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Denotes the place where an action takes place, with reference to the subject or object. May my heart always be fixated upon Rama. Technically, the genitive expresses the relation of one noun to another in a sentence. There are two other cases called the locative absolute and the genitive absolute. When the participle agrees with a Subject different from the Subject of the Verb, the Phrase is said to be in Absolute Construction: A good understanding of the common usage of the various cases is fundamental to make any progress in learning Sanskrit. Though the absolute case is somewhat difficult to initially master, it is used very frequently and the beginner should be at least able to identify the absolute case, if not be actually able to use it properly. The less frequent usages of different cases may be initially omitted. The declensions, learnt with such difficulty, make sense only when the student knows how to use them and for that a preliminary understanding of the matter treated above is absolutely essential. If the object being learnt has a purpose, it makes the act of learning less of a chore and more interesting. Usually the relation between the words is not mentioned. When required, the compound is resolved, giving the relationship between the words joined. The rules of sandhi are observed when the words forming a compound come together. In all respects, the compound word behaves like a word and takes case affixes and can form other compounds. One criticism of later developments in Sanskrit is that the compounds became very long – often running to a full page – doing the duty of full fledged sentences. Compounds are variously classified in four, five or six groups, with further sub-classification. A note about writing compound words is in order. In contrast, German is more insistent that a compound word retain its fundamental character of being a single word. Thus, we have the German Nationalsozialistische Deutsche Arbeiterpartei National Socialist German Workers Party shortened to Nazi Party using the first two letters of the two words in the first compound. Having said this, it must be mentioned that conventions develop over time and the general usage becomes the standard usage. Once the basics are learnt, a working knowledge of compounds ought to be acquired for it is almost impossible to find any fragment of non-vedic Sanskrit without compounds. Taddhitas or Secondary Derivatives Vritti is the general term for any complex formation in Sanskrit requiring explanation or resolution. Taddhithas are not restricted to persons alone. Often books are named as a secondary derivative of the author. There are more than 70 taddhita pratyayas, and are most profusely used. Taddhitas seem to be preferred from a stylistic point as well, more so amongst the Southerners. Conjugation of Roots Conjugation refers to the changes that a verb undergoes. In Sanskrit the verb changes its forms in the three numbers – singular, dual and plural – and three persons: Third person, second person and first person. The Six Tenses The three most familiar tenses or simple tenses are the present, past and future. Sanskrit has three more tenses: Additionally, there are four moods. We will examine each of these in turn. An example would be: That was thousands of years ago; Dasaratha is no longer around. This is the perfect past; the Imperfect Past is the opposite of it: Conceivably, this happened sometime back. The technical rule is that this ought to be used when the event is capable of being witnessed by the speaker. In practice that is often not the case. Then, there is a third kind of past tense, which is supposed to be indefinite about whether the action is complete or not. Based on the Greek word for indefinite, this is called the Aorist. A lot of this terminology came from early studies in Indo-European languages, but the labels can sometimes confuse the beginner. From the above description, a sensible approach would be to use the Aorist heavily and use the Perfect and Imperfect tenses with precision and clarity; that however is not the case. The most commonly used verb form of past tense is the Imperfect and the Sanskrit Imperfect is quite different from the English Imperfect called the Past Continuous or Past Progressive. This is not to say that the label-givers were wrong. In fact, in other Indo-European languages, the Imperfect indeed refers to only past actions; English is more the exception. There are two future tenses, referred to as 1st Future and 2nd Future, or Periphrastic Future and Simple Future, in that order. Periphrastic is another unfamiliar technical word of grammar. Thus, periphrastic means phrase-like. The 1st future in Sanskrit refers to an action that would occur at a definite time in future but not this day, whereas the 2nd future refers to an action that would occur at an indefinite time in

