Natural Language Processing
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Lecture - 30
Wordnet and Word Sense Disambiguation (Contd…)

We continue our discussion on word net and word sense disambiguation. In the last class, we saw that one of the cardinal and absolutely, critical problems of natural language processing is word sense disambiguation. It is a one of the most amazing feeds of human mind that we understand written and spoken communication inspite of an enormous number of possibilities that exist, because of multiple meanings of words, which compose a sentence. It is equally amazing, that we produce correct sentences, choosing the words in there appropriate context. And therefore, any system that proposes to implement natural language processing on a computer has to address, very seriously the question of word sense disambiguation.

We also understood that the problem of word sense disambiguation became much more well founded, and much more well understood when these immensely important lexical resource called word net was created. A word net is a graph like structure of notes and arcs, where the notes are concepts are meanings of words expressed in the form of sets of synonymous words, and arcs are semantic relations. We will revise these concepts once again, and we will once again understand the constructs of word net. And then move on to, how word sense disambiguation algorithms are created using word net.

So, in our discussion of word net, we say that lexical matrix forms a very, very fundamental structure, where the matrix has rows which are representatives of meanings. So, assume our conceptual word has small m number of meanings. So, M 1, M 2, M 3 up to M m are the rows in this matrix, how these meanings are represented? What kind of ids or identifiers are used for these meanings is a concern to be addressed later. But assume for now, that there is way to distinguish chunks of meaning or distinguish meaning units in the form of M 1, M 2 up to M m.

And the column's are word forms F 1, F 2 up to F n are the word forms, they form the vocabulary of a language. So, the example that we took last time, was the example of bank, and the word from bank, suppose appears here in F 1, and the word from depend appears here. Now, we know that, what are the meanings of bank is depend I bank on you, for your support is an example sentence.

So, suppose M 3 is that meaning of bank in the sense, of depend then we will have a tick here below F 1 on the row for M 3, and also a tick in this cell, in the row for M 3 and column for F 3. So, thereby we mean that this meaning M 3 in the sense of bank and depend, is expressed by words bank, word forms that is bank and depend. In this row, can you think of another word, which express this meaning, yes another word which would express this meaning, would be rely may be the word form appears here. So, bank depend rely all of them, stand for this depend bank rely meaning. And these are the

synonymous corresponding to that meaning, on the other hand if we concentrate on what is happing in the column, what is happening in the column is that, the word form is unique.

But it has a number of ticks in the column, and each tick corresponds to different meanings or polysemi of the word. For example, the word bank may have a tick here, where M 2 stands for the financial institute meaning of bank that means a place where money is deposited, transacted and withdrawn, another meaning of bank, could be embankment on the side of a river or a sea or a water body. So, these could be a row here, which means the embankment of a river or a sea and the word bank will have the tick their also, we find 3 meanings of bank, when we go over the or decent the column under bank 1 meaning of bank is the financial institution, second is the depend meaning and third is the embankment meaning. So, notice how the lexical matrix quite elegantly and effectively, captures the intersection between the meaning units, and the word units of a language. So, this is the intersection of meaning units and the vocabulary of a language.
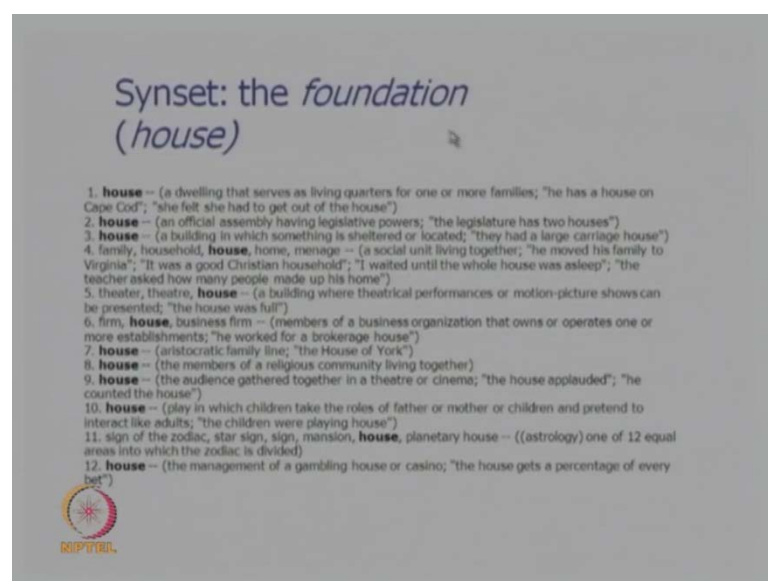
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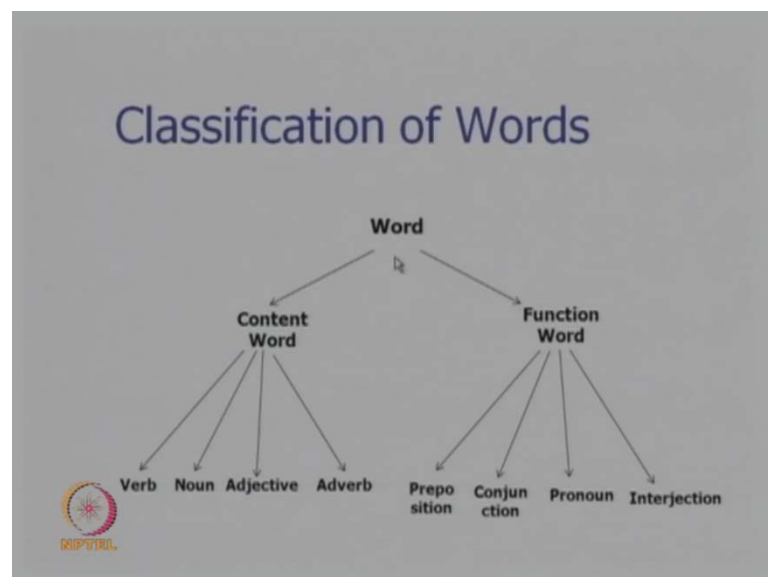
Proceeding further, we know that words can be broadly divided into 2 parts content word and the function word. Now, the word net or for that matter most lexical resources try to represent very correctly and completely, the content words which means the verbs, nouns adjectives, and adverbs, adjectives qualify nouns, adverbs qualify verbs. And these are

the words, which are the content words they carry the load of the meaning expressed in a communication. We also know that nouns are the most important beers of meaning followed by verb, followed is by adjective and adverb, while the content words carry the load of meaning. The other group of words expressed here, in the form of function word and it should not be neglected.

