



RESEARCH PAPER

**Pragmatics and Artificial Intelligence Conversational Systems:
Enhancing Semantic Understanding in Pakistani Language
Documentation**

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ABSTRACT

The present study aims to analyze that how pragmatics and artificial intelligence conversational systems is enhancing semantic understanding in Pakistani language documentation. The study utilizes content analysis approach and the population of the study was the Pakistani newspapers. A sample of thirty newspapers was selected to find that how pragmatics and artificial intelligence conversational systems is enhancing semantic understanding in Pakistani language documentation. The collected data was analyzed by using content analysis approach and later the analyzed data was presented in the tables. The findings of the research divulged some examples that are increasing semantic understanding in Urdu and Punjabi language documentation semantically with Artificial Intelligence (AI). In the end on the base of these findings the researchers presented some recommendations for the future scholars and researchers.

KEYWORDS Pragmatics, Artificial Intelligence, Conversational Systems, Semantic Understanding, Language Documentation

Introduction

Pragmatics is a subfield of linguistics which studies the ways in which context contributes to meaning. The term “pragmatics” was first coined in the 1930s by the philosopher C.W. Morris; developed as a subfield of linguistics in the 1970s. The name of the field comes from the word pragmatic, which is itself derived from the Latin word pragmatics. The original Latin term refers to a good lawyer or businessperson; in English, a pragmatic person is one who thinks practically about the world around them. Pragmatic language refers to the way we use language in social contexts to convey meaning and achieve our communication goals. It involves understanding and using appropriate language in different situations, interpreting social cues and nonverbal communication, and engaging in turn-taking and conversation skills. The language system of pragmatics helps us to understand that written language is more structured than spoken language because we anticipate that some forms of writing, like tales, will adhere to predetermined organizational patterns, which has resulted in a highly organized written language. Semantics studies the meaning of words, phrases, sentences, and larger chunks of discourse. It also examines how smaller parts of discourse interact to form the meaning of larger expressions. Pragmatics studies the same words and meaning but places an emphasis on social context. In written language, pragmatics also encompasses how writers are aware of their audience and how they adapt their use of language to communicate their message effectively (Chakrabarti & Luger, 2012; Bunt & Petukhova, 2023; Abbas et al., 2025; Erdogan & Christina, 2025).

Conversational Artificial Intelligence is a type of Artificial Intelligence (AI) that can simulate human conversation. It is made possible by natural language processing (NLP), a field of AI that allows computers to understand and process human language and Google's foundation models that power new generative Artificial Intelligence capabilities. Artificial Intelligence (AI) is a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyze data, make recommendations, and more. Conversational Artificial Intelligence and virtual assistants have their roots in speech recognition technology dating back decades. Researchers began experimenting with computerized speech recognition systems in the 1950s and 1960s. It was, however, still in its infancy and far from accurate. Semantic Artificial Intelligence is all about understanding the meaning and context of words in human language. It goes beyond just processing language on a syntax level; it strives to understand semantics, or the meaning of language as humans understand it. Saleem, Anjum & Tahir, 2021; Kasirzadeh & Gabriel, 2023; Seals & Shalin, 2023; Younis et al., 2023; Rasheed et al., 2024).

Literature Review

Literature review is a written overview of major writings and other sources on a selected topic. Sources covered in the review may include scholarly journal articles, books, and websites. The purpose of literature review is to gain an understanding of the existing research and debates relevant to a particular research topic (Shakir et al., 20011; Abbas, 2016., Ahmad, Farhat & Choudhary, 2022; Rao et al., 2023; Ahmad, Sanobar & Cheema, 2024., 2024; Sadaf et al., 2024; Abbas et al., 2024). Literature review of the present study comprises following points.