future including today, and to denote recent and future continuous time. Thus, in place of three familiar tenses actually there are more than three tenses in English such as past perfect and present perfect continuous, we have six tenses in Sanskrit. Let us say the principal of the School sends a directive for school children regarding the Republic Day event at school. The fourth is called the conditional where the action of the verb is conditional upon another event. In English and Classical languages of the West, the subjunctive requires an event contrary to the present state of affairs to take place. This is the sense conveyed by the Subjunctive. The subjunctive, as used in the Vedic language, is slightly different. It is a composite mood, and may be considered to have six tenses as per S. We have started the introduction saying there are four moods, but listed five: Imperative, Potential, Benedictive, Conditional and Subjunctive. These are best understood by first knowing the meaning of these terms. The Injunctive is related to the word used so commonly in courts: An injunction is an order, a command. In grammar, the mood expressing a preferred choice amongst alternatives, that is a wish, is called the Optative. These terms are used in the grammar of Greek and Latin, and attempts were made to find equivalents in Sanskrit. The equivalent in Sanskrit for the Injunctive is found in the Aorist. There are seven according to M. Kale or three varieties according to Western grammarians of Sanskrit of the Aorist, and the Injunctive is one of those. The difference between the Imperative and Injunctive is in terms of affixes, augmentation and historical development, rather than in usage. Similarly, the Precative and Optative are, in one interpretation, forms of the Aorist. Vasu however treats the Potential as the same as the Optative. In dealing with all these labels, the point of view of the author is of much significance. For somebody not interested in comparative studies, these labels are less than helpful. What is important, and which is clear enough in the traditional classification, is to know which form expresses a command, wish, blessing, prayer, possibility and conditionality. One other label might be mentioned: It is usually stated that Sanskrit has no pluperfect. This is true in the sense of comparison with Greek, but Sanskrit is perfectly capable of expressing actions fully completed in the past using the various participles, the locative absolute and such others. In the more advanced books on grammar, usually remarks are made as to how a given particle or tense serves the function of the pluperfect as well. There it is most useful to substitute past perfect for the pluperfect.

2: Avyaya | Vidyaadaanam

avyayas: second person singular present imperfect class 1 parasmaipada the word is used in connection with avyayas or indeclinables;

Not for sale or distribution. Bharat Bhushan - bharatbhushan a vahoo. For many, it is not. He was extremely learned and talented. I have not found the correct answer, and I feel I should say so. Why do I hesitate to accept that Brahmarishi Vishwamitra could be the author? This is because Vishwamitra was already recognized as a Brahmarishi, many hundreds of years earlier, when he met Dasharath to ask him to allow Ram to accompany him. He was not recognized or mentioned as Kousika Rishi during and after his association with Ram. There could be four theories. The most recounted and repeated theory is that Sri Budha Kousika Rishi is nobody other than Brahmarishi Vishwamitra himself. I am very tempted to believe it. This theory is on the basis of the fact that he was the King Kousika, and later, the Kousika Rishi, before he was recognized as the Brahmarishi Vishwamitra. He could have existed, in some other time period, and he could have written the Sri Rama Raksha Stotra. If this were to be true, then indeed, the identity and story of Sri Budha Kousika Rishi would be an absolute riddle. This is true of the sages who had manifested as the sons born from Brahma, the Creator. That, of course, is a different story. The seven of the most important rishis of those times are 1 Gautama, 2 Bharadwaja, 3 Vishwamitra, 4 J amadagni, 5 Vasishta, 6 Kashyapa, and 7 Atri. It is later mentioned that Kousika was a descendant of the great Brahmarishi Vishwamitra. Similarly, Kaundinya was a descendant of the great sage Vasishta, and Vatsa was descended from the great sage j amadagni. Why could the author be Brahmarishi Vishwamitra? First reason, of course, Vishwamitra knew Ram. He knew him better than anyone else, perhaps better than his father, Dasharatha, or even his brother, Lakshmana. He knew Ram, before Sita or Hanuman became inseparable aspects of his life. If anyone could describe Ram, in relative perspective to every aspect of his being, behaviour and of his very existence, and ascribe powers to these aspects, it could be none other than Brahmarishi Vishwamitra. But, if the great Brahmarishi did in fact write down the Sri Ram Raksha Stotra, why did he not sign it by the name of Vishwamitra? That indeed, is a mystery. The other contemporary sages, including the first seven, have signed their own names to the works ascribed to them. Vishwamitra and Parashurama, the son of J amadagni, never got along. They hated each other and were in perpetual mistrust of each other. One is in praise to Vishwamitra, and would the great sage have given such value to himself? Would the Brahmarishi have stretched the context to such an extent? Or, am I missing something here? This line makes me doubt, for that very brief moment, if the great Brahmarishi Vishwamitra would appreciate and write about himself? To those who know the story of Vishwamitra, it would be very tempting to say that the great sage would indeed write about himself and ascribe such affection to Ram. Here, I beg to differ. If he would indeed write about his affection to Ram, he could have written about the friendship in more lines, rather than limit it to only one half of the metre. The other line that strengthens the doubt is - "NaabhimJ ambavadaashraya" - "Rama, who gave refuge to J ambavan, protect my navel". Again, there is this very brief doubt. The story of J ambavan, and his presence in the Ramayana, is much later to Sugreeva, Hanuman, Vaali, Angad and the other vanaras. J ambavan, is depicted, as a bear-man. Rama gives refuge to J ambavan, who swears allegiance in the war to come with Ravana. Rama did give refuge, but in those moments of the Ramayana, he gave support and courage to all those who approached him. It is much later, after the Kurukshetra war that J ambavan reappears in the story of Satyakam and Sri Krishna. The refuge sought by J ambavan from Sri Krishna is certainly more emphatic. Was there an entirely unknown rishi, by the name, Budha Kousika Rishi? Why would Shiva come to him in his dreams and why would he be asked to write the Sri Rama Raksha Stotra? Who was this great rishi, who penned the Stotra with such precision in accurate metre. Was it indeed difficult in those times to write the Sri Ram Raksha Stotra in such precision? It may not have been, for the great sages composed several stotras during those times, and their authorship is included in the earlier couplets. I am tempted to agree to the premise that the Brahmarishi Vishwamitra was indeed the author of the Sri Ram Raksha Stotra, after he received the instructions from Shiva. It is not because of the precision of the composition, but it is in the affection, love, the entire surrender to Ram, by one who had already

