्टान्	कुशला
निकटात्	विप्रकृष्टात्	कुशल
निकटम्	विप्रकृष्टम्	लग्ना
निकटे	विप्रकृष्टे	लग्न
निकटेन	विप्रकृष्टेन	निपुणा
पूर्वा	दूरा	निपुण
पूर्वान्	दूरान्	प्रसूतः
पूर्वं	दूरात्	प्रसिता
पश्चात्	दूरम्	प्रसित
पश्चिमा	दूरे	प्रसितः
पश्चिमान्	दूरेण	साधु
पश्चिमं	दक्षिणा	उत्सुका
		उत्सुक

उत्सुकः
युक्त

प्रयोजनम्
आयुष्यम्
भद्रम्
शम्
अर्थे
चिरञ्जीवितम्
हितम्
कृते
कुशलम्
मद्रम्
निरामयम्
सुखम्
स्वाहा
स्वधा
स्वस्ति
वषट्

स्वामी
ईश्वर
अधिपतिः

प्रतिभू
साक्षिणी
साक्षिणं
साक्षिन्
स्वामिन्
स्वामिनी
दायाद

सहार्थः
साकम्
साधर्म्
सह
समम्

विनार्थः
अन्तरा
अन्तरेण
नाना
पृथक्
विना

निर्धारणम्
प्रसूता
प्रसूतः

उद्धारवाचकः
धिक्
हा

कर्तृसमानाधिकरणम्
अलम्

स्रोतः
आरभ्य
प्रभृति

अन्यसम्बन्धाः
यावत्
अर्थे
अलम्
नमः
ऋते
नाना
प्राक्

5 वाक्येतरसम्बन्धाः (Inter Sentential Relations)

When a sentence has more than one तिङन्तs, then the relation between the two वाक्यs formed by these two तिङन्तs get established in three ways:

1. Single Connector such as किन्तु, परन्तु, etc..,
2. Connectors which occur in pairs,
3. Quotative marker इति .

5.1 Single Connector such as किन्तु, परन्तु, etc.

Such connectors join two sentences, which are complete individually. After the first sentence, the second sentence starts with connectors such as किन्तु/परन्तु. The connector connects with the verb of the second sentence with अनुयोगी and with the verb of the previous sentence with प्रतियोगि relation.

5.1) Sentence: गजेन्द्रः तीव्र-प्रयत्नम् अकरोत् किन्तु नक्र-ग्रहात् न मुक्तः।
Gloss: Gajendra best-efforts did. But crocodile-hold-from not free
Eng: Gajendra tried his level best, but he could not free (himself) from the hold of the crocodile.

Analysis:

1 गजेन्द्रः कर्ता,3
2 तीव्र-प्रयत्नम् कर्म,3
3 अकरोत् प्रतियोगी,4; अभिहित_कर्ता,1
4 किन्तु अनुयोगी,7
5 नक्र-ग्रहात् अपादानम्,7
6 न प्रतिषेधः,7
7 मुक्तः अभिहित_कर्ता,1
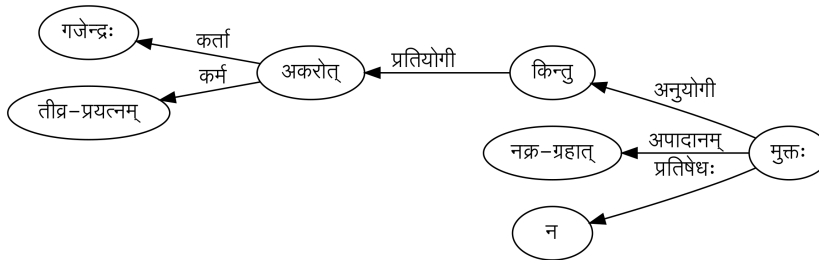
5.2 Connectors which occur in pairs

When sentences are connected by pair of connectors such as:

1. यदि तर्हि
2. यद्यपि तथापि
3. यतः ततः/अतः
4. यावत् तावत्

Here we mark the relations between each of the individual sentences separately, and mark the relations between the main verbs in each of the sentences with **यदि** and **तर्हि**, etc. respectively by **प्रतियोगी** and **अनुयोगी** and the words **यदि-तर्हि** etc. are connected with each other by the relation **नित्यसम्बन्ध:**.

5.2) Sentence: **यदि त्वं इच्छसि तर्हि अहं भवतः गृहम् आगमिष्यामि।**
Gloss: If you wish then I will come to your house.
English: If you wish then I'll visit your house.