Pragmatics and AI Conversational Systems

In the context of AI conversational systems, "pragmatics" refers to the study of how language is used in context, meaning how an AI system can interpret and respond to a user's intentions, social cues, and the overall situation, going beyond just the literal meaning of words to create a more natural and human-like interaction. These are some key points about pragmatics and AI conversational systems firstly it provides contextual understanding as pragmatics allows AI systems to understand the implied meaning behind a user's words by taking into account factors like the conversation history, social situation, and cultural norms. Secondly it interprets speech acts by identifying the intended action behind a statement, such as a request, a question, or a complaint. Lastly it generates appropriate responses by considering pragmatics, an AI system can craft responses that are not just factually correct but also socially appropriate and relevant to the current conversation. While AI systems are good at understanding basic syntax and semantics, accurately interpreting the pragmatic nuances of human language remains a significant challenge. Some instances of pragmatic aspects in AI conversations are as

- **Inference:** if a user says "It's cold today," an AI system with pragmatic capabilities would infer that the user might be asking for the weather forecast or suggesting they wear a jacket.
- **Conversational implicature:** understanding implied meaning, like when someone says "Can you pass the salt?" which is actually a request to pass the salt, not a question about their ability to do so.

- **Social cues:** recognizing and responding appropriately to tone of voice, sarcasm, or politeness levels.
- **Context-dependent responses:** tailoring responses based on the conversation history and the user's previous interactions.

Language Documentation

Language documentation is a subfield of linguistics, where language's primary data is compiled and presented. In simple words, LD is known as a record of a language.

Reason behind Language Documentation

Language endangerment is the main reason for language documentation. Language documentation consists on audio, video recordings of a communicative event, their vocabulary lists and grammar rules.

Steps in Language Documentation

There are three basic steps are:

- Getting the data
- Analyzing data
- Preserving data

Language Documentation can be useful for understanding culture and heritage, to keep memory of the facts important for the local communities, families, and individuals.

Semantic Understanding in Pakistani Language Documentation

Semantic understanding is the ability to understand the meaning of words and phrases in a given context. It enables systems to interpret and generate responses that are relevant and appropriate, playing a critical role in natural language processing and conversational AI applications (Ahmad et al., 2025).

Semantic understanding in Pakistani language documentation refers to the study of meaning within Pakistani languages, particularly focusing on how words, phrases, and sentences acquire their meaning within the cultural and linguistic context of Pakistan, often including analysis of how borrowed words from other languages like English can undergo semantic shifts when used in Pakistani dialects like Urdu and Punjabi.

There are some central points about semantic understanding in Pakistani language documentation; firstly, it focuses on meaning by understanding how words and expressions convey meaning in Pakistani languages, including nuances and cultural implications. Secondly, it focuses on code-switching and borrowing as due to significant English influence, analyzing how English words are adopted and sometimes change meaning when used in Pakistani languages is crucial. Thirdly, it focuses on contextual factors by understanding the context in which words are used is vital, as it can significantly impact their interpretation. Lastly, it focuses on semantic shifts by studying how borrowed words acquire new meanings different from their original language is a key aspect of semantic analysis in Pakistani languages.

Some instances of semantic understanding in Pakistani language documentation are as first instance is to analyze the different meanings of "light" in Urdu; While "light" in English typically refers to illumination, in Urdu, it can also be used to mean "electricity". Second instance is to investigate the use of slang terms by studying how colloquial expressions acquire specific meanings within different Pakistani communities. Third instance is to examine the impact of regional variations by analyzing how the meaning of words can differ between different Pakistani dialects.

Semantic understanding important in Pakistani language documentation firstly, it accurately process language by understanding the nuances of meaning is essential for developing effective language technologies like machine translation and natural language processing systems for Pakistani languages. Secondly, in the linguistic research by studying semantic variations helps researchers to understand the evolution of Pakistani languages and the influences of other languages. Lastly, provides cultural awareness by analyzing the semantic aspects of language, researchers can gain deeper insights into Pakistani culture and societal norms.

