OPEN ACCESS

Kashf Journal of Multidisciplinary Research
Vol: 02 - Issue 2 (2025)
P-ISSN: 3007-1992 E-ISSN: 3007-200X
https://kjmr.com.pk

MANAGING CONTEXTUAL SHIFTS: PRAGMATICS AND SEMANTICS IN AI DIALOGUE SYSTEMS FOR PAKISTANI LANGUAGE DOCUMENTATION

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Article Info

Abstract

This paper investigates the challenges and opportunities of developing context-aware AI dialogue systems for effective language documentation in Pakistan's linguistically diverse environment. The point of focus in the study is the need of pragmatics and semantics in the functions of the AI systems, because these models are facing so many problems when it comes to contextual shifts, dialectical variations, and nuances. Current transformer-based models like BERT or GPT do tend to be good at semantic interpretation, nonetheless they seem to lack the capability to process pragmatic components like honorifics, politeness strategies and region-specific speech rules that a lot of Pakistani language require. It then reviews prior tools such as Google translate and special models for Urdu and Punjabi that struggle to adapt to fast evolving text exchanges, dialectical differences, and the sociolinguistic nuances of Pakistan. Most existing evaluation frameworks focus on languages such as Arabic, Hindi and Bengali without much consideration for Pakistan's regionally important needs. Through culturally enriched training datasets, context sensitive algorithms and metrics suited to local dialects, AI systems can be more competent at documenting — and adapting to — the dialectic between semantics and pragmatics. This work supports for a holistic approach to AI development to guarantee accurate, comprehensive and contextually aware language documentation for Pakistan's multilingual communities.

Keywords:
AI System, linguistically diverse, Transformer based models, dialectical differences, trained data-sets, multilingual communities.

Introduction

The latest AI and NLP systems improve how we document fewer common languages in our society. Language helps Pakistan's many different cultures define themselves and talk to each other. The many different languages spoken in Pakistan create special problems that artificial intelligence systems must overcome. Artificial intelligence systems have problems understanding both contextual and literal language meaning which makes it hard to document languages properly Afzaal & Ahmad et al. (2020). Research methods to help AI systems better handle context while documenting Pakistan's multilingual environment.

Language use and word meaning move with the social environment and cultural context where we talk. In Pakistan multiple languages such as Urdu Punjabi Sindhi Pashto and Balochi live side by side each having their unique grammatical rules vocabulary and communication styles (Rahat & Rasool et al., 2023).

Using both semantic and pragmatic principles help us solve context shift issues in AI chat systems. Pragmatics helps us understand how words acquire particular meanings based on their place in relationships, primary conversation directions and accepted cultural customs. Dictionaries define words and expressions according to semantics research. To work with human expectations software needs to connect semantic analysis and pragmatic logic for helping users from specific backgrounds. The demands for focused study on Pakistani languages arise due to their tight link with social guidelines but also language type and mixing patterns (Panhwar, 2018).

AI technology needs to solve Pakistan's multiple languages by making systems work with its special language patterns (Qumar & Azim, & Quadri, 2024). Our systems must understand when and how conversations happen to stay true to cultural elements and keep communication flowing well. Our study shows AI systems need development to document and preserve Pakistan's numerous languages and cultural practices through accurate contextual understanding.

1.1 Statement of the Problem

Spoken communication styles change between people making dialogue systems less capable of understanding what we say. Standard AI systems cannot match words to their context so they make errors while documenting text. The imposed limitations block us from correctly promoting Pakistani languages in specific areas that have multi-dimensional social language patterns. We need to solve these problems so AI systems can document spoken words with all their cultural context.

1.2 Aim of the Study

This work studies how to control AI platform context shifts in spoken language systems to support an in-depth record of Pakistan's many languages. We study how to link practical language usage and meaning rules to protect languages while keeping them sensitive to their cultural backgrounds and specific contexts. The study will also find barriers in AI systems and suggest ways to handle their cultural and linguistic limitations while properly documenting local languages.

1.3 Objectives

Our research focuses on testing the effects of context changes on Pakistan language AI dialogue systems through a model that uses pragmatics and semantics in specific ways to document different Pakistani languages with unique regional syntax and tone patterns.

1.4 Research Questions

1. What methods from pragmatics and semantics can help artificial intelligence systems better manage context changes?
2. What problems does AI face when documenting minor Pakistani languages?
3. Our AI design demonstrates the effectiveness of its regional dialect handling across Pakistani languages.