achieved perfection. The great sage, returned to urban areas, to the Royal Court, after nearly two hundred years of residing in the remote forests, to seek Ram, to take it upon him to train Ram, and to insist upon it, and to argue with Dasharath to allow it to happen. That indeed, is an author, who gave the Ram Raksha Stotra to millions of devotees of Ram, and caused them to be blessed, and will do so in the future. Bharat Bhushan bharatbhushan a vahoo. We will not discuss or argue the timeline or the possible time-period of the Ramayana. What is most certainly known, without argument, is that the great sage- poet, Valmiki, wrote the Ramayana in the Anushtup Chanda, or metre. He wrote the Ramayana in verse-form through nearly 24, verses, divided amongst seven books that are recognized as Kaandas. To illustrate the use of a specific metre, through an entire stotra, is the Gayatri Chanda, or metre, for the Gayatri Mantra, composed by Brahmarishi Vishwamitra. Later, Veda Vyasa included the mantra in the Vedas. There are other authors and poets who have written the Ramayana in variant versions, including those that are written in other countries of South and South-East Asia. Some of these variant metres have the entire Ramayana beginning and concluding within those nations, without any trace or hint that the story could have taken place in India. The diversity can be discussed by a million other webpages, blogs, network groups and experts. The story of Valmiki discovering the Anushtup Chanda metre of poetry is in itself extremely fascinating, especially because of the romanticisation of the love of the Krauncha birds and their subsequent sorrow. The verses in Anushtup metre were grouped into chapters that were termed as Sarga, that were later compiled within a Kaanda. Interestingly, the word Kaanda, is usually meant to depict the internode point of sugarcane, and in ancient Sanskrit, was used to depict an interlude within a story. There is a seventh Kaanda, and its inclusion is a different story and a different argument elsewhere. The Anushtup metre is comprised of 32 syllables in one verse. Uniquely, the sage-poet, Valmiki, seemed to have confirmed to most of the rules of Sanskrit Grammar, that must have been defined much later. The Ram Raksha Stotra is also similarly constructed, in precise Anushtup metre, with 32 syllables in four lines of the verse. Sri Budha Kousika Rishi, as did Valmiki, did not stray from the rules that would later be written to depict the system governing the structural and functional relationships of the verse, following its earlier verse, and subsequently leading to the compilation of the entire Sri Ram Raksha Stotra. There is also complex organization of the morphology and syntax of the series of words within each metre. This simplicity of the phonology of the Stotra, in juxtaposition to the complex nature of its morphology, is what makes the Sri Ram Raksha Stotra so very amazing, and makes one respect the genius of these great sage-poets, such as Valmiki and Budha Kousika Rishi. Did Sanskrit Grammar get defined because of the Ramayana of Valmiki? It would be interesting to determine, and more interesting to be proved wrong. Compare this to the Ramayana, in 24, verses. There could be many variants in combining two words. Similarly, there could be variants of vibhakti or declensions, in the combination of two words. A declension is when a noun changes its form when it changes its number or its case. This can also be similarly noticed in the conjugation of verbs. These are however, finite. In contrast, there are other variants, where avyayas or indeclinables are used. This is particularly noticed when words that refuse to merge with each other, are brought together. Thus, there could be combinations of using vibhakti and avyaya within the same line of a verse. This is where it gets complex, when one has to compose in the Anushtup chanda. How do you use the same word, for e. For centuries, devotees of Ram, be they Hindus, or from any other religion, have been reciting the Stotra. Those who have memorized the Stotra, and those who chant it out loud, and those who teach the words to younger generations, have fallen in love again and again with the words and the images that they invoke. This magic has been made possible by the awesome interplay of rules of grammar within the Anushtup Chanda. They accept that the complex structure of the 32 syllables in Anushtup metre, helps the devotee to memorise the complicated vibhakti forms, and the common bhakta does not need to learn Sanskrit grammar to internalize the stotra. This is especially true in the most amazing verse of the Sri Ram Raksha Stotra, and can be the most illustrative example of the completeness of the syllable structure of each verse through the magic of Sri Budha Kousika Rishi in Anushtup Chanda. This verse has been made an example to depict the magic and excellence of the Stotra in texts that explain Sanskrit grammar. The padama first , dwitiya second , tritiya third and catuslipaada fourth lines depict awesome word play that could not be more beautiful, more evocative and more sublime. All our modern-day software programmers may put their minds together, and discover and