The role is supreme in the way, they form a sentence, so I eat rise with a spoon, I eat rice, they or all meaning bearing units, eat and rice are verb and noun, respectively I is a pronoun, I is a given the status of function word but a very important role is played by the word with, which is a preposition appearing here, and shows the relationship between the activity of eating, and eat it in spoon. So, with a helps to relate the word eat, that is to perform the action of eating, and the noun spoon.

Similarly, they are Conjunction, Pronoun and Interjection, Interjections are words like ho ah, which express exclamation some kind of emotion, pronounce are substitute for Nouns and the Conjunctions, link to parts of sentences, in the form of phrases or even to complete sentences. So, while words are divided into this way in the form of different categories, which is a concerned of the problem of part of speech tagging, we a remember once again the content words, are the entities which are expressed in the word net.

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Synset: the *foundation*
(*house*)

1. **house** -- (a dwelling that serves as living quarters for one or more families; "he has a house on Cape Cod"; "she felt she had to get out of the house")
2. **house** -- (an official assembly having legislative powers; "the legislature has two houses")
3. **house** -- (a building in which something is sheltered or located; "they had a large carriage house")
4. family, household, **house**, home, menage -- (a social unit living together; "he moved his family to Virginia"; "It was a good Christian household"; "I waited until the whole house was asleep"; "the teacher asked how many people made up his home")
5. theater, theatre, **house** -- (a building where theatrical performances or motion-picture shows can be presented; "the house was full")
6. firm, **house**, business firm -- (members of a business organization that owns or operates one or more establishments; "he worked for a brokerage house")
7. **house** -- (aristocratic family line; "the House of York")
8. **house** -- (the members of a religious community living together)
9. **house** -- (the audience gathered together in a theatre or cinema; "the house applauded"; "he counted the house")
10. **house** -- (play in which children take the roles of father or mother or children and pretend to interact like adults; "the children were playing house")
11. sign of the zodiac, star sign, sign, mansion, **house**, planetary house -- ((astrology) one of 12 equal areas into which the zodiac is divided)
12. **house** -- (the management of a gambling house or casino; "the house gets a percentage of every bet")

NPTEL

Now, Synsets forms the foundation of word net, I have given here, and example of the word house or simplify the concept of Synset through the word house. Now, house is shown to have 12 meanings here, the most common meaning of house is a dwelling, that serves as a living quarters, for one or more families he has a house on cape god, she felt she had to get out of the house. This is the most normal, most frequent, and most well understood meaning of house, namely it is a living quarter. Another meaning of house, it is a official assembly having legislative powers, the legislature has 2 house for example, house of commons and house of lords in England, in India we have [FL] which are the 2 houses of the parliament.

Similarly, the third meaning is a building, in with something is sheltered are located, these corresponds to the structural meaning of house. So, these way different meanings house are given, you can see also and important meaning of house in the form of family, and this is a good example of Synset or set of synonymous words, family household house, home and ménage. So, these are synonymous words, and one look and the Synset tells you, what meaning is conveyed by these set.

So, the movement you see the word family, you know that word house is being used in the sense of family. Another meaning of house is the sign of the zodiacs star, sign mansion house, planetary hours this responds to that astrological meaning of house. Now, the set of synonymous words forms a really the foundation of the word net, the quality of a word net is very largely to a large extent, decided by the quality of these Synsets.

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Now, the Synsets we have explained before form the notes of word net graph, and semantic relations, starting from number 2 with a gap of 3 4 5 6 and 7. Now, 5 also is go with it, so number 2 namely Hypernymy Hyponymy, 4 Meronymy Holony, 6 Entailment, and 7 Troponymy are the relationships between synsets. The relations at antonym and gradation are between word forms, so 1 3 and 5 are lexical or word to word relationships, rest are semantic Synset to Synset.
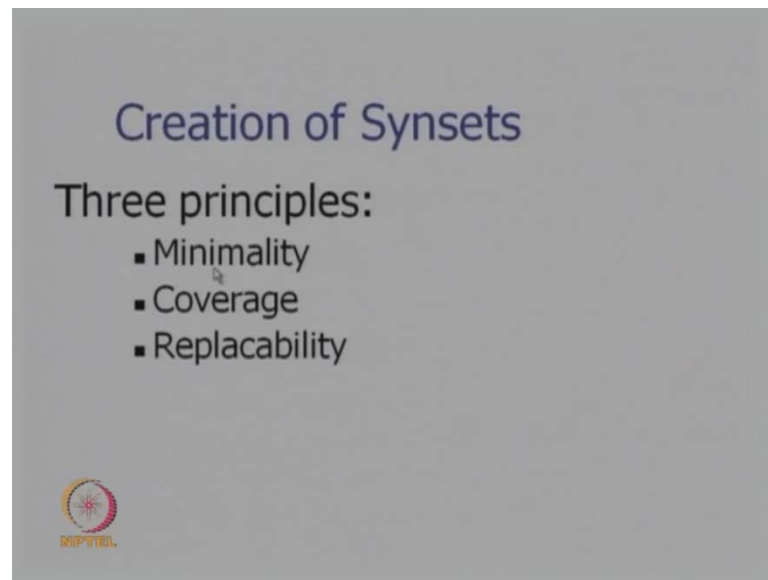
To relationships the Synset is create created in using 3 principles, the principles are minimality, principle of coverage and principal of the replacability. We had mentioned this before, and I would like to explain this further. So that the foundational understanding of word net is complete through this.
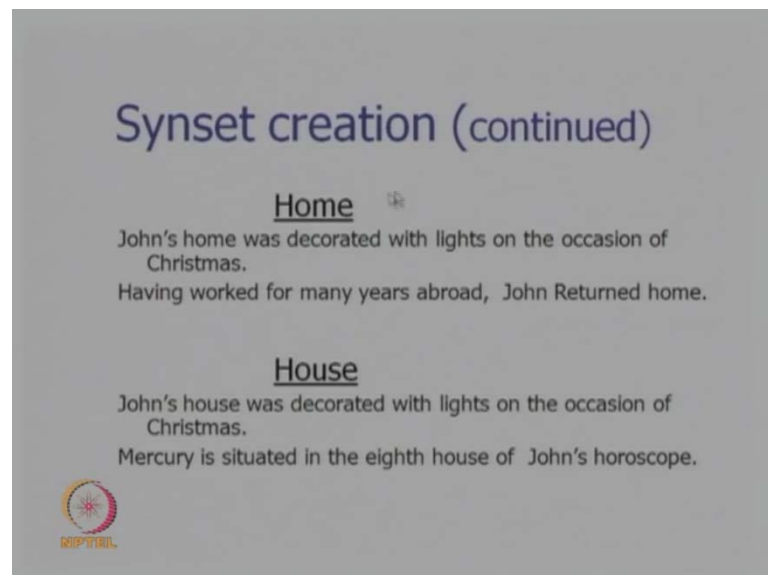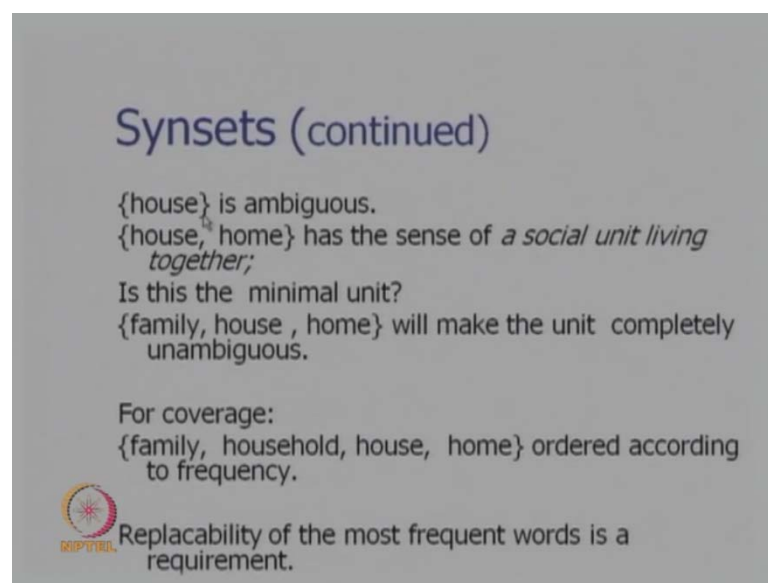
Take the word home, john's home was decorated with lights, on the occasions of Christmas. And what is the meaning of home here, here the home means, the structural meaning of home, which synonymous with house, it is a structure a building and we can

