Theory of नञ्वाद (Nañ-Vāda) and Its Modern Application to WSD

Dr. Pankaj D. Jaje

Abstract- Classical Sanskrit theories are highly useful for current computer based modern tools. In the era of Machine translation, semantic disambiguity is difficult to attain, as languages are covered with the speaker's background knowledge; their intentions and so on. In such cases, the wisdom inherited in our ancient texts and Indian knowledge streams truly approaches the ground need of the hour. In this study, it was explored how the structured theory known as नञ्वाद; the doctrine of negation be helpful to handle the sense ambiguity of any Sanskrit words when they are perceived by the computers. This study tries to demonstrate how this classical theory along with some Paninian rules can be useful to analyse the correct meaning of the given input - sentence. By this study, it was aimed to achieve the ways to resolve the sense ambiguity; negation detection and correct context interpretation in NLP systems. It bridges the relevance of ancient theories with the modern context.

Keywords-Classical theories, नञ्वाद, Semantic Disambiguity, Machine Translation.

I. INTRODUCTION

Classical Indian linguistic theories developed by Pāṇini, along with its later explanations by Kaiyaṭa, Nāgeśa, and the Naiyayikas and Mīmāṃsakas, contain deep insights into how negation modifies meaning. One of the most influential theory of this system is नञ्वाद (Nañ-vāda), the doctrine of interpreting words qualified by the particle nañ (नञ्) meaning *not, without, non,* etc in brief, doctrine of negation.

While it may appear at first to be a simple rule of negation, Nañ-vāda is a sophisticated theory of semantic inversion, contextual negation, lexical modification, and meaning-selection. These very mechanisms closely parallel some of the most difficult problems in modern computational linguistics, especially Word Sense Disambiguation (WSD).

Thus, Nañ-vāda provides a classical model that anticipates many modern ideas about context-related meaning, semantic structure, and lexical disambiguation.

1.1 What is Nañ-vāda

नञ् (nañ) is a prefix (Upasarga) used to express negation, similar to English prefixes *non-*, *un-*, *in-*, *without*. For e.g.

नरः = man ननरः = not-a-man / non-man

पुण्यः = virtuous नपुण्यः = non-virtuous

Nañ-vāda seeks to explain how negation affects the meaning of a word, and whether it:

- Negates an base word (गुणप्रध्वंस)
- Negates an entity entirely (अस्तित्वनिषेध)
- Creates a new positive concept (भावप्रधान interpretation)
- Chooses one sense among many available meanings of the base word

Nañ-vāda therefore includes:
semantic rules, syntactic rules, context-based disambiguation, philosophical implications about what "non-existence" means
The key question arises-
'What exactly is negated, and how does negation interact with meaning?'
Classical texts list four major types. These closely mirror logical and linguistic categories used today.
अस्तित्वनिषेध (Absolute Negation) The entity itself is denied.

- *na-gauḥ* — "not a cow," i.e., total absence of cow-ness.

गुणवाचननिषेध (Attribute Negation) Only a quality is denied.

- *na-śvetaḥ gajaḥ* — "a non-white elephant."

अभावयोग्यता (Contradictory Negation) Negation generates a contrary (opposite) concept.

- "non-dharmic" → "adharmic."

परामर्शात्मक / व्यवहार-नञ् (Pragmatic/Contextual Negation)

Meaning depends entirely on context.
Example:

- *na-brāhmaṇaḥ* could mean:
  - not a Brahmin
  - a fallen Brahmin
  - a man behaving unlike a Brahmin

This contextuality is crucial for understanding its modern relevance.

1.2 Nañ-vāda as a Theory of Lexical Semantics
Nañ-vāda can state that:
Words can have multiple possible semantic outputs after negation. Context determines which meaning is selected. Negation may yield a logically opposite concept or a pragmatically appropriate one. Word meaning is not static; it undergoes semantic transformation based on affixes.
In modern terms, nañ introduces semantic polarity, scope, feature modification, and semantic shift. 'The classical Vyākaraṇa tradition, particularly in Nāgeśa's Paramalaghumañjūṣā, draws a clear semantic distinction between nominal negation (paryudāsa) and propositional negation (prasajyapratiṣedha), treating the negative marker as a semantic operator that can change referential class or indicate absence/non-existence'. (Lowe, J. J., & Benson, J. W. 2022).

II. DISCUSSION

Word Sense Disambiguation (WSD): A Modern NLP Problem to identify the correct sense of a word in context is the aim of this current research trend.
Examples can be seen here from English language
bank → river bank / financial institution / rely on
light → illumination / lightweight / not serious
Similarly, let us see in Sanskrit:

गौः → cow / light-ray / earth / speech (in Vedic usage)
धर्मः → virtue / duty / law / nature

Nañ-vāda faced the same issue:
When "nañ" is prefixed to a polysemous word, which meaning gets negated? The choice depends on context, exactly as modern WSD algorithms aim to do.

2.1 Parallels Between Nañ-vāda and WSD

- Sense Selection

Nañ-vāda states that the negated meaning must be the meaning intended by the speaker (तात्पर्य), judged from context,and modern WSD uses:

- context windows
- dependency relations
- semantic networks

Both decide meaning contextually.