invent the best algorithms, and develop a method of writing in the syllable Anushtup metre of verse. This may be possible in the world of the future. However, nobody will be able to write more sublimely, to establish the best of devotion, as has been written by Sri Budha Kousika Rishi, in Anushtup chanda, when he writes these two verse- lines, and yet, be extremely evocative. They are presented in variant contexts in the Stotra. It is thus written that Sri Budha Kousika Rishi dreamt of Shiva reciting the entire series of verses, and later, at dawn, the sage wrote the entire Sri Ram Raksha Stotra. Why would Shiva recite the stotra to present aspects of Ram that would help people seek succour and support in times of distress? What were the aspects of Ram that Shiva needed to inform people about that were not already specified in the Ramayana?

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The avyayas indicate a particular meaning in association with words depending on the context. So they are not vaachaka. Vaachaka is the expression or the word and Vaachya is the expressed meaning or artha.

The stem or base of a noun is that noun as it stands before any suffix has been added to it. A root is a primitive element of the language incapable of any grammatical analysis, and expressing an abstract idea. This indefinite idea is developed out of the root and is made to ramify into a diversity of meanings, both abstract and concrete, by means of suffixes. Every true root is monosyllabic as: Roots which have more than one syllable are the result of a the union of a verbal prefix with the root itself, both having become inseparable in the expression of a particular idea; for instance: There are two great divisions of Derivation: Primary Derivatives are formed from the root itself and Secondary Derivatives from the Primary Derivatives. The student will readily understand that the root may be preceded by any prefix: The same remark applies to all the other suffixes. State of, quality, abstract idea: It will be remarked that some suffixes are merely made up of a principal one which has taken the vowel a or i or u before it. By means of this suffix are formed an extremely large number of derivatives. It forms nouns, substantive and adjective showing: Used to form the names of some animals; the derivation is obscure. It also forms a numerous class of action-nouns and adjectives: These nouns are neuter. So, majjhimo, middling, from majjha, middle. This is the sign of the Superlative. This suffix and its derivatives are incomprehensible. Most of the derivatives from man, have migrated to the class of those formed by the last suffix -ma. From this are made a few adjectives. It is often preceded by the vowels a and i. Used to form adjectives of possession. The derivatives from this are not very numerous: This forms a very numerous class of action nouns, Fem.