therefore, say the sentence, john's home or house was decorated with lights, on the occasion of Christmas. And the other the meaning of home expressed in this sentence here, having worked for many years abroad, john return to home here, the home as the meaning of motherland or once own home country. So, we can see 2 meanings of home here, for house again I see we see the first sentence here, john's house was decorated with lights, on the occasion of Christmas. So, this is the structure meaning of house, mercury is situated in the eighth house of john's horoscope; this is the astrological meaning of house.

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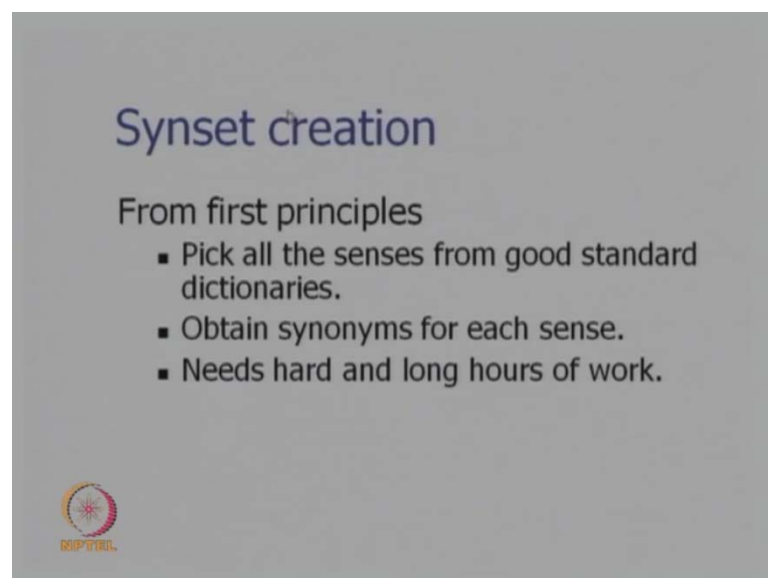
So, we see intersection of or overlap of meaning, between the word home and house has an exsimplified by this sentence. And then there at is divergences, diverged meanings, one is the meaning of motherland for home, and other is the astrological meaning of house, has given here. So, it is clear that the word house itself is ambiguous, so if we for form a set, a single Synset with house in it, the meaning of this set is not clear, it can be anything a ranging from a living quarter to astrological position, to family, to legislative assembly and so on. The movement I put in another word, whom I have eliminated some meanings like, the astrological position or legislative house, because that not use, the word whom in that sense. Those Meanings are isolated but still it is ambiguous, because here it is not clear, whether it refers to whom has a structure or even home, and how is meaning family.

So, that these too meanings are still existing, and the unique meaning has not merged for this exit. So, is this the minimum unit, now because it still has 2 meanings, the movement a insult family, in the beginning of Synset, I have eliminated the structural sense of these 2 words, and I have homed onto the family meaning. And therefore, now this has become a completely disambiguated, and family and house, so and family and home, would form a minimal unit, for giving a unique sets, for the Synset. Now, there is a coverage principle, where we have to introduce, words which I existing in the language, in the, with the same meaning. So, the word house hold was absent here, the for coverage principle, were insisted that this word be would be introduced, and put at the right place, in the order of the words, so family the most frequent word in the sense of a family household is possibly.

The second most frequent word, and then there is the principle of replacability, where the most frequent words in a Synset, should be able to replace each other, in a few sentences at least. So, he comes from a aristocratic family, in this sentence I can replace the word family, with house socially comes from a aristocratic household. So, let us then summarized this discussion, Synset are created using the minimal principles, that the coverage principles, and the replacability principle.

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Now, the Synset can be created in 2 by using 2 methods, one is from first principals, tic a word, pick all the senses of the word from a good standard dictionary or good standard

dictionaries. It is very difficult to use more than 1 dictionary for all the senses, obtained synonyms for each sense, and this really need hard and long hours of work. For example, the Hindi word net, which was created at IIT Bombay for last 8 to 10 years are required, consulting multiple dictionaries, looking at each word minutely, explaining and discussing it is a senses, thread bear. Then finally, deciding which meaning unit that word will go into, and all possible senses of a word or try to be captured and for a, senses all possible words are given, obeying the coverage principle. So, this is Synset creation from first principle.