- Semantic Polarity and Feature Modification

In Nañ-vāda, negation modifies lexical features of a word:

- [+human] → unchanged
- [+male] → unchanged
- [+Brahmin] → negated
- → creates a new semantic class

This is identical to modern feature-based lexical semantics.

- Scope and Logical Negation

Computational linguistics distinguishes:

- wide-scope negation
- narrow-scope negation
- predicate negation
- attributive negation

Handling Lexical Ambiguity

Nañ-vāda formally recognizes that a single nañ-prefixed word can yield multiple meanings:

- non-man
- sub-human
- animal
- inhuman person
- morally degraded person

2.3 Applying Nañ-vāda to Modern WSD Models

- Rule-Based WSD Using Nañ-vāda

Classical rules can be translated directly:

- If the negated attribute is explicit, use attribute-negation.
- If negation is absolute, remove the entire semantic class.
- If context implies a contrary meaning, choose the opposite sense.
- If syntactic cues indicate scope, choose narrow/wide-scope negation.

These rules improve interpretability in symbolic WSD systems. 'If the negated attribute is explicit, use attribute-negation. If negation is absolute, remove the entire semantic class. If context implies a contrary meaning, choose the opposite sense. If syntactic cues indicate scope, choose narrow/wide-scope negation.' (2022).

- Nañ-vāda for Machine-Learning WSD

In ML models, negation often confuses embeddings (e.g., not good vs. bad).

Using Nañ-vāda principles:

- contextual embeddings can encode negation as a meaning-transforming operator, not simply a negative token.
- classification models can learn multiple types of negation.

- Nañ-vāda in Transformer-Based WSD

Modern models struggle with:

- negation scope
- negation reversal
- pragmatic negation

Training them with Nañ-vāda-inspired representations (scope tags, semantic inversion markers) enhances:

- contextual sensitivity
- handling of polysemous Sanskrit words
- more accurate negation interpretation in multilingual corpora

- Nañ-vāda for Sanskrit NLP

In Sanskrit processing:

- Sandhi → morphological analysis
- Polysemy → semantic tagging
- Affix semantics → derivational analysis

Nañ-vāda rules can be embedded into:

- Sanskrit WSD systems
- semantic taggers
- negation-aware word embeddings
- Sanskrit WordNet and IndoWordNet

2.4. Significance of Nañ-vāda in Modern Linguistic Theory

Nañ-vāda anticipates several modern ideas:

- Formal semantics (Montague grammar): scope of negation
- Lexical semantics: meaning modification
- Pragmatics: contextual meaning selection
- Cognitive linguistics: concept inversion
- Computational semantics: behavior of negation markers

III. CONCLUSION

The classical theory of नञ्वाद (Nañ-vāda) offers a rich and precise analysis of how negation transforms meaning. Far from being a mere grammatical rule, it provides a comprehensive framework for:

- semantic disambiguation
- context-based meaning selection
- scope determination
- lexical feature modification
- compositional meaning construction

These are exactly the challenges tackled in modern Word Sense Disambiguation (WSD) systems in computational linguistics.

Thus, Nañ-vāda not only reflects the intellectual depth of Pāṇinian and Indian logical linguistic theory but also provides a valuable model for designing context-aware, negation-sensitive NLP systems—particularly for Sanskrit, but also for modern languages.

IV. FUTURE SCOPE

The study of Nañ-vāda opens exciting possibilities for modern language technologies. Its insights can help computers better understand negation and context in Sanskrit and other languages. By combining classical rules with AI and machine learning, we can build smarter, more accurate language systems, improve lexical resources, and explore how meaning changes in real-life communication.

REFERENCES

[1] Datta, S. (1991). *The ontology of negation*. Jadavpur University / K.P. Bagchi & Co.
[2] Dasgupta, S. (1922). *A history of Indian philosophy* (Vol. 1). Cambridge University Press.
[3] Hossain, M. M., Chinnappa, D., & Blanco, E. (2022). An analysis of negation in natural language understanding corpora.
[4] Lowe, J. J., & Benson, J. W. (2023). A grammarian's view of negation: Nāgeśa's *Paramalaghumañjūṣā* on Nañartha. *Journal of Indian Philosophy, 51*, 49–75
[5] Matilal, B. K. (1968). *The Navya-nyāya doctrine of negation: The semantics and ontology of negative statements in Navya-nyāya philosophy* (Harvard Oriental Series, Vol. 46). Harvard University Press.
[6] Subba Reddy, P. V. (2010). Fuzzy modeling and natural language processing for Panini's Sanskrit grammar.
[7] Cardona, G. (1967). Negation in Pāṇinian rules. *Language, 43*(1), 34–56. — (As quoted in secondary sources summarizing his view on dual negation in Pāṇini.)
[8] Cardona, G., & Deshpande, M. M. (Eds.). (2003). *Indian grammars: Philology and history*. Motilal Banarsidass.
[9] Cardona, G. (1990). On attitudes toward language in ancient India. *Sino-Platonic Papers,*
[10] Lowe, J. J., & Benson, J. W. (2022). A grammarian's view of negation: Nāgeśa's Paramalaghumañjūṣā on nañartha.Journal of Indian Philosophy, 51, 49–75.