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list of avyayas was collected from the text "avyaya kÅ•Åa", avyayas written by Srivatsankacharya. Here a simple lookup is enough to identify the avyayas.

The great sage-poet, Valmiki, had also composed the Ramayana in the same metre, the Anushtup Chanda. This much is known, for it is said so, at the beginning of the stotra "Sri Sitaramachandro Devata Anushtup Chanda Seeta Shakti Srimad Hanumana Keelakam - The deity of this stotra is Sri Ram, the metre is Anushtup, the power of the stotra is from Sita, and Sri Hanuman is the lynchpin nail that keeps the verses and the entire stotra together and gives it the magnificence of devotion that only he can. We will not discuss or argue the timeline or the possible time-period of the Ramayana. What is most certainly known, without argument, is that the great sage-poet, Valmiki, wrote the Ramayana in the Anushtup Chanda, or metre. He wrote the Ramayana in verse-form through nearly 24, verses, divided amongst seven books that are recognized as Kaandas. To illustrate the use of a specific metre, through an entire stotra, is the Gayatri Chanda, or metre, for the Gayatri Mantra, composed by Brahmarishi Vishwamitra. Later, Veda Vyasa included the mantra in the Vedas. There are other authors and poets who have written the Ramayana in variant versions, including those that are written in other countries of South and South-East Asia. Some of these variant metres have the entire Ramayana beginning and concluding within those nations, without any trace or hint that the story could have taken place in India. The diversity can be discussed by a million other webpages, blogs, network groups and experts. The story of Valmiki discovering the Anushtup Chanda metre of poetry is in itself extremely fascinating, especially because of the romanticisation of the love of the Krauncha birds and their subsequent sorrow. The death of one of the birds caused the sage, Valmiki, to exclaim in verse, that he later realized was in a proper metre, and was accepted and recognized as the Anushtup. The verses in Anushtup metre were grouped into chapters that were termed as Sarga, that were later compiled within a Kaanda. Interestingly, the word Kaanda, is usually meant to depict the internode point of sugarcane, and in ancient Sanskrit, was used to depict an interlude within a story. There is a seventh Kaanda, and its inclusion is a different story and a different argument elsewhere. The Anushtup metre is comprised of 32 syllables in one verse. Each sloka, or a para within the poem, is usually comprised of four lines, and sometimes more. Uniquely, the sage-poet, Valmiki, seemed to have confirmed to most of the rules of Sanskrit Grammar, that must have been defined much later. The Ram Raksha Stotra is also similarly constructed, in precise Anushtup metre, with 32 syllables in four lines of the verse. Sri Budha Kousika Rishi, as did Valmiki, did not stray from the rules that would later be written to depict the system governing the structural and functional relationships of the verse, following its earlier verse, and subsequently leading to the compilation of the entire Sri Ram Raksha Stotra. There is also complex organization of the morphology and syntax of the series of words within each metre. It would be obvious to those who have memorized the Sri Ram Raksha Stotra, and those who are able to recite the entire Stotra in loud chanting, with rhythm, that the phonology of the verse following verse, is very simple, once you have been able to internalize the entire series. This simplicity of the phonology of the Stotra, in juxtaposition to the complex nature of its morphology, is what makes the Sri Ram Raksha Stotra so very amazing, and makes one respect the genius of these great sage-poets, such as Valmiki and Budha Kousika Rishi. Did Sanskrit Grammar get defined because of the Ramayana of Valmiki? It would be interesting to determine, and more interesting to be proved wrong. Compare this to the Ramayana, in 24, verses. There could be many variants in combining two words. Similarly, there could be variants of vibhakti or declensions, in the combination of two words. A declension is when a noun changes its form when it changes its number or its case. This can also be similarly noticed in the conjugation of verbs. These are however, finite. In contrast, there are other variants, where avyayas or indeclinables are used. This is particularly noticed when words that refuse to merge with each other, are brought together. Thus, there could be combinations of using vibhakti and avyaya within the same line of a verse. This is where it gets complex, when one has to compose in the Anushtup chanda. How do you use the same word, for e. For centuries, devotees of Ram, be they Hindus, or from any other religion, have been reciting the Stotra. Those who have memorized the Stotra, and those who