Analysis:

1 यदि नित्यसम्बन्धः,4
2 त्वं कर्ता,3
3 इच्छसि प्रतियोगी,1; अभिहित_कर्ता,2
4 तर्हि अनुयोगी,4
5 अहं कर्ता,8
6 भवतः षष्ठीसम्बन्धः,7
7 गृहम् कर्म,8
8 आगमिष्यामि अभिहित_कर्ता,5
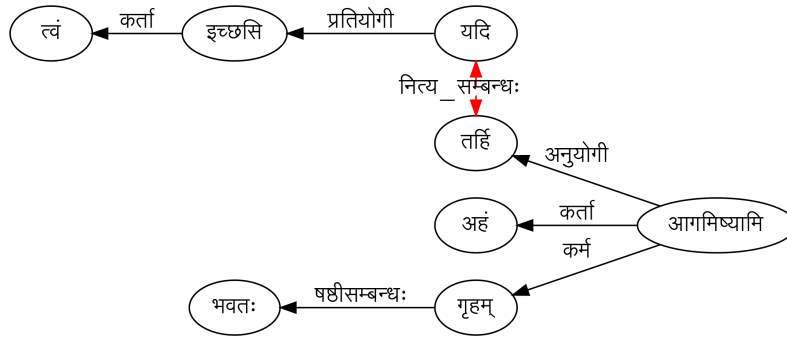
Thus the overall head/ **मुख्यविशेष्य** of the pair of sentences is **आगमिष्यामि**.

5.3) Sentence: **यद्यपि अयं बहु प्रयासं कृतवान् तथापि परीक्षायां उत्तीर्णः न अभवत्**
Gloss: Though he did many efforts still in the examination pass not happen.
English: Though he took a lot of efforts, still he could not pass the examination.

Analysis:

1 यद्यपि नित्यसम्बन्धः,6
2 अयं कर्ता,5
3 बहु क्रियाविशेषणम्,4
4 प्रयासं कर्म,5
5 कृतवान् प्रतियोगी,1; अभिहित_कर्ता,2
6 तथापि अनुयोगी,10
7 परीक्षायां अधिकरणम्,10
8 उत्तीर्णः कर्ता,10

9 न प्रतिषेधः,10
10 अभवत् अभिहित_कर्ता,2
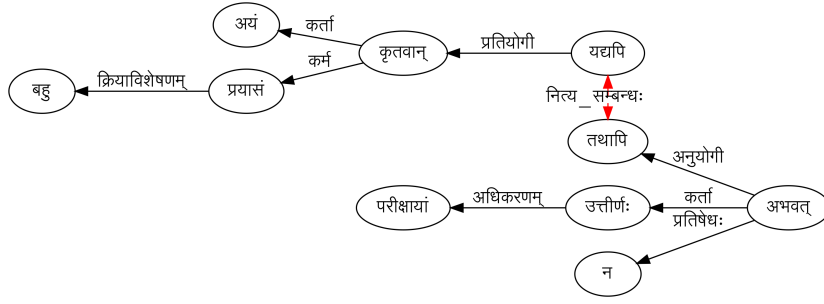
5.4) Sentence: **यतः सः समये न आगतः ततः परीक्षायां न अनुमतः।**
Gloss: Since he in time not come, therefore in the examination not allowed.
Eng: Since he did not come on time, he was not allowed to (take) the examination.

Analysis:

1 **यतः नित्यसम्बन्धः**,6
2 **सः कर्ता**, 5
3 **समये अधिकरणम्**,5
4 **न प्रतिषेधः**,4
5 **आगतः अभिहित_कर्ता**,5
6 **ततः अनुयोगी**,9
7 **परीक्षायां अधिकरणम्**,9
8 **न प्रतिषेधः**,9
9 **अनुमतः**

*** This is being worked out ***

Many a times, one of the two connectives from **यदि तर्हि, यद्यपि तथापि , यतः ततः/अतः, यावत्
तावत्** is absent. In such cases, the marking is similar to the one discussed in the previous
section with single connectors.

5.5) Sentence: **त्वम् इच्छसि तर्हि अहं भवतः गृहं आगमिष्यामि**
Gloss: You wish then I will come to your house.
English: If you wish then I'll visit your house.

Analysis:

1 **त्वम् कर्ता**,2
2 **इच्छसि प्रतियोगी**,3; **अभिहित_कर्ता**,1
3 **तर्हि अनुयोगी**,7
4 **अहं कर्ता**,7
5 **भवतः षष्ठीसम्बन्धः**,6
6 **गृहम् कर्म**,7
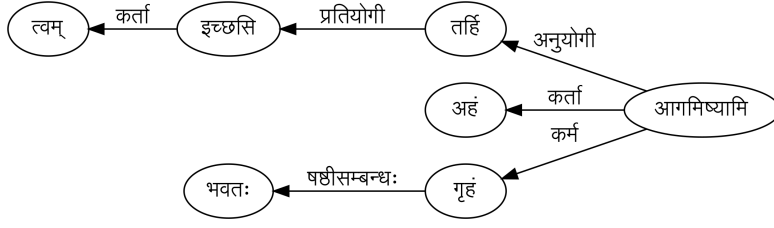
7 आगमिष्यामि अभिहित_कर्ता,4

5.6) Sentence: **त्वम् इच्छसि चेत् अहं भवतः गृहं आगमिष्यामि।**
Gloss: You wish provided, I will come to your house.
English: Provided you wish, I'll visit your house.