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And the second method is to create Synsets, from the word net of another language repreferably in the same family, pick the Synset and obtain the sense from the gloss, get the words of the target language, often same words can be used, especially for languages in the same family. And then, we do translation insertion and deletion, so in this methodology, the efforts are little less, compared to the method which uses first principles, that us because meaning units, have been sought of pre-decided. And our task is simply too find a set of words, which will express these meaning, and will form the components of Synset, after satisfied the principle of minimality coverage, and replace ability.
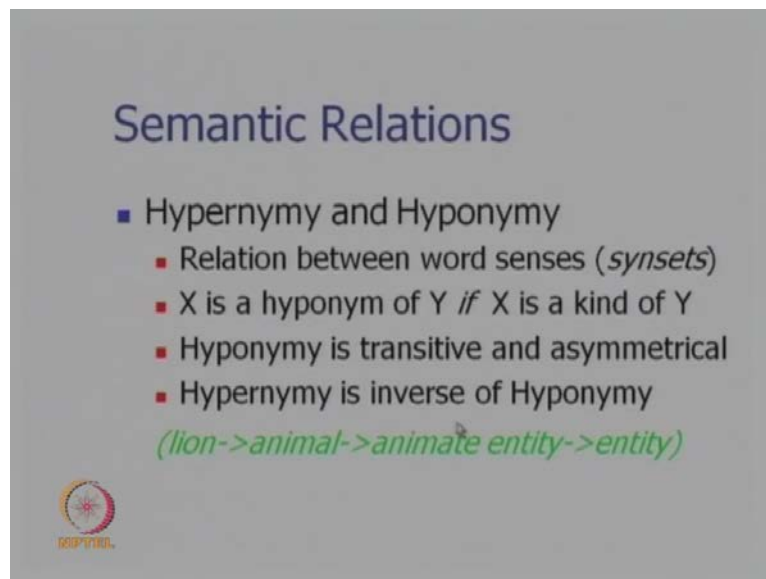
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I illustrate these with an example, let us take the English Synset meaning earthquake, the other words existing in English, in this sense are quake, temblor and seism. Here is the gloss of further Synset, meaning there by the explanation for the Synset, which is this shaking and vibration at the surface of the earth, resulting from underground movement, along a fault playing or from volcanic activity. Now, for this English Synset, the corresponding Hindi Synset would be [FL]. So, the these 2 words [FL] simply autographic variations of the same word, here to [FL] these are autographic variations of same word, the word is most frequent in Hindi the, that occupy a first position in the Synset. The gloss for the Synset is [FL], so this is simply the transition of English clause for this Synsets, I need to express the concept of earthquake [FL].

Now here is an example sentence, which we do not see in the English Synset, [FL] the transition is many well killed in the earthquake in Gujarat, in 2001. Now, if I want to create the Synset for Marathi, which is a familiarly closed me related language to Hindi, then what I do is that, I assimilate this Synset, the meaning of this Synset, and completely forget about it, after that, as far as Hindi words as concerned. I just remembered the meaning, I will observe the meaning, then for this meanings I find that there are 2 Marathi words [FL] and [FL] between the [FL] and [FL] is more frequent. So, I place it earlier the [FL] this form first word of the Synset, and then write down the gloss [FL]. So, this is the same gloss which is expressed in English and Hindi, the

meaning is that shaking and vibration at the surface of the earth, and the example sentence is also the transition of Hindi sentence [FL].

So, this is simply the transition of the Hindi sentence, so these example should clarify to you, the way the Synset of a language are created, the first step principle methodology is that, we take the words and keep on collecting senses of the word, and then enumerate them one by one, in which the order should enumerated, they are enumerates in the order of them frequency. The sense which is more frequent is give a lower number, in the order the later senses come one of the other depending on the frequency, our Synset creation methodology illustrated, the silent points of how the Synset is created. So, when the Marathi Synset is created from Hindi, we simply found 2 important words in Marathi, which express the sense of earthquake, and put them in Synset in the right order, and then the gloss and the example translation sentence, where translated from Hindi.

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Now, we move on to Semantic relations and Semantic relations the important factor was they missed, at their languages indifferent. And therefore if Semantic relations are created for the word nets of all language, they can be borrowed into the word nets of another language. So, the first symmetric relation that comes to our notice is the generalization the specialization symmetric relation.

So, the technical name for such relationship is Hypernymy, and hyponymy, and Hypernymy and hyponymy is relationship between words senses or synsets, X is a hyponym of Y, if X is a kind of Y hyponymy is transitive and asymmetrical Hypernymy is inverse of hyponymy. So, Hypernymy is a generalization, so hyponymy is specialization, lion is a kind of animal, animal is a kind of animate entity, and animate entity is a kind of entity. So, has we go from lion into the entity, we are increasingly moving towards higher and higher level of generalization. And when we come back in the reverse direction, we are going in the hyponymy direction, and we are specializing the concept.

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Next important symmetric relation is Meronymy and Holonymy, this is essentially the part of whole relationship for example, branch is a part of tree, so between the concept of branch and tree. There is a part whole relationship, Meronymy and Holonymy relationship, so X is a Meronymy of Y, if X is a part of Y and Holonymy is the inverse relationship of Meronymy. So, kitchen has a Meronymy relationship with house, house has Holonymy relationship with kitchen.

Now, notice the set rotation here, this means that the relationship is between the concept of kitchen and the concept of house, not between the word kitchen and the word house. It is between the meaning of kitchen and meaning of house, surely you can immediately detect, and point that, this Synset for kitchen is not complete, there may be other

synonymous kitchen you, will go there by virtue of the coverage principle. Similarly, there are words like whom, building etc which will go into this Synset, because those are the synonymous, and coverage principle has to be,
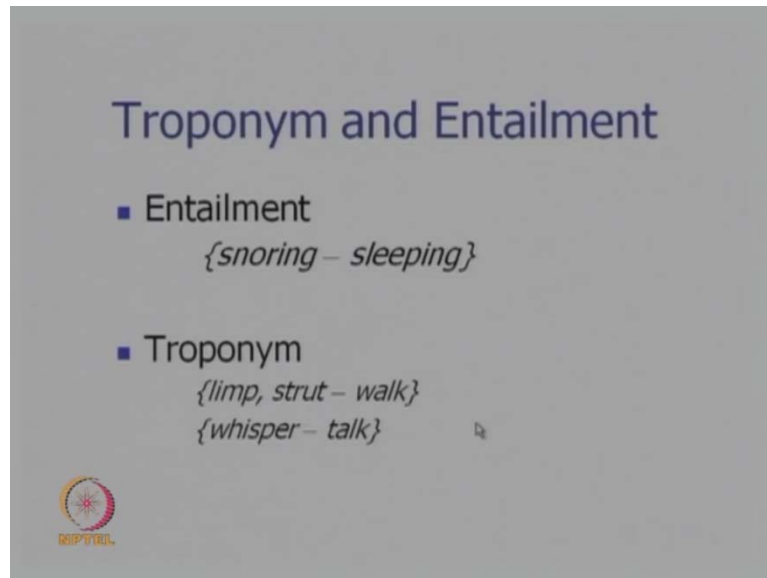
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Then we come to the Lexical Relationship of an Antonymy, which expresses oppositeness in meaning. This is relationship between word forms, not between meaning even though, the purpose is to capture oppositeness in meaning, actually it is established between words. The reason is that words are we choose, with respect to the words, they are antonymous with, which are the words they will antonymous. It depends a many factor like phonetics, word forms, word length etcetera sound plays an very important role there. For example, they Synset rise, and ascend express the meaning of going up, versus fall and descend, which expresses the meaning of going down.