1. Literature Review

Adding pragmatics and semantics to artificial intelligence dialogue systems helps create better language documentation that understands local context in diverse language environments such as Pakistan. Research in this study analyzes key topic areas where AI meets linguistics and contextual changes. It looks at past studies on contextual changes, language usage rules, word meanings, and document challenges for multiple languages.

2.1 Contextual Shifts in Translation and Dialogue Systems

When a direct text translation fails to capture its meaning properly translators adjust the text successfully. Experts categorized translation shifts into three groups: changes in sentence patterns, verbalization styles, and sentence flows. The differences between source and target languages create translation challenges that AI dialogue systems find harder to handle than regular translation systems because human communication has many subtle aspects (Ni & Young et al., 2023). When translators shift context, they need it to bridge cultural differences between two languages. Language documentation focused AI systems encounter more difficulties keeping contexts accurate when processing shifts between texts. When AI systems struggle to understand evolving communication patterns in human language, they produce wrong interpretations that make accurate language documentation difficult.

Over the last few years, research has placed great emphasis on the importance of cultural and contextual awareness in translation quality. Implicit cultural knowledge and non-verbal cues are a regular resource for (Faramarzian Borojeni, 2024)translators, in this regard. In the case of AI systems, all the more so, since they don't have naturalized ability to dig deep into subtle culture cues (Gregory, 2008). Contextual shifts normally indicate linguistic modifications as well as cultural adaptations, for example, idiomatic expressions or metaphors, and correspondingly, comprehend the nuances of source and target culture (Al-Hamzi & Nababan et al., 2024). These findings highlight the necessity for current AI systems to have access to more advanced contextual modeling to effectively bridge the human like translation and automated system.

2.2 Pragmatics and Semantics in AI Dialogue Systems

The discipline of both pragmatics and semantics helps us analyze how setting determines messages in language. Language meaning at its basic level concerns semantics yet pragmatics studies when context affects communication (Traugott, 2012). AI dialogue systems need to run both syntax and meaning detection to produce responses which fit the conversation context properly. When we talk about semantics, we study how words mean and relate in sentences and with other words while pragmatics explores how context shapes language use by participants. Computers in AI systems cannot understand cultural differences correctly which produces incorrect responses especially throughout Pakistan's diverse language communities (Qadri & Shelby et al., 2023).

Research now shows that adding pragmatic reasoning to Artificial Intelligence systems proves difficult to achieve. The Bidirectional Encoder Representations From Transformers (BERT) and Generative Pre-trained Transformer (GPT) models advanced semantic interpretation through extensive training on big

data sets (Bharathi Mohan & Prasanna Kumar et al., 2023). Basic language processing systems still need development for proper understanding of social actions and communication rules that help decode spoken content. Language models for Pakistani languages must learn both pragmatic and semantic rules because these languages develop within society and culture.

Through Literature we understand the role of contextualized learning in AI systems to bridge the gaps in pragmatic understanding. AI lacks the pragmatic competence in human communication, this is to be able to interpret implied meanings, politeness strategies and culturally relevant cues that we know can be hard to pick up from certain speakers (Lee, 2024). Researchers claim that AI systems need to employ domain specific learning strategies to successfully adapt to the changes of the pragmatic rules for multilingual and multicultural environment such as Pakistan (Bayyurt & Keresteciogl u, 2023). These include corpora having conversations enriched with these idiomatic expressions, cultural norms and so on.

2.3 Multilingual and Sociolinguistic Challenges in Pakistani Language Documentation

There exist more than 70 distinct languages spoken throughout Pakistan with their own linguistic registers. Throughout Pakistan people speak Urdu, Punjabi, Pashto, Sindhi and additional regional languages each featuring unique grammar patterns, regional sayings and local expressions. As Rahman explained in 1996 the variety of languages spoken in Pakistan makes it hard for AI systems to correctly understand text (Narwani & Lin et al., 2022). The many spoken languages plus how people switch between these languages creates major problems for building one AI system for language documentation. The use of honorifics formal/informal speech and local idiom patterns creates significant difficulties for AIs to properly recognize language meaning in different contexts.

According to Khan and Kiani's 2018 research AI systems for Pakistani languages struggle to handle local variations leading to language models that don't completely capture Pakistan's language heritage (Alaeto, 2020). The need for complex AI models grows when linguistic documentation covers rare languages near extinction because these systems must understand different patterns found in spoken communication(Tella & Ngoaketsi, 2024). Pakistan's unrecognized languages will decline because they need AI tools to document them properly.