Analysis:

1 त्वम् कर्ता,2
2 इच्छसि प्रतियोगी,3 ; अभिहित_कर्ता,1
3 चेत् अनुयोगी,7
4 अहं कर्ता,7
5 भवतः षष्ठीसम्बन्धः,6
6 गृहम् कर्म,7
7 आगमिष्यामि अभिहित_कर्ता,4
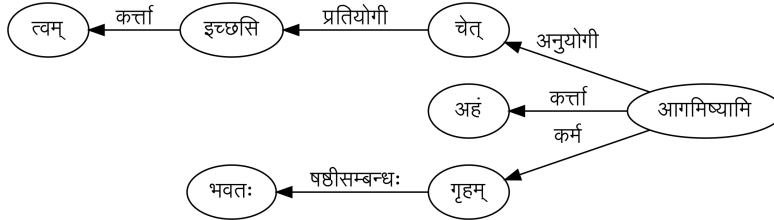
5.7) Sentence: **यदि त्वम् इच्छसि अहं भवतः गृहं आगमिष्यामि।**
Gloss: If you wish provided, I will come to your house.
English: If you you wish, I'll visit your house.

Analysis:

1 यदि अनुयोगी,7
2 त्वम् कर्ता,2
3 इच्छसि प्रतियोगी,1 ; अभिहित_कर्ता,2
4 अहं कर्ता,6
5 भवतः षष्ठीसम्बन्धः,5
6 गृहम् कर्म,6
7 आगमिष्यामि अभिहित_कर्ता,4
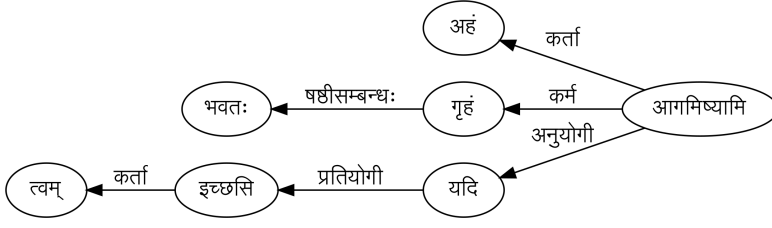
5.8) Sentence: **अयं बहु प्रयासं कृतवान् तथापि परीक्षायां उत्तीर्णः न अभवत्।**

Gloss: He did many efforts still in the examination pass not happen.

English: He took a lot of efforts, yet he could not pass the examination.

Analysis:

1 अयं कर्ता,4
2 बहु विशेषणम्,3
3 प्रयासं कर्म,4
4 कृतवान् प्रतियोगी,5 ; अभिहित_कर्ता,1
5 तथापि अनुयोगी,9
6 परीक्षायां अधिकरणम्,9
7 उत्तीर्णः कर्ता,9
8 न प्रतिषेधः,9
9 अभवत् अभिहित_कर्ता,1
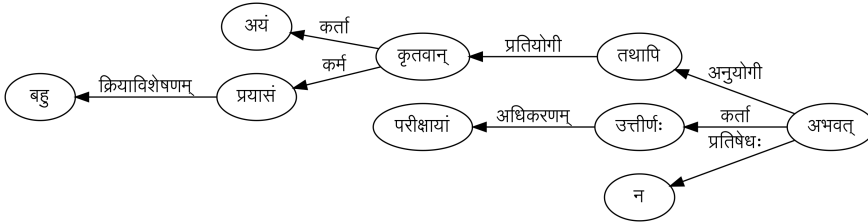
5.3 समुच्चितः (Conjunction)

Consider the sentence **रामः सीता च वनम् गच्छतः**. In this sentence, both **राम** and **सीता** are the **कर्ता** and **वनम्** is the **कर्म** for the **धातु गम्**. So we may be tempted to mark the relations as
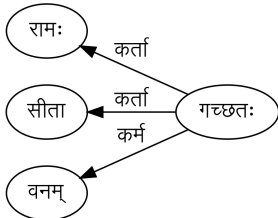
But the **कर्तृत्व** does not reside in **राम** and **सीता** seperately, it resides in both **राम** and **सीता** together simultaneously. This is exactly is the meaning of '**च**', which indicates **समुच्चय**. The **कर्तृत्व** resides in the **समुच्चय** of **राम** and **सीता**. We mark the relations as below.
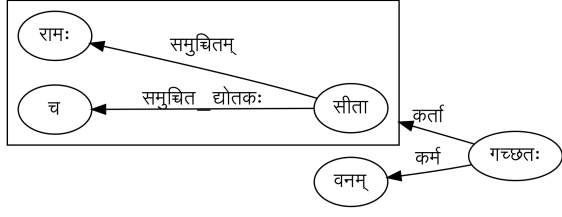
Since '**च**' is considered to be a function (**द्योतक**) word, it just illuminates the meaning and for establishing relation between the words, it is considered to be an indicator to decide the relation between other words. The concordance provides us a clue in the establishing of relations there are two cases: Either the word close to the verb is governed by the verb, or the whole group of words is governed by the verb as one unit. When the word which is close the verb is governed by the verb, we mark the relation of the verb with this noun. Consider the following sentence:

5.9) Sentence: **रामः सीता च वनं गच्छति।**
Gloss: Rama{nom} Sita{nom} and forest{acc} go{pr sg 3p}
Eng: Rama and Sita go to the forest.

Analysis:

1 **रामः समुच्चितः**,2
2 **सीता कर्ता**,5
3 **च समुच्चय_द्योतकः**,2
4 **वनं कर्म**,5
5 **गच्छति अभिहित_कर्ता**,2
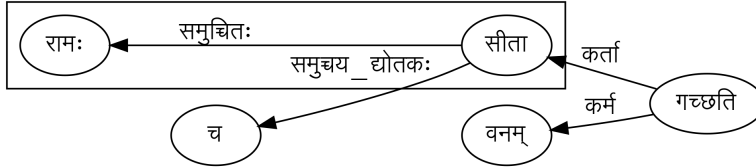
Here the relation between '**च**' and **सीता** is marked as **समुच्चय_द्योतकः**, and the relation between **राम** and **सीता** is marked as **समुच्चितः**.

5.10) Sentence: **रामः च त्वं च ग्रामं गच्छसि**
Gloss: Rama{nom} and you and village{acc} go{pr sg 2p}
Eng: Rama and you go to a village.

Analysis:

1 **रामः समुच्चितः**,3
2 **च समुच्चय_द्योतकः**,3
3 **त्वं कर्ता**,6
4 **च समुच्चय_द्योतकः**,3
5 **ग्रामं कर्म**,5
6 **गच्छसि अभिहित_कर्ता**,3
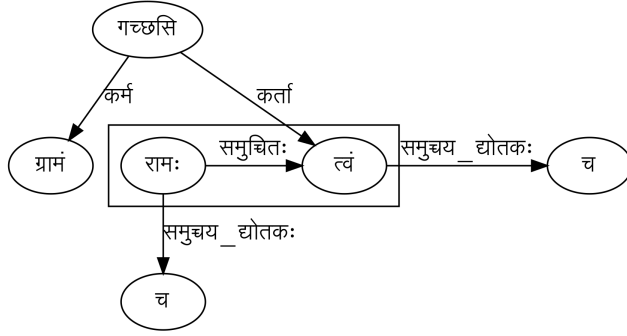
5.11) Sentence: **रामः च अहं च ग्रामं गच्छामि**
Gloss: Rama{nom} and I and village{acc} go{pr 1p sg}
Eng: Rama and I go to village.

Analysis:

1 **राम समुच्चितः,3**
2 **च समुच्चय_द्योतकः,3**
3 **अहं कर्ता,6**
4 **च समुच्चय_द्योतकः,3**
5 **ग्रामं कर्म,5**
6 **गच्छामि अभिहित_कर्ता,3**
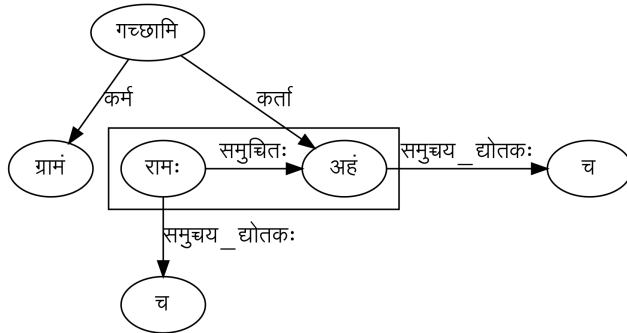
When the verb shows concordance with the group of words conjoined through '**च** ', then the **कारकत्व** is in the whole group and not in the individual items. Hence in such cases, the relation is marked with the complete group as shown in the annotation of

following sentence.

5.12) Sentence: **रामः सीता लक्ष्मणः च वनं गच्छन्ति।**
Gloss: Rama{nom} Sita{nom} Lakshman{nom} and forest{acc} go{pr 3p pl}
Eng: Rama, Sita and Lakshman go to the forest.