However when we give Antonymy relationship, we do not give their relationship between these 2 synsets because that leaves open, the question of which word is Antonymous with, which we know that Antonymy of rice, Antonymy of rise fall and not descend the Antonymy ascend is descend not fall. So, the words by virtue of their phonetics properties sound, and also the property of, and also the property of word length and other features choose to we buy us towards, a by other words in terms of Antonymy rice is a buy us to a fall, for Antonymy ascend will take this sentence Antonymy.

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Moving on, we take up these 2 relationship of Troponymy and Entailment as symmetric relations, Entailment is the relationship of implication, so let me write down the Entailment relationship.

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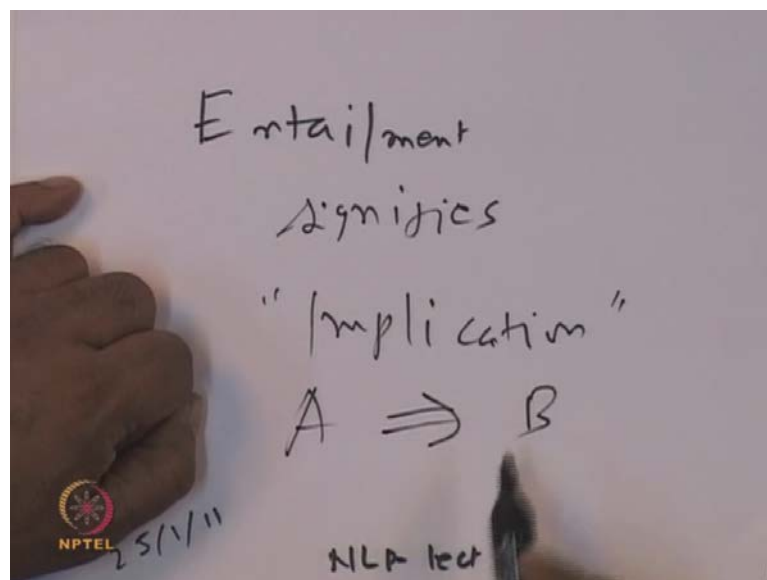
Entailment signifies Implication, Implication which is expressed as A implies B. So, if you look at the slide, then we understand why Entailment is an implicate situation. So, the meaning of the word snoring has a Entailment relationship with the meaning of word sleeping, snoring implies sleeping if somebody snoring, that means this person is

sleeping, but not the other way round. It is possible for an individual to sleep without snoring, so snoring entails sleeping not the other way round Troponymy is also a relationship, between meaning Troponymy means manner of Entailment means implication, Troponymy means manner of.

So for example, the word limp and strut, which expresses a Particular kind of walking a manner of walking, has Troponymy relationship with the meaning of word walk, whispering is a manner of talking, so whisper has Troponymy relationship with talk. So, Troponymy is a manner of relationships, sometimes the word net does not separately mentioned Troponymy, somewhat explicitly unseparately mentioned, Troponymy instant they use the word hyponymy itself, to mean the manner of relationships. So, hyponymy and Troponymy are sometimes synonymously used in word nets. But we must keep in mind, the fact that Troponymy is the manner of relation, and is used for verbs, verb meanings, and hyponymy is typically used for noun meanings.

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So, this is what I said snoring entails sleeping, buying entails paying, now you see that is this interesting point about, the Entailment being slightly different in these 2 situations snoring entails sleeping, well and good sure, buying entails paying sure. The activity of buying embeds in it, the concept of paying, buying but you see there is this temporality consideration, coming up here snoring is properly temporally included in sleeping, and inclusion can be in any way. So, snoring typically happens, for a duration of time, during
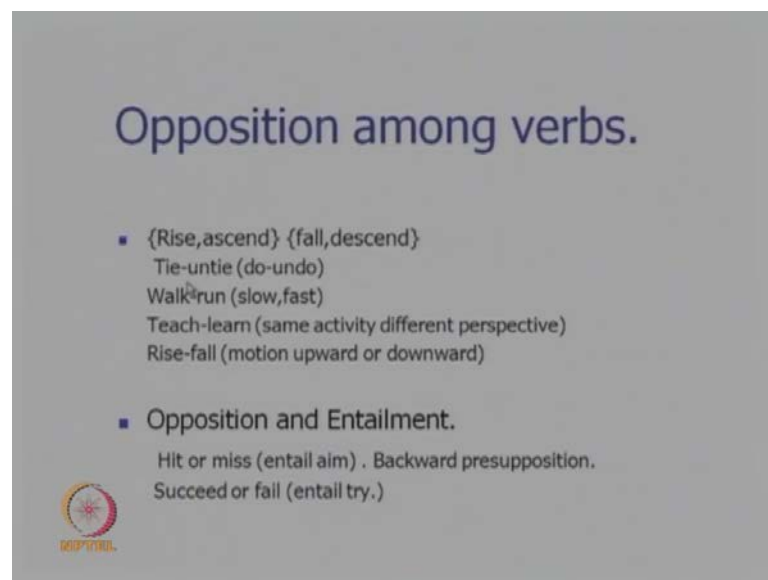
sleeping, so snoring is temporarily not completely overlapping with sleeping. So, sleeping temporally include snoring, buying also temporally includes paying, then there is co-extensiveness, which obtained for Troponymy.

So, if Limping is a manner of walking, then when a person is Limping he must be walking also, and temporarily Limping and walking are co-extensiveness. We corrupt have any pointive time, where Limping is happening but not walking is not happening, there co exists here. Now, verbs and satellite forms a very important component of Lexical resource, most natural language processing applications need to represent verbs in a very effective way capturing all its subtleties. So, can also, can have Antonymy relationship between them, we can have opposition of meaning among verbs.