chant it out loud, and those who teach the words to younger generations, have fallen in love again and again with the words and the images that they invoke. This magic has been made possible by the awesome interplay of rules of grammar within the Anushtup Chanda. They accept that the complex structure of the 32 syllables in Anushtup metre, helps the devotee to memorise the complicated vibhakti forms, and the common bhakta does not need to learn Sanskrit grammar to internalize the stotra. This is especially true in the most amazing verse of the Sri Ram Raksha Stotra, and can be the most illustrative example of the completeness of the syllable structure of each verse through the magic of Sri Budha Kousika Rishi in Anushtup Chanda. This verse has been made an example to depict the magic and excellence of the Stotra in texts that explain Sanskrit grammar. Ramo rajamanih sada vijayate, Ramenabhihata nisacaracam, Ramaya tasmai namah I would also propose the following verse-line to present the magic of Sri Budha Kousika Rishi. The padama first , dwitiya second , tritiya third and chatushpaada fourth lines depict awesome word play that could not be more beautiful, more evocative and more sublime. Rama rame rameti, Sahasra naama tatulyam, rama naama varanane Can there be any other verse that can be better? All our modern-day software programmers may put their minds together, and discover and invent the best algorithms, and develop a method of writing in the syllable Anushtup metre of verse. This may be possible in the world of the future. However, nobody will be able to write more sublimely, to establish the best of devotion, as has been written by Sri Budha Kousika Rishi, in Anushtup chanda, when he writes these two verse-lines, and yet, be extremely evocative. They are presented in variant contexts in the Stotra. Rameti ramabadreti, Naro na lipyate paapai, bhuktim muktim cha vindate The one who will constantly recite the words " Ram, Ramchandra or Ramabhadra will never be trapped in sinly acts.

There are a class of words called avyayas or indeclinables which do not decline. In other words, they have an identical form in all the three numbers and seven cases. Nominally, a noun form is formed by the addition of a case affix called a 'sup' to the noun stem.