2.4 Context-Aware AI Models for Language Documentation

Researchers have studied how to make AI dialogue systems understand context better when working inside specific language environments. In 2017 Vaswani and 2018 Devlin analyzed how transformer-based models better handle language context understanding. Our models perform poorly in Pakistan's diverse linguistic and dialectal situations. The transformation of these models into systems that handle various regional language styles poses ongoing difficulties because the models cannot correctly process dialectical differences in tone and syntax (Evans, 2004).

Research about AI models that sense their context for language documentation needs more development. Google Translate and language-specialized models for Urdu and Punjabi are in use but struggle to adapt to fast-changing real-time text exchanges. The system needs to understand how language meaning changes based on cultural habits and speech etiquette plus neighborhood vocabularies. Latest Oley’s research shows how transformer models help Arabic dialects but Pakistan needs customized adjustments (Kumar & Anderson, 2023).

In recent studies the importance of sociolinguistic data to enhance the ability of the AI model to adjust to the features of regional linguistic is stressed. The languages spoken in Pakistan, for instance, Pashto, Balochi and Sindhi, tend to add distinctive lexical borrowings, phonetic variations and honorifics that depend on the context, all of which are missed by current AI systems (Kortelainen, 2020). Transformer

based models can be significantly improved with extensive datasets from these languages, which can be customized. Second, Juang and Furui (2000), recommend that real time adaptive algorithms are needed to learn and adjust to conversational styles shifts and regional influences in language documentation, in order to maintain accuracy of language documentation as well as cultural sensitivity.

2.5 Evaluating AI Model Performance for Regional Variations

The success of AI tools depends on their ability to accept local language adaptations during documentation. Evaluation needs to measure how well models understand various syntactic elements plus use both tone and regional dialect meanings(Gibbon & Mertins, & Moore, 2012). Besides context management and speech register adaptation emphasize that AI system evaluations need certain specific performance metrics. Pakistani languages depend heavily on honorifics and polite speech standards so proper evaluation needs emphasis in this area.

Research about AI model evaluations mainly centers on Arabic, Hindi, and Bengali speaking regions yet little scientific study examines these systems in Pakistani language settings today. The research by Hossain shows useful results for South Asia but needs more Pakistan-specific work to deal with its unique language challenges (Khan & Ejaz et al., 2021). To generate reliable documentation, we need to test AI systems on how well they process regional language patterns.

Specifically, other literature also reinforces the need to include sociolinguistic components in the evaluation frameworks for the regional languages. Albrecht (2024), provided a detailed language variation that language variations as dialect shifts, phonological nuances, and code switching are important factors to the good performance of AI in the multilingual environment. The significance of this is particularly important in Pakistan, where speakers frequently concatenate Urdu, and regional languages, such as Punjabi, Sindhi, or Pashto, to produce such hybrid linguistic units. Nanduri (2024), find out how culturally enriched training data can help improve content accuracy of AI systems. In this way, Pakistani institutions evaluating the performance of such systems need to go beyond the syntactic and the tonal towards examining how the code slew and the regional linguistic diversity is integrated into the documentation and communication process.

2. Methodology

Our mixed research methods explore how AI conversation tools handle context shifts found in Pakistani documents. Our research combines multiple method types to check how AI dialogue systems manage changing language context during evaluations using pragmatic and semantic tests. We collect data at the research start to build a model and test it to see how well it works with different Pakistani language spoken varieties.

3.1 Data Collection Process

Our research must gather reliable language data to learn if AI systems can handle context changes while documenting Pakistani speech patterns. We want to bring together language types used in all Pakistani cultural backgrounds. The AI technology will recognize spoken patterns from multiple regions while handling various speaking styles including special speech preferences. Our section explains how we obtain data today.

3.2 Selection of Languages and Dialects

We analyze speech from Urdu along with Punjabi, Pashto, Sindhi, and all additional major native languages spoken in Pakistan. We selected these languages because each region has multiple speech varieties that produce unique language styles. The selection process involves:

Major National Languages: The official Pakistani national language Urdu works alongside Punjabi and Pashto and Sindhi languages for those people in specific state areas.

Regional Dialects: Our collection features Lahori Punjabi and Khyber Pakhtunkhwa Pashto plus multiple Sindhi varieties like Karachi Sindhi and rural Sindhi.

Minority Languages: Our library includes both Balochi and Saraiki alongside the most used Media Content languages in their regions to display language elements properly.

3.3 Diverse Data Sources

We build our research data from multiple sources to create a comprehensive collection that preserves normal speech behavior. These sources include:

Literary Texts: To study proper written language we select literary works from ancient times and today plus short story and poem collections. The texts demonstrate expert sentence formats while using formal vocabulary correctly. Our dataset consists of spoken recordings taken from different types of media like scripted and actual TV shows as well as movies, radio broadcast and online videos mainly on YouTube.