Analysis:

1 रामः समुच्चितः,3
2 सीता समुच्चितः,3
3 लक्ष्मणः कर्ता,5
4 च समुच्चय_द्योतकः,3
5 वनं कर्म,6
6 गच्छन्ति अभिहित_कर्ता,3-2-1
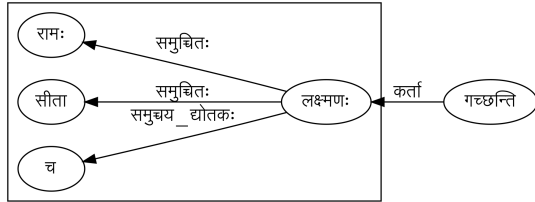
Now let us consider sentences where the conjunct joins to activities.

5.13) Sentence: **रामः फलं खादति जलं च पिबति**
Gloss: Rama{nom} fruit{acc} eats water{acc} and drinks.
Eng: Ramaeats a fruit and drinks water.

Analysis:

1 रामः कर्ता,3
2 फलं कर्म,3
3 खादति समुच्चितः,6; अभिहित_कर्ता,1
5 जलं कर्म,6
4 च समुच्चय_द्योतकः,3
6 पिबति अभिहित_कर्ता,1
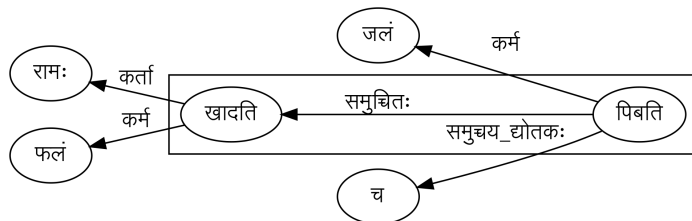
In the next sentence, where the two different activities are denoted by the same word, we repeat the verb, and produce the analysis as shown below. Note that the repeated word is in parenthesis, indicating that this is not a part of original sentence.

5.14) Sentence: **रामः आम्र-फलं खादति सीता च कदलि-फलं**

Gloss: Rama{nom} mango{acc} eats Sita{nom} and banana{acc}.

Eng: Rama eats a mango and Sita a banana.

Analysis:

1 रामः कर्ता,3
2 आम्र-फलं कर्म,3
3 खादति समुच्चितः,7; अभिहित_कर्ता,1
4 सीता कर्ता,7
5 च समुच्चय_द्योतकः,3
6 कदलि-फलं कर्म,7
7 (खादति) अभिहित_कर्ता,4
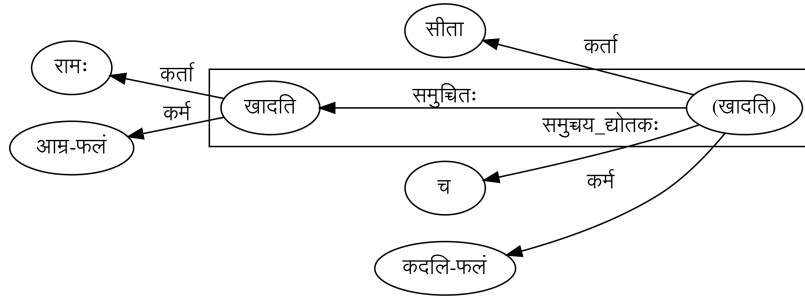
5.4

In the case of a disjunctive particle **वा**, we mark the relation between the disjuncts as **अन्यतरः** and the relation of the disjunctive particle with the head as **अन्यतर_द्योतकः**.

Below are the same examples, but with disjunctive particle.

5.15) Sentence: **रामः सीता वा वनं गच्छति।**

Gloss: Rama{nom} Sita{nom} or forest{acc} go{pr sg 3p}

Eng: Either Rama or Sita go to the forest.

Analysis:

1 रामः अन्यतरः,2
2 सीता कर्ता,5
3 च अन्यतर_द्योतकः,2
4 वनं कर्म,5
5 गच्छति अभिहित_कर्ता,2
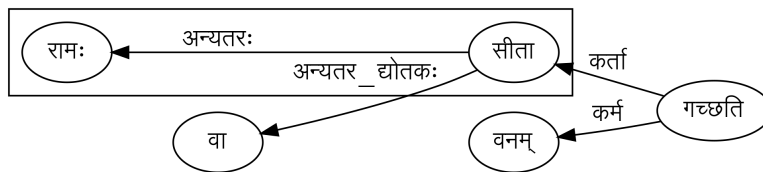
Here the relation between 'वा' and **सीता** is marked as **अन्यतर_द्योतकः**, and the relation between **राम** and **सीता** is marked as **अन्यतरः**.

5.16) Sentence: **रामः वा त्वं वा ग्रामं गच्छसि**
Gloss: Rama{nom} or you or village{acc} go{pr sg 2p}
Eng: Either Rama or you go to a village.