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So, here is discussion on the slide of the opposition among verbs, rise and ascend has opposition in meaning, with fall descend. Similarly, tie and untie are in opposition relationship, walk and run of course, has Troponymy relationship, I know walk and run have some kind of opposition, in meaning relationship teach and learn same activity but different prospective, rise and fall motion upward or downward. So, opposition in meaning and the Entailment relationship are related to each other hit or miss, they entail aim, and there is this phenomenal backward presuppositions. So if I attend the hit or miss, that definitely implies that, I taken and aimed before I hit or miss before something, I

must aimed for something succeed or fail entail try. So, these are cases of backward pre opposition.

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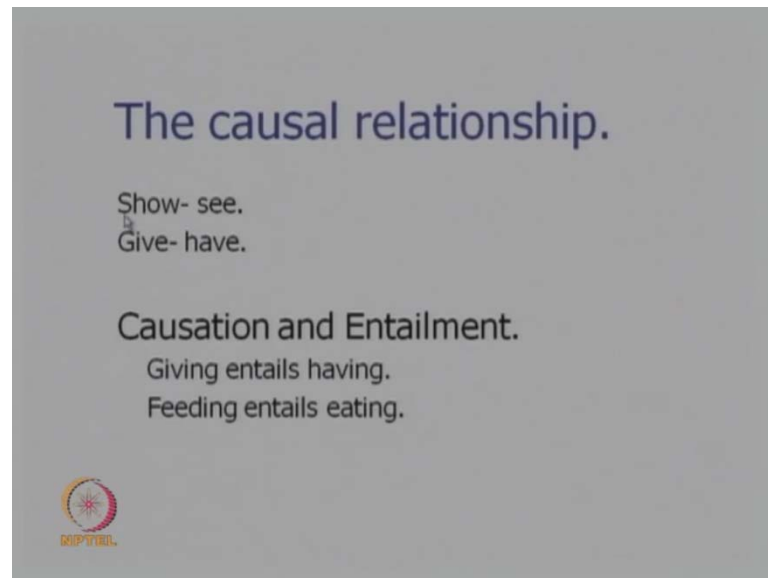
There is a casual relationship between verbs, for example, show and see, so if somebody shows to something to somebody else then this somebody else would see this something. So, show causes seeing, give causes having therefore, there is a relationship between causation and Entailment also, giving entails having feeding entails eating. So, the what is the purpose of all these discussing, the purpose of all these discussion is that verbs have implication relationship, between them and this implication on or Entailment also have different categories under it, backward presupposition causality temporality and so on and so for. So, this is capture very neatly by this taxonomy diagram for entailment.
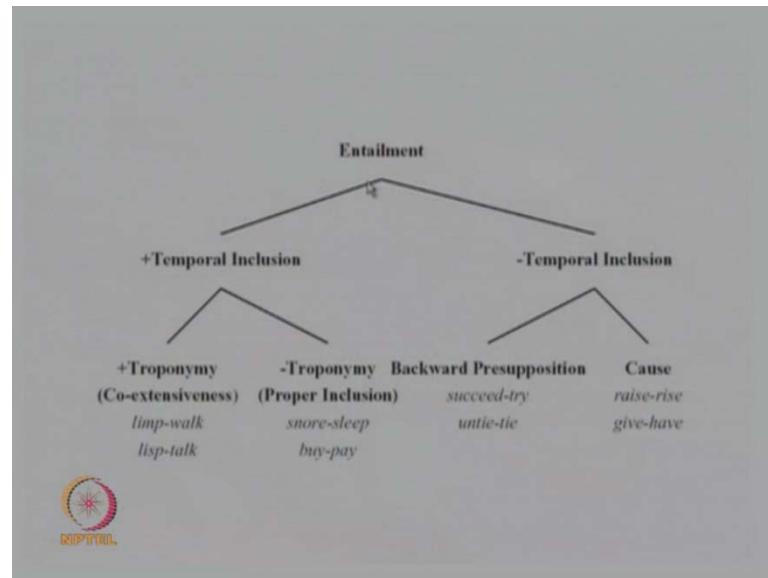
So, you can see here at the root is the Entailment, and these Entailment be with temporal inclusions or without temporal inclusions, has shown plus temporal inclusions, and minus temporal inclusions. Temporal inclusions again can be which Troponymy or without Troponymy, when it is with Troponymy there is co-extensiveness, and when these minus Troponymy there is a proper inclusion. And similarly, there is pre backward presupposition, which is and without temporal inclusions, and also cause this is also without temporal inclusions.

So, we know that cause and effect have to be temporally separate each other, when cause finishes effect starts, so temporally effect is after cause, backward presupposition also implies a sequentiality in time, succeed and time try for example, untie and tie. When, we come these part of the tree Troponymy, and minus Troponymy they have this co extensiveness in time, and proper inclusion in time. So, snoring is a not a manner of sleeping, that is why a minus Troponymy, but it has proper time in inclusion in the activity of sleeping. Buying has also proper time inclusion in paying, and then there is the co-extensiveness, between verbs like Limping and walking, Limping and walking are temporally co-existence, both have two happen together, lisping and talking also have to happened together.

So, plus Troponymy, minus Troponymy shown here, backward presupposition and cause, are also shown here, raise and rise if I raise somebody, there are the second person

risers, if I give something to somebody, then that somebody has the something. So, this is the cause and effective relationship, and they never temporally included, backward presupposition is also of same kind. So, these tree is a useful tree, where the different relationships between verbs are shown, and has we can see taxonomical division is happening in the following way. Entailment is divided into 2 kinds as with temporally inclusion, and without temporally inclusion within that temporally inclusion once again, we have with Troponymy and without Troponymy, without Troponymy inclusion, we have backward presupposition and cause.

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Kinds of Antonymy

Size	Small - Big
Quality	Good – Bad
State	Warm – Cool
Personality	Dr. Jekyl- Mr. Hyde
Direction	East- West
Action	Buy – Sell
Amount	Little – A lot
Place	Far – Near
Time	Day - Night
Gender	Boy - Girl

So, as Entailment as different shades of usage and meaning, has a Entailment is reach in its structure. There is also a kind of richness in the antinomy relationship. So, Antonymy can be of different types like size Antonymy, the words small and big indicate that quality Antonymy, good and bad dictates that size antinomy is warm, and state antinomy is warm and cool a, an entity can in a state of warm or it can be cold. There is personality Antonymy Dr. Jekyl- Mr.Hyde, direction antinomy east and west, action Antonymy buy and sell, amount Antonymy little and a lot, place Antinomy far and near, time Antonymy day and night, gender Antonymy boy and girl.