Rk Parsing Sanskrit texts: Building a sentential parser following a dependency framework needs a well defined set of relations. These relations are critically examined from the point of view of feasibility of building a rule based parser. We propose an intermediate parse with nice computational properties of a tree structure and then propose another layer to make this tree structure more useful for information retrieval and user understanding. The parse of positional languages such as English are well expressed by constituency structure while languages like Sanskrit which are morphologically rich and to a large extent free word order are better represented by a dependency tree. A king gives a cow to a brahmin. Various relations described in the traditional grammar books have been compiled and classified by Krishnamacharyulu under the two broad headings viz. This tagset can be put to use for two tasks – a to develop an annotated corpus, b to develop a parser that produces a parse tree of a given sentence. One question we would like to ask before putting it to actual use is whether the granularity of this tagset is suitable for the above two tasks? The suitability of a tagset for manual annotation can be judged on the basis of the following parameters: A statistical parser that uses manually annotated data will also have these as the main concerns. A rule based parser, on the other hand, will have different considerations. A rule based parser performs better the less it depends on extra linguistic information. So with a goal to build a rule based parser, we critically examined all the tags in Krishnamacharyulu. The basic principles we followed during this critical examination were – The relations should be binary. In the next section, we describe the notation for representing the relations and in section 3, we discuss various cues for extracting the relations. Section 4 discusses various criterion used for the choice of a relation, and section 5 discusses the issues of granularity. In section 6 we describe the post processing for making the parse more useful. We represent this graphically as in Fig 2. Fig 3 shows the corresponding graph. For the ease of annotation, instead of annotating the sentences in graphical mode, we represent them as a text with three fields separated by a tab. The first line of a sample annotation below then means: Similarly certain indeclinables mark some grammatical relations. Agreement between the words also indicate certain grammatical relations. We discuss below these clues for extracting relations. For the sake of completeness, we repeat the relevant portion here. Vibhakti The verbal as well as nominal suffixes in Sanskrit are termed vibhaktis. Now we consider the nominal suffixes. They fall under three broad categories. These indeclinable, mark a relation of a noun with another noun, and in turn demand a special case suffix for the preceding noun. Indeclinables avyaya The indeclinables mark various kinds of relations such as negation, adverbial manner adverbs only, co-ordination, etc. Sometimes they also provide information about interrogation, emphasis, etc. However, there is a subtle difference between the information being conveyed. Should they be treated as a node in a tree or an edge? The basic principles we follow in arriving at the decision and the rationale behind them are 1. Preserve one-one mapping between the nodes of a tree and the words in a sentence. If this condition is relaxed, the parse ceases to be a tree, losing its nice computational properties⁷. In case of derived nouns, consider only the inflectional suffix for establishing the relations. In case of derived indeclinables, use the derived suffix to mark the relations. In case of indeclinables other than the derived kr. A suffix or a word can represent one and only one relation. These principles themselves provide answers to the questions raised above. Now consider another example: Fig 4 Fig 5 A loop destroys the nice tree structure of a parse, and hence we decide to mark only relations indicated through the inflectional suffixes and not through the derivational suffixes. Hence we propose to represent the relations as in Fig 5. Now one may raise an objection that this representation is not faithful to the information content in the given string. The answer to this objection is: The advantage of postponing the marking of this information is that the resulting parse is a tree and we can use the existing computational tools for extracting a tree from the graph. Should an indeclinable be treated as a function word or a content word? The indeclinables fall into three categories viz. The treatment of

each of them is discussed below with an example. Consider the following example: Since this is an indeclinable, there is an elision of inflectional suffix, and hence we mark the information encoded by the derivational suffix as a relation. Thus in the above example, pib precedes the action of going denoted by gam in gacchati. So the graph showing the relations will be as shown in Fig 6. Further, because of two incoming arrows into a single node, the graph results in nodes having multiple inheritances which prohibits this parse from being a tree. This relation will be restored at the post-processing stage. Further, in order to reduce the number of relations, we mark this relation as saha-sambandha, following the tradition, ensuring that there is no loss of information in doing so. Fig 9 Fig 10 Now the next question is whether to treat this upapada as a content word or as a function word? In other words which parse to prefer " the one represented in Fig 9 or Fig 10? So it is desirable to group the upapada together with the preceding content word and mark the relation with the content word as in Fig 9. Though this solution is desirable, it creates a mismatch between the number of words and the nodes in the graph. To avoid this mismatch, we propose to generate a graph as in Fig 10 and then we collapse the intermediate node to generate the graph in Fig 9 mechanically later. These are all more like function words than content words. However, in order to preserve the one-one relation between the number of words in a sentence and the nodes in a graph, we treat these words as content words and mark the relations as in Fig 11 and Fig 11 Fig 12 3. Treatment of Inter-sentential connectives The inter-sentential connectives connect two sentences. Here tvam icchasi and aham bhavatah. The words yadi-tarhi might be grouped together to form a node, but since this will create a mismatch between the number of words and the nodes, we name the relation between yadi and tarhi as sambandhah.. This scheme then can be extended to handle cases of ellipsis where either yadi or tarhi is dropped as below. The corresponding graphs are shown in Fig. Treatment of Anaphoras The convention for showing the anaphoric references is by co-indexing. Consider the sentence aryah. The parse for this may be represented as in Fig Fig 16, Fig 16a fig 17 This parse consists of two trees. But the given sentence is a single one because each of the part is incomplete without the other Then how do we account for a parse consisting of two trees? To convert it into a single tree, words yatra and tatra would have to be joined together. One possible parse with single tree is as in Fig 17 making it a totally unintuitive parse! Let us look at the information content again. The words yatra and tatra are in the seventh case with yat and tat as the nominal stems. The inflectional suffixes mark the relation of adhikaran. Now the anaphoric relation between them is due to the nitya sambandhah. The co-indexing denoted by double arrow as in Fig 16a will turn the forest into a tree. Treatment of conjunctions and disjunctions The problem in the representation of conjunction and disjunction is deciding the head. Following a Naiyayika we mark the conjunctive or disjunctive particle as a head. Fig 18 Fig 19 This is represented in Fig This is represented by the box which in turn contains all the individuals, joined by the conjunctive particle ca. The reason being, this information is not explicitly coded by any morpheme but is inferred through the property of the conjunctive particle. Such an information resulting due to inference will be shown in the post processed parse structure. If one can tell one relation from the other purely on the basis of syntax or morphology, then the two relations may be treated as distinct. We illustrate this with an example. But these are not sufficient. The sufficiency comes from their referents. Thus in case of these relations, morphology and syntax provide the necessary conditions. But this is not so with other relations. For example, only on the basis of morphology and syntax one can not claim that asih. Thus in the case of karan. After examining all the tags proposed by Krishnamacharyulu , we arrived at a set of only 31 relations see appendix A for which only morphology and syntax play as a necessary criterion.