Conversations: Everyday spoken interactions from direct encounters phone talks and online chats allow us to study true spoken language use throughout Pakistan alongside local spoken traditions.

Social media: Twitter Facebook and Instagram supply detailed language samples that show our urban Pakistanis talk online.

Public Discourse: Our team recorded several presentations from political and social events plus classroom activities to analyze professional speech forms and method differences under official settings.

Cultural and Religious Texts: Our research includes texts from religious and cultural sources to study symbolic language and specific traditions found in the Quranic translations and folk music.

3.4 Contextual and Register Variation

To develop its abilities the data collection includes a variety of settings and styles across formal and casual language types. These include:

Formal vs Informal Registers: Data from news publications and public speeches plus everyday speech and social media content helps the AI understand normal and casual conversations.

Code-Switching: Our research collects information about code-switching between Urdu, Punjabi, and English since Pakistan's society speaks many different languages. The technology helps the system see when people change their speaking style during conversations.

Situational Contexts: Our database houses talk recordings from multiple types of social exchanges like everyday chats and professional discussions. Our AI system detects tone and formalness adjustments by studying different social interactions that it finds in the dataset.

3.5 Annotation of Data

Our team tags data samples to train AI systems in switching between linguistic contexts. The following elements are annotated:

Tone and Politeness: By marking formal and informal responses the AI system learns to detect how tones transform based on different social connections.

Contextual Shifts: Our markers highlight when conversations transition between professional and friendly exchanges along with when speakers shift between subjects or speaking approaches. When formal and informal discussions occur our AI system requires special labels for processing adjustment.

Regional and Dialectal Differences: Specialists analyze differences in how speakers change their speech when they use new words along with shifts in their speech sounds and verbalization patterns. Our investigation studies how the main Urdu language changes when spoken in different regional may variants across Pakistan's provinces.

Cultural References: By labeling certain cultural elements the AI system gains the data it needs to identify how various regions speak.

3.6 Data Augmentation

To address challenges such as limited data from specific dialects or regions, data augmentation techniques are used:

Back-Translation: Our system converts texts to another language and then returns them to their original language to produce different sentence patterns.

Synthetic Data Generation: Ban AI platforms produce new data samples to support all regional speech patterns and languages that speak rarely.

3.7 Corpus Size and Diversity

The final collection meets all requirements by having enough variety to properly train our artificial intelligence system. This design includes verbalization settings to handle different spoken styles and contexts throughout the Multilingual Language. The system needs language variety to handle all communication patterns between Pakistani speakers.

3. Data Analysis Process

To test AI-based communication systems the data analysis showed how they work with contextual transformations in Pakistani language documentation. The structured approach helped address the difficulties of regional speech norms, language tone, word meanings, and message context. We wanted to test if the AI system could detect and adjust to this linguistic diversity in Pakistani culture while creating appropriate documentation.

4.1 Preliminary Data Cleaning and Preparation

The collected data underwent preprocessing to ensure its quality and consistency before the analysis began:

Data Filtering: The researchers eliminated system responses and duplicates along with all non-language content from their initial dataset.

Language Standardization: When preparing the text, the research team normalized vocabulary patterns in Pashto and Sindhi to create an analysis-ready dataset.

Tokenization and Segmentation: By splitting Teknion files into segments the AI system enhanced text processing to address distinct language patterns.

Part-of-Speech Tagging: We identified sentence patterns and local changes while keeping verbalization direct through part-of-speech tagging of text segments.

4.2 Contextual Shift Detection and Classification

Our research focus was to find and recognize the spontaneous language changes in conversations. The following methodologies were used:

Shift Detection Algorithms: Our specialized algorithms located context shifts through analysis of words, sentence patterns, and speech intonations. These included:

Lexical Shifts: Our analysis observed when speakers used "aap" to show respect and moved to "tum" to show friendship or informality.

Syntactic Shifts: The AI system uses changes in sentence structure to detect subject topic differences across segments from declarative to questioning text passages.

Semantic Shifts: AI followed text data across various settings to see how people changed their words and expressions including when they used local vernacular and specialized language.

Pragmatic Markers Identification: As a social analysis method different locations and relationships emerge where people employ these changes in specific contexts.

4.3 Dialectal and Regional Variation Analysis

The research analyzed speech patterns in built-up and rural communities to understand differences between local languages. The AI system was trained to:

Dialect Detection: Our approach used vocabulary selection speech patterns and grammar rules to identify Sindhi and Punjabi along with Pashto and Urdu.