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Meronymy also has different kinds like component object head and body, staff and object, wood and table member connection, tree and forest, features and activity, speech and conference. So, speech for example, forms a part of conference, place area palo alto forms, part of California phase state, youth forms part of life, resources process pen part of writing, actor act physician forms part of the act of the treatment, so is the different kinds of Meronymy.

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Gradation is a interesting relationship, which kind of enforcers a spectrum, for the Antonymy relationship. So, you can have state gradation, where childhood, youth and old-age forms a spectrum, youth is in between, between childhood and old-age, so childhood and old-age can be looked up as, Antonymous to each other, and in between there is a shades of Antonymy youth. For example, comes between childhood and old-age similarly, they can be gradation based on temperature, hot warm and cold, hot and cold are Antonymous is but warm comes has in between state, action sleep and wake and antonymous doze, which is neither sleep not for the awake either fully sleeping, not fully awake is a state in between sleeping and waking.
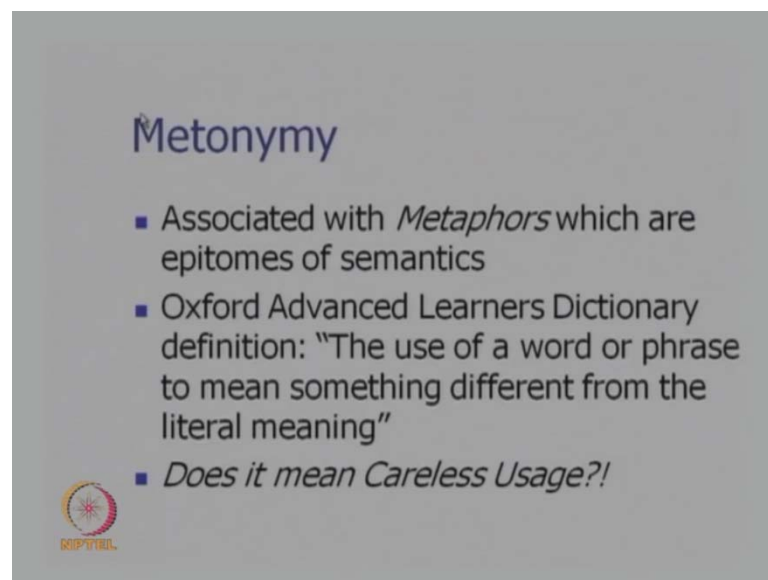
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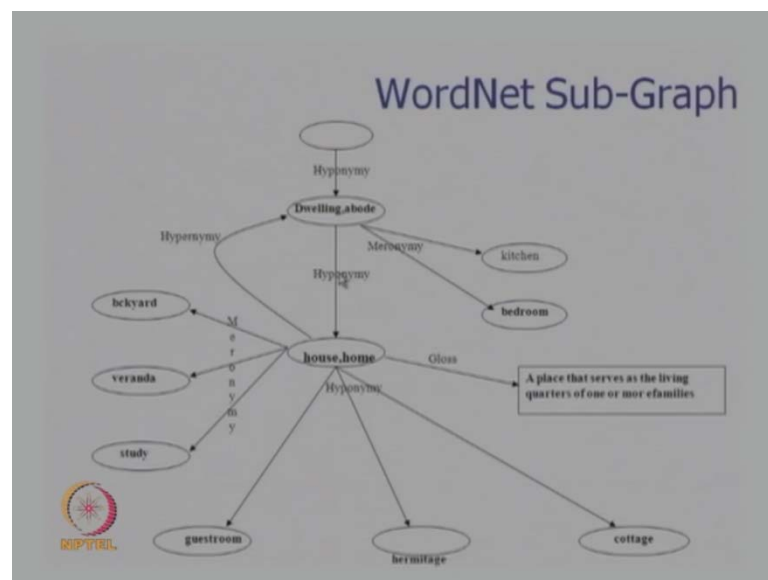
So, when we have discussed the Synsets, and we have discussed symmetric relationships, we find that the word net actually, forms a graphical structure. So, here is a note way Synsets for the word net house and home, house and home is a kind of dwelling or abode. So, dwelling about is forms a Synset, and there is Hyponymy relationship between, these 2 concepts dwelling about is a generalization of the concept of house home, house home has a spot backyard, here veranda and study. So, these concepts are organized with Meronymy relationship, with the concept of house and home, Hyponymy is the specialization relationships. So, guestroom hermillage cottage are different kinds of house, home so hyponymy relationship be from, house and home to guestroom.

Then dwelling and abode has Meronymy with kitchen and bedroom, if we the question is why is the kitchen and bedroom not kept here, with synsets the reason is that, the other kinds of dwelling about, which also have kitchen and bedroom has a parts, they are in and we have to repeat the kitchen and bedroom, everywhere. Instead if, we just keep at 1 place namely at the parent all children, would linked to this concept by means of in inherit ends. And you can see in the square box, the gloss for house and home, a place that serves as a living quarters 1 and more families. So, one can begin a ascending this Hypernymy, Hypernymy hierarchy and finally, it entity which is the like a general concept, upswing all other concepts below it.

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Now, in our last part on the discussion on the symmetric relations, we mention Metonymy, which is very old symmetric relationship, but still is new in word net. Metonymy is associated with metaphors, which epitomes of semantics, our imagination creativity, intelligence are called to play to foulest extent when, we use metaphors for colourful figure in speech, metaphors are great indicators of human imagination and creativity. So, we see here a definition of the word Metonymy, Oxford Advance learners Dictionary defines Metonymy has the use of a word or phrase to mean something different, from the literal meaning but Metonymy does not mean careless usage a language in competent person, will not be able to create, effective metaphorical examples in the language. So, Metonymy is a very important relationship used by people all the time, in the writing and speech what is now, aimed for in most of the word net

enterprises, is to capture metaphorical relationships, and Metonymy, within the word net structure itself. So, we therefore have to understand Metonymy.

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We can obtained inside from the Sanskritic Tradition, where the there is a fundamental discussion on the power of a word, words typically have 3 a kinds of usages [FL]. Let us take example of the word hall, the meaning of hall is expressed by the following sentence, the hall is packed, here the hall is a physical structure. Now, this is a direct and the most apparent surface meaning of hall, so the hall is packed, so this is the an example of [FL], the words most direct apparent meaning [FL] is somewhat metaphorical usage of the word, the hall burst into laughing. So, it is impossible for in an animate hall, which is vales at the ceiling, with the window and door it is impossible for such a structure which is in animate to burst in to laughing.