avyayas of type 3. Consider the following examples: Each word indicates a different meaning because of the suffixes. The following simple sentences illustrates the role of avyayas Sentence: Noun avyaya verb Meaning: I wish to go. I wish to come. Noun avyaya avyaya verb Meaning: In all the examples given above, avyayas act as adverbs. Both the avyaya and main verb are mutually dependent on each other and it is impossible to understand the meaning of the sentence without gaining a proper understanding of the avyaya. Hence the structure of avyaya may be as follows: The Avyaya Analyzer will give the derivational morphological information of an avyaya i. With the combination of all these upapadas, upasargas, roots and suffixes, we can generate a large number of avyayas. The upapada, upasarga, root and suffixes acquire different forms due to euphonic transformations between them. Hence, each and every possible phonetic change of roots, suffixes, upasargas, and upapadas were written manually along with the necessary linguistic features. Morphological dictionaries for upapadas, upasargas, roots and suffixes were created. An example of the possible phonetic changes in upapada, upasarga, root and suffix are given below. For computational purpose, the data is presented in WX transliteration scheme. The second field in the Root gives the information about the root, class, type, and root number as given in siddhantakaumudi. If the word is nipata, then it will be treated as avyaya. If the word ends with any one of the krit suffixes related to avyaya, then it return suffix info and strips the suffix and checks for upapada [11]. As upapada and upasarga are optional, they may or may not be present in the given word. Hence, if upapada is present, then returns the upapada info and strips it. Then the presence of upasarga will be tested. If upasarga is found, then returns upasarga info and strips it. Then checks whether the remaining part of the word is the root or not. If it is, then return the root info; or else control will be transferred to the next stage. The following figure illustrates the process of analyzing the avyaya. The output is rewritten for convenience. Output of the Avyaya Analyzer Input Word: Output of the Avyaya Analyzer 5. Kridantas may be nouns or adjectives or ayayas. Some times a kridanta can be treated as a verb when there is no main verb in the sentence. The following example illustrates this. It is derived from an upasrga "nir, root "gam, krit suffix "kwa and a sup suffix. This word functions as a verb. A word consisting of krit suffix like kta, ktavatu denotes the action done by the agent. In Sanskrit, adjectives will also take suffixes and can be inflected in all cases and in all numbers just like nouns. Hence, adjectives and nouns are treated in a similar way in the process of analyzing them. As it is pointed earlier, krit suffixes are used in the process of generating nouns, adjectives and avyayas. Avyayas cannot be inflected, but nouns and adjectives can be inflected by adding 21 sup pratyayas suffixes to the base form or pratipadika of a kridanta. The surface form of a kridanta will contain a root, krit pratyaya and a sup pratyaya. Upapada and Upasarga are optional. Sometimes a kridanta may contain another kridanta as upapada. Hence to analyze a kridanta properly, it is essential to know its base form or pratipadika, case, gender and number. The information regarding the case, gender and number will be useful in the process of identification of phrases and understanding the semantic role of each word.

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