Analysis:

1 रामः अन्यतरः,3
2 च अन्यतर_द्योतकः,3
3 त्वं कर्ता,6
4 च अन्यतर_द्योतकः,3
5 ग्रामं कर्म,5
6 गच्छसि अभिहित_कर्ता,3
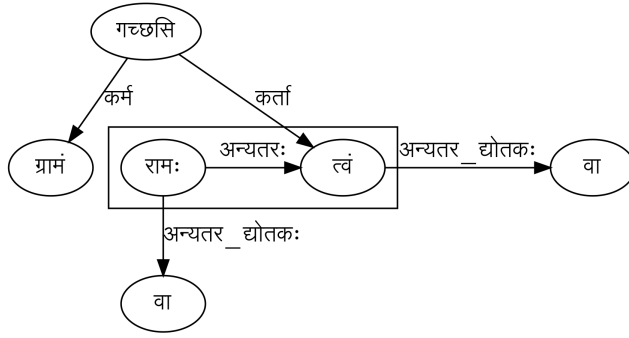
5.17) Sentence: **रामः वा अहं वा ग्रामं गच्छामि**
Gloss: Rama{nom} and I and village{acc} go{pr 1p sg}
Eng: Rama and I go to village.

Analysis:

1 राम अन्यतरः,3
2 च अन्यतर_द्योतकः,3
3 अहं कर्ता,6
4 च अन्यतर_द्योतकः,3
5 ग्रामं कर्म,5
6 गच्छामि अभिहित_कर्ता,3
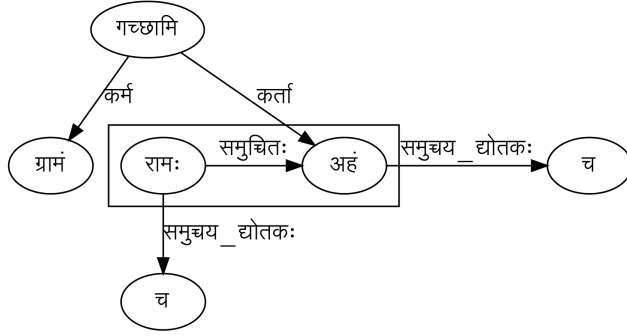
Now let us consider sentences where the conjunct joins to activities.

5.18) Sentence: **रामः फलं खादति दुग्धं वा पिबति**

Gloss: Rama{nom} fruit{acc} eats milk{acc} or drinks.

Eng: Ramaeats a fruit or drinks milk.

Analysis:

1 **रामः कर्ता**,3
2 **फलं कर्म**,3
3 **खादति अन्यतरः**,6; **अभिहित_कर्ता**,1
5 **दुग्धं कर्म**,6
4 **वा अन्यतर_द्योतकः**,3
6 **पिबति अभिहित_कर्ता**,1
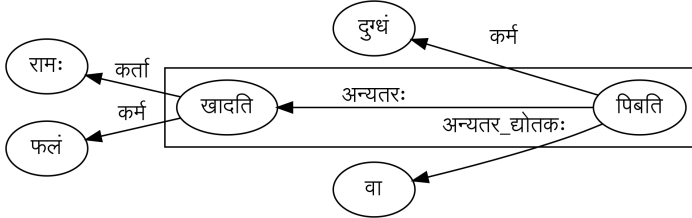
6   History

The first tag proposal for kāraka tagging was prepared by Prof. K V Ramkrishnamacharyulu and was presented in the Third International Sanskrit Computational Linguistics Symposium held at University of Hyderabad, in Jan 2009.

This tagset was compared with the existing tagset of Hindi Tree bank, and a preliminary work of tagging of 100 sentences from संक्षिप्तरामायण, and the sentences from 15th and 16th sargas of सुन्दरकाण्ड, using this proposed tagset was taken up.

Based on the inputs we received, we had several meetings on kāraka tagging at Sanskrit Academy and University of Hyderabad. The first meeting was from 24-26th July 2010, the second was from 7-9th Sept 2010, and the third was on 21-22 Oct 2010.

We thank Prof. K V Ramkrishnamacharyulu, who was instrumental in arriving at these guide lines, by providing inputs at various stages of its preparation.

We also thank all the members of the consortium, and especially those who attended the meetings and provided various kinds of inputs by raising questions, providing solutions, participating in the discussions, providing various kinds of feedback on the guidelines, etc.

Following scholars attended one or more meetings on kāraka tagging—

Prof. K V Ramkrishnamacharyulu	Prof. Veeranarayana Pandurangi
Prof. S S Murthy	Prof. Tirumala Kulkarni
Prof. Shrinivas Varkhedi	Prof. Rajadhar Mishra
Prof. Dipti Mishra Sharma	Prof. Girish Nath Jha
Prof. Gérard Huet	Prof. Amba Kulkarni
Dr. Varalakshmi	Dr. Devanand Shukla
Acharya Ramachandra	Dr. Sheetal Pokar
Acharya Madhavacharya	Dr. R. Chandrashekhar
Shri. Pavan Kumar	Shri Anil Gupta
Ms. Sivaja	Dr. Vibhuti Nath Jha
Mrs. Preeti Shukla	Ms Monali
Ms Gayatri	Acharya Deepak
Shri Madhav Gopal	Shri Nrpendra Pathak
Shri Jagadish	Shri Lalit

Our thanks are also due to Prof. Rajeev Sangal, and Prof. Vineet Chaitanya for valuable discussions.