But it is meant here is the people in the hall, the hall burst into laughing, means the people in the hall burst into laughing. So, through the word hall, we indicate its occupance, who started laughing burst into laughing [FL], is the implied unsaid and implied sense the hall is full. So, if we go to a movie hall, and see and here the sentence the hall is full, what is the unsaid here is that, and so we cannot enter, this is the [FL]. So, a word can be used as [FL], the direct and apparent meaning, [FL] metaphorical usage, the hall burst into laughing and [FL] the implied associated sentence the hall is full.

Metaphors have been extensively studied in the Indian tradition, the technical terms for those are [FL] and [FL], the former indicates the object being compared, and the later the object being compared with, so [FL] and [FL] are concept standing for object being compared, and object being compared with see, if I take this example here [FL] was like a lion in the battle with the Alexander. So, we have said that [FL] have to be used here, so [FL] was like a lion in the battle, here [FL] is a [FL], because he is being compared, compared with what compared with lion, so lion is the [FL] here.
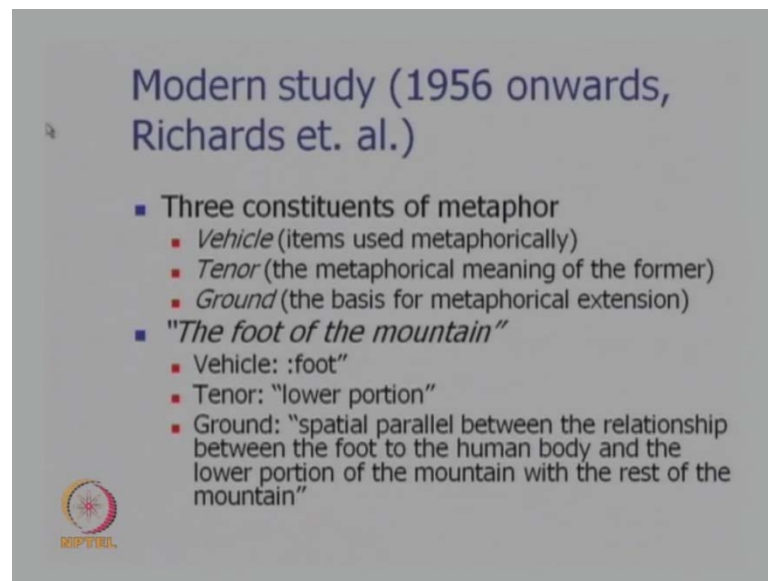
Now, concepts like [FL] or [FL] have been studied in the Sanskrit literally tradition, [FL] is the expressed comparison, [FL] was, is like a king in the battle with Alexander. The word the preposition like, makes the correspondence very occurant, very direct and open, [FL] was like a lion in the battle with Alexander, [FL] is implicit comparison. If you dropped the word like, and appropriately make the sentence grammatical, [FL] was a lion in the battle with Alexander [FL] was a lion in the battle with Alexander.

So, [FL] was like a lion in the battle with Alexander is not said expressed it here, so there is a implicit comparison, this is known as [FL] [FL] is it us a exaggeration, where [FL] and [FL] both are dropped, the person the entity against to which comparison is being done, and the entity which is compared both are dropped. So, here is a discourse segment [FL] army fled but the lion fought on, so the explicit, explicit reference to [FL] is dropped here, the lion here co referentially an implicit in spoon, so this is the an example of [FL].
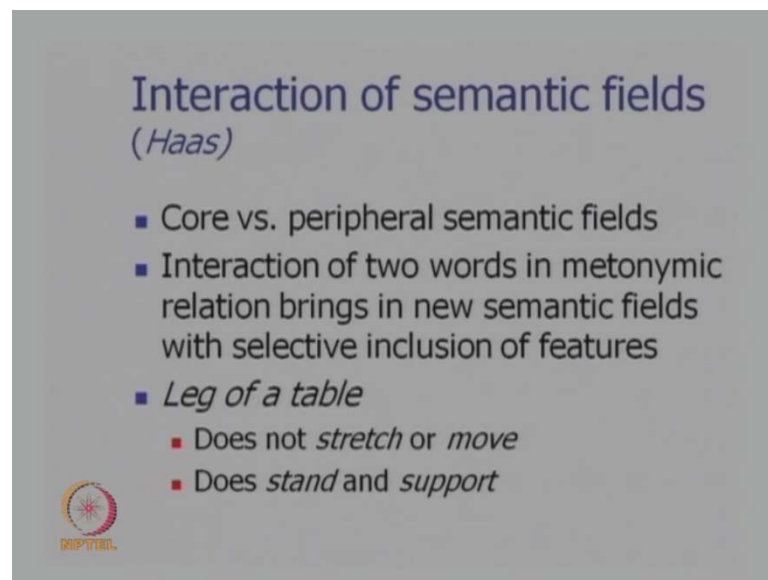
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In modern study, which is happen 1956 onwards, through the works of Richard at all, we understand there are 3 constituents of metaphors, a vehicle this is a set of item used metaphorically, tenor the metaphorical meaning of former, and ground the basis for metaphorical extension. So, if I take the phrase the foot of the mountain here, the metaphorical usage is that, of the word foot typically, we associate foot with an animate entity, animal food birds a foot.

So, here when we see here, when we see foot of the mountain, so mountain is an in animate, so what do we mean, we mean the bottom part of the mountain, the word foot here has been borrowed from the animal domain, and used for mountain to create an effect, to have a sparkling example of speech. So, that effect is achieved through the usage of the word foot, which is metaphorical for the mountain, vehicle is foot, tenor is a lower portion, the metaphorical meaning of former, and the ground is a spatial parallel between the relationship, between the foot of the human body, and the lower portion of the mountain, with the rest of the mountain. So, the correspondence here is the special parallel, between the relationship, between the foot of the human body, and the lower portion of the mountain, with the rest of the mountain.

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Now, there was this, what by a well-known semantics, call Haas who argues and establishes that, it is the interaction of semantics fields, with give lives to metaphorical meaning. So, there is a Core versus peripheral semantic fields, and the interaction of two words in the metonymic relation bring in new semantic fields with selective inclusion of features. So, when we use the phrase Leg of a table, we borrow the idea of leg from animal domain but we selectively used features. For example, the leg of a table, it does support and stand, so thereby it is analog has to leg of an animal but the analogy stops, I when we try to see, if the leg of a table stretchers is almost. So, we continued discussing Antonymy and metaphor, in the subsequent class.