Previous Related Studies

Kaleem (2015) In his doctoral dissertation at Manchester Metropolitan University investigated the Urdu language and its lexical and grammatical features in order to, design a novel engine to handle the language unique features of Urdu. But the pragmatics and artificial intelligence conversational systems was totally disregarded, therefore, the gap left in this study was filled through the present study as from the part of researcher it is an exertion to explore that how pragmatics and artificial intelligence conversational systems are enhancing semantic understanding in Pakistani language documentation. Li et al. (2020) analyzed semantic understanding processing model based on machine learning. Li, Thomas and Liu (2021). studied from semantics to pragmatics: where IS can lead in Natural Language Processing (NLP) research. Han et al. (2022) studied spoken language understanding for conversational artificial intelligence recent advances and future direction. McTear (2022). In his book named conversational artificial intelligence dialogue systems, conversational agents, and chatbots which is contained on six chapters and one hundred-fifty pages highlights diverse categories of dialogue systems but he did not explore that how pragmatics and artificial intelligence conversational systems are enhancing semantic understanding in Pakistani language documentation. Consequently, the researcher tried to fill this remaining gap through the present study. Zou, (2024) in his doctoral dissertation studied creative computing in language understanding a novel approach to pragmatic analysis. Instead of all these researches there is no single research that is conducted to analyze that how pragmatics and artificial intelligence conversational systems is enhancing semantic understanding in Pakistani language documentation. Therefore, to fill this gap left in the previous studies the researchers conducted present research by using following material and methods.

Material and Methods

"The systematic process used to collect data to solve the problem is called research methodology, its objective is to offer systematic structure of the research study (Ahmad et al., 2021; Naz & Zafar, 2023; Ramzan et al., 2023; Mumtaz et al., 2024; Rasheed et al., 2024; Maitlo et al., 2025). Moreover, "it's part of study in which the researcher gives account of the research methods used in research" (Ahmad, Farhat & Abbas, 2024, p.305). Moreover, Ahmad, Farhat and Abbas, (2024) used content analysis approach for their

study and the population of the study was the Bulleh Shah's poetry; similarly, the present study utilizes same approach and the population of the study was the Pakistani newspapers; and a sample of thirty newspapers was selected to find that how pragmatics and artificial intelligence conversational systems is enhancing semantic understanding in Pakistani language documentation. The analyzed data was presented in the tables.

Results and Discussion

Findings and discussion are presented below in the table number one, table number two, table number three, and table number four.

Table1
Urdu and Punjabi parts of speech tagging/categorizing with artificial intelligence.

Noun tagging	Verb tagging	Preposition tagging
Pronoun tagging	Adverb tagging	Conjunction tagging
Proper Noun tagging	Adjective tagging	Interjections tagging

Urdu Language Documentation Semantically with artificial intelligence.

Table: 02
Parts of Speech Tagging in Urdu Language.

Numbers	Part of Speech	Sample of Tagging
1	Nouns (اسم)	• Tum (تم) You.
2	Pronoun (ضمیر)	• Larki (لڑکی) Girl. • Main (میں) I. • Tum (تم) You.
3	Proper Noun (اسم خاص)	• Karachi (کراچی).
4	Verbs (فعل)	• Sota hai (سوٹا ہے) Sleeps. • Padh raha hai (پڑھ رہا ہے) Reading
5	Adverbs (حال)	• Tezi se (تیزی سے) Quickly. • Aahista se (آہستہ سے) Slowly
6	Adjective (صفت)	• Acha (اچھا) good. Bara (برا) Bad.
7	Prepositions (جر حرف)	• Ke saath (ساتھ کے) With. • Ke liye (لئے کے) For.
8	Conjunctions (عطف حرف)	• Aur (اور) and. Lakin (لیکن) But.
9	Interjections (ندا حرف)	• Achha (اچھا) Good! Waah (واہ) Wow!
10	Sentence with parts of speech tagging:	• "ہوں۔ رہتا میں کراچی میں" ➤ (میں - Pronoun) ➤ (کراچی - Noun) ➤ (میں - Preposition) ➤ (رہتا - Verb) ➤ (ہوں - Auxiliary Verb).

In the above table number one data from the parts of speech tagging in Urdu language is presented with examples. The noun, pronouns, proper nouns, verbs, adverbs, adjectives, prepositions, conjunctions, and interjections are presented with examples followed by sentence with parts of speech tagging with example.