A parser was built following Pāṇini's grammar and the theories of śābdabodha. Sanjeev Panchal as a part of his PhD dissertation, worked on the ākāṁkṣā (expectancy) extensively covering almost all the sūtras from Pāṇi's grammar. This led to addition of new tags. During this revision, the relations due to *upapada*s and also the treatment of constructions due to conjunctive particles was revised.

Further, using this tagset around 4000 sentences from various resources were tagged. This led to further additions of a few tags.

The tagset was further revised while dealing with inter-sentential relations. Malay Maity, Amruta Barbadikar, Amruta Malavade, Saee Vaze, and Dr Pavakumar Satuluri have contributed towards the enhancement of the 2022 version.

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A कारक-विभक्तिः mapping

धातुप्रकारः	कर्ता	मुख्यकर्म	गौणकर्म	उदाहरणम्
अकर्मकः	1	-	-	रामः तिष्ठति
सकर्मकः	1	-	-	रामः ग्रामं गच्छति
द्विकर्मकः	1	2	2	रामः अजां ग्रामं नयति

Table 1: कर्तरि प्रयोगः

धातुप्रकारः	कर्ता	मुख्यकर्म	गौणकर्म	उदाहरणम्
अकर्मकः	3	-	-	रामेण शीयते
सकर्मकः	3	1	-	रामेण ग्रामः गम्यते
द्विकर्मकः 1	3	2	1	रामेण गौः दुग्धं दुह्यते
द्विकर्मकः 2	3	1	2	रामेण अजा ग्रामं नीयते

Table 2: कर्मणि प्रयोगः

धातुप्रकारः	प्रयोजककर्ता	प्रयोज्यकर्ता	कर्म	उदाहरणम्
अकर्मकः	1	2	-	रामः लक्ष्मणं शाययति
सकर्मकः 1	1	2	2	रामः लक्ष्मणं वेदं पाठयति
सकर्मकः	1	3	2	रामः लक्ष्मणेन अन्नं पाचयति
द्विकर्मकः	1	3	2	रामः लक्ष्मणेन अजां ग्रामं नाययति

Table 3: णिजन्तकर्तरि प्रयोगः

धातुप्रकारः	प्रयोजककर्ता	प्रयोज्यकर्ता	कर्म	उदाहरणम्
अकर्मकः	3	1	-	रामेण लक्ष्मणेन शीयते
सकर्मकः 1.1	3	1	2	रामेण लक्ष्मणः ग्रामं गम्यते
सकर्मकः 1	3	1(2)	2(1)	रामेण लक्ष्मणः वेदं पाठ्यते / रामेण लक्ष्मणं वेदः पाठ्यते
सकर्मकः	3	3	1	रामेण लक्ष्मणेन ओदनं पाच्यते
द्विकर्मकः 1	3	3	1(मुख्य), 2(गौण)	रामेण लक्ष्मणेन गौः दुग्धं दुह्यते
द्विकर्मकः 2	3	3	1(मुख्य), 2(गौण)	रामेण लक्ष्मणेन अजा ग्रामं नीयते

Table 4: णिजन्तकर्मणि प्रयोगः

\# द्विकर्मकः 1 - दुह्, याच्, पच्, दण्ड्, रुधि, प्रच्छि, छि, ब्रू, शास्, जी, मथ्, मुष्
\# द्विकर्मकः 2 - नी, हृ, कृष्, वह्
\# सकर्मकः 1.1 - गत्यर्थकधातवः
\# सकर्मकः 1 - गतिबुद्धिप्रत्यवसानार्थशब्दकर्मधातवः

B List of relations in Pāṇinian grammar

Prof. K V Ramakrishnamacharyulu has compiled the relations found in various grammatical texts. These are listed below.

1. kartā

    (a) anubhavāı kartā
    (b) amūrta kartā
    (c) prayojaka kartā
    (d) prayojya kartā
    (e) madhyasthaḥ kartā
    (f) abhiprerakaḥ/utprerakaḥ kartā
    (g) ṣaṣṭhī kartā

2. karma

    (a) īpsitatam
    (b) karma-kartṛ
    (c) karaṇa-kartṛ
    (d) utpādya-karma
    (e) vikārya-karma
    (f) prayojya kartā
    (g) ādhāra-karma
    (h) deśaḥ-karma
    (i) kālaḥ-karma
    (j) bhāvaḥ-karma
    (k) mārgaḥ-karma
    (l) sampradāna-karma
    (m) anīpsitatam-karma
    (n) akathita-karma
    (o) gati-karma
    (p) yam-prati-kopaḥ
    (q) manya-karma
    (r) ṣaṣṭhī-karma

3. karaṇam

    (a) karaṇa-karma
    (b) parikrayaṇam

4. sampradānam

    (a) satvāśrayaḥ
    (b) svīkartā
    (c) kriyayā abhipretaḥ
    (d) jñīpsyamānaḥ
    (e) uttamarṇaḥ

    (f) īpsitam

    (g) prīyamāṇaḥ

    (h) yasya vipraśnaḥ

    (i) parikrayaṇam

5. apādānam

    (a) bhaya-hetuḥ

    (b) ākhyāta-upayoge

    (c) yasmāt vāraṇam

    (d) yasya adarśanam iṣṭam saḥ

    (e) prakṛtiḥ

    (f) prabhavaḥ

    (g) parājayaḥ

6. adhikaraṇam

    (a) kāla-adhikaraṇam

    (b) deśa-adhikaraṇam

    (c) viṣaya-adhikaraṇam

7. samayasya-avadhiḥ

8. antarāla-deśaḥ

9. akārakasambandhaḥ sākṣāt-kriyayā

10. sambodhanam

11. prasajyapratiṣedhaḥ

12. sāmyam

13. kriyā-āvṛttyantarālasamayaḥ

14. tādarthya

15. hetuḥ

16. vīpsā

17. kriyā-āvṛrtti-gaṇanā

18. kriyāviśeṣaṇnam

19. atyanta-sambaddhaḥ kālaḥ

20. atyanta-sambaddhaḥ mārgaḥ

21. ṣaṣṭhī

22. ārambhasamayaḥ māpane

23. ārambhadeśaḥ māpane

24. lakṣaṇam

25. tādarthya

26. saha sambandhaḥ

27. vinā

28. vibhaktaḥ

29. nirdhāraṇam

30. prayojanam

31. bhāvalakṣāṇa saptamī

32. samakālīnatvam

33. anantarakālinatvam

34. pūrvakālīnatvam

35. kāraṇasatve'api kāryābhāvaḥ

36. hetuhetumadbhāvaḥ

37. samuccayaḥ

38. samānādhikaraṇatvam

39. asāphalyam

This list, still is not complete, in the sense that it does not list relations such as avadhāraṇa (emphasis), etc.

C   Tagset of Dependency Relations implemented in the Parser as on Jan 2022

सम्बन्धाः

- कारकसम्बन्धः
  - कर्ता
    * प्रयोजककर्ता
    * प्रयोज्यकर्ता
  - कर्म
    * मुख्यकर्म
    * गौणकर्म
    * वाक्यकर्म
  - करणम्
  - सम्प्रदानम्
  - अपादानम्
  - अधिकरणम्
    * कालाधिकरणम्
    * देशाधिकरणम्
    * विषयाधिकरणम्
- कारकेतरसम्बन्धः
  - क्रियाक्रियासम्बन्धाः
    * पूर्वकालः
    * वर्तमानसमानकालः
    * अनन्तरकालः
    * भावलक्षणसप्तमी_अनन्तरकालः
    * भावलक्षणसप्तमी_पूर्वकालः
    * भावलक्षणसप्तमी_समानकालः
    * सहायकक्रिया
  - क्रियासम्बन्धाः
    * हेतुः
    * प्रयोजनम्
    * कर्मसमानाधिकरणम्
    * क्रियाविशेषणम्
    * प्रतिषेधः
    * सम्बोध्यः
  - नामनामसम्बन्धाः
    * विशेषणम्
    * विधेय_विशेषणम्
    * तीव्रतादर्शी
- षष्ठीसम्बन्धः
  * अङ्गविकारः
  * वीप्सा
    · अपादान_वीप्सा
    · करण_वीप्सा
  * विभक्तम्
  * ल्यप्कर्माधिकरणम्
  * निर्धारणम्
  * अत्यन्तसंयोगः
  * अपवर्ग_सम्बन्धः
  * उपमानम्
  * सञ्ज्ञा
  * घटकः
  - सम्बन्ध_द्योतकाः
    * वाक्यकर्म_द्योतकः
    * सम्बोधन_द्योतकः
    * सहार्थः_द्योतकः
    * विनार्थः_द्योतकः
    * उपमान_द्योतकः
    * सञ्ज्ञा_द्योतकः
    * समुच्चय_द्योतकः
    * अन्यतर_द्योतकः
    * घटक_द्योतकः
- उपपदसम्बन्धः
  - सन्दर्भबिन्दुः
  - तुलनाबिन्दुः
  - सहार्थः
  - विनार्थः
  - स्वामी
  - स्रोतः
- वाक्येतरसम्बन्धः
  - अनुयोगी
  - प्रतियोगी
  - नित्य_सम्बन्धः
- समुच्चयादिसम्बन्धाः
  - समुच्चितः
  - अन्यतरः