Table 3
Parts of Speech Tagging in Punjabi Language.

Numbers	Part of Speech	Sample of Tagging
1	Name, naav or naam tagging	• (Mulāzam) ملازم-Employee. • (Lahaur) لاہور-Lahore
2	Verbs (kiriya) tagging	• (Khāṇā) کھانا - To eat. • (Paṛhnā) پڑھنا - To read.
3	Adjectives (visheshan) tagging	• چنگا (changā) - Good • وڈا (vaddā) - Big

4	Adverbs (kriya - visheshan) tagging	• نال تیزی (teji nāl) - Quickly • آستانال (ahisata nāl) - Slowly
5	Pronouns (sarvnaam)	• میں (maiñ) - I • تون (tuñ) - You
6	Prepositions (poorv-sambandhak)	• دے نال (de nāl) - With • لے (lai) - For
7	Conjunctions (sanyojak)	• تے (te) - And • پر (par) - But
8	Interjections (ucchaaarn or ikaai-pad)	• واہ (vah) - Wow! • ہو/ہو (hun) - Oh!
9	Sentence with parts of speech tagging	• اے رہا پڑھ کتاب اک میں (Main ik kitaab parh raha haan) - I am reading a book • اے کتاب چنگی اک اے۔ (Ih ik changi kitaab hai) - This is a good book

In the above table number two data from the parts of speech tagging in Punjabi language is presented with examples. The noun, pronouns, proper nouns, verbs, adverbs, adjectives, prepositions, conjunctions, and interjections are presented with examples followed by sentence with parts of speech tagging with example.

Table 4
Question answering with artificial intelligence in Urdu language.

Type	Question	Answer
1. Simple questions	• پاکستان کا دارالحکومت کیا ہے؟ • Pakistan ka daralhakumat kia hai? • What is the capital of Pakistan?	• اسلام آباد • Islamabad. • Islamabad.
2. Definition-based questions	• علم کیا ہے؟ • Ilm kya hai? • What is knowledge?	• سمجھنے انسان کو جو علم ایک ایسا علم ہے • کی صلاحیت دیتا ہے سمجھانے • Knowledge is a science that gives humans the ability to understand and explain.
3. Context-dependent questions	• ہے؟ جاتا منایا تہوار سا کون میں پاکستان • Pakistan mei kon sa tyohar manaaya jaata hai? • Which festival is celebrated in pakistan?	• آزادی عید الفطر، عید الاضحیٰ، اور یوم • Eidul-fitr, Eidul-Adha, aur Yom-e-Azadi. • Eid ul-fitr, Eidul-Adha, and Independence Day.
4. Open-ended questions:	• کیا آپ میں بارے کے معشیت کی پاکستان جانتے ہیں؟ • Pakistan ki moshiat k bare mien ap kia jante hain? • What do you know about Pakistan's economy?	• ہیں، لیکن چیلنجز سارے بہت میں معشیت کی پاکستان ہے مارکیٹ کا مواقع بڑا ایک بھی یہ • Pakistan ki maishat mein baht sare challenges hain, lekin yeh bhi ek bada mauqe ka market hai. • Pakistan's economy has many challenges, but it is also a big opportunity market.

In the above table number three data from the question answering with AI in Urdu language is presented with examples. The simple questions, definition-based questions, and context-dependent questions are presented with examples followed by open-ended questions with example.

Conclusion

After all the above discussion it may gather that the role of artificial intelligence is very significant in Urdu language documentation as well as in other languages. Artificial intelligence can play an important role in Urdu language documentation, which involves the collection analysis, and preservation of linguistic data by examining the above discussed certain ways. There are some benefits of adopting artificial intelligence

in Urdu documentation consist: increased efficiency, improved accuracy, enhanced preservations and increased accessibility.

Recommendations

On the bases of these results researcher recommends that the young professional scholars must take responsibility on their shoulders to explore the role of language from different platforms. The present research work will not only pave pay but it will also motivate students to conduct researches in this field.

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