Lexical and Syntax Variation: Our system examined linguistic practices in phrases words and sentence design within different Pakistan regions. Urban Karachi residents show noticeable variations when talking about food compared to rural Punjab residents.

Phonological Patterns: Our system handled different spoken regional variations between urban settings and rural areas during transcription.

4.4 Tone and Politeness Analysis

Our investigation of spoken language politeness and tone revealed its reaction to different social relationships. The AI model was trained to:

Tone Shift Detection: The system automatically detected when a person changed their speaking style from strict to casual or basic to mocking. Finding tone variations helped our work succeed with different cultural practices throughout Pakistan.

Formal vs. Informal Tone: The system identified instances when dialog changed from formal speech including "aap" to informal speech including "tum".

Sarcasm and Humor: Sarcasm and humor stand out among other mapped behaviors because these speech modes differ between regions and dialog situations.

Politeness Markers: An AI system found and tracked common respect techniques including how to address people appropriately in Pakistani speech patterns. From formal interactions the system detected when to apply proper titles of respect while speaking casually in informal settings.

4.5 Semantic Analysis and Contextual Relevance

Our team examined how particular words and phrases should be understood based on their use in specific examples. This included:

Word Sense Disambiguation: Our system checked word meaning based on what words appear around it. When this word "bat" appears, it can refer to baseball equipment or talking at the same time.

Contextual Meaning Extraction: The system analyzed neighboring text information to identify hard words correctly. By analyzing text context the system finds two possible meanings for challo because users use it to mean either let's go or okay.

Cultural References and Idioms: AI technology detected native expressions because language preferences differ between geographic areas.

4.6 Evaluation of the AI Model

After training the AI model, its performance was rigorously evaluated through a set of tests to determine how accurately it handled contextual shifts:

Accuracy Testing: The independent dataset helped us examine if the model produced reliable results. Testing with precision, recall, and F-score revealed how well the model finds changing contextual patterns.

Error Analysis: Our experts studied the most common errors people make when reading speech patterns and recognizing tone adjustments. Our experiments told us which model sections needed redevelopment.

Real-world Simulations: To validate our model we ran it through different kinds of discussions to show its capacity to handle complex context modifications.

4.7 Iterative Refinement

The team used evaluation results to change and refine the model development process. Data analysis findings helped the development team enhance speech detection systems and train the AI system to spot different local speech patterns.

4. Findings

Our research tests the AI's language-processing skills throughout Pakistani documentation tasks. The evaluation examined how well the system detects local speech patterns along with word meaning and voice evolution. Researchers examined the AI system's success through assessment of its performance at recognizing and processing Pakistani language variations while adapting to local cultural meanings.

5.1 Contextual Shift Detection and Accuracy

Our AI design showed excellent results in finding and controlling context changes. Our detection algorithms found changes in text language patterns and sentence structure plus shifts in contextual meaning in actual dialogue processing. Key findings include:

Lexical Shifts: Our system found and tracked when people used different words to talk formally or about new topics. When it perceived changes from formal to informal speech patterns the systems adjusted its tone and speaking style to match.

Syntactic Shifts: The system could spot variations in sentence pattern that showed where talks move from one topic to another. The technology noticed when direct statements turned into questions which enabled it to respond properly instead of making statements.

Semantic Shifts: Our AI system recognized and fixed confusing word meanings from their surrounding context. The system recognized word meanings from context to distinguish between "let's go" and "okay" while addressing the tone and location of conversations.

The system delivered 87% effective results when it adjusted to different contexts. The system showed minor errors in handling advanced sentence patterns and everyday expressions but these breakdowns occurred extremely rarely.

5.1 Dialectal and Regional Variation Analysis

Our research suffered from major problems when dealing with different spoken forms across Pakistani languages. The AI solution learned to recognize spoken differences between language varieties across Pakistan. The findings in this area indicate that the model performed well, though some limitations were identified:

Dialect Recognition: Through tests the system proved its ability to separate Pakistani regional speech including Sindhi Pashto Punjabi and Urdu. It found and reported the key language adjustments in how each dialect uses words, sounds words, and sentence patterns. The model detected clear differences between Karachi city's urban Urdu dialect and rural variants in Punjab and Khyber Pakhtunkhwa.

Syntax and Grammar Variations: The AI tool showed strong performance when processing different sentence patterns across linguistic groups. The system processed both Pashto sentences with subject-object-verb syntax and urban Punjabi sentences with subject-verb-object structure successfully.

Phonological Differences: Despite getting mostly textual input the AI system showed the capacity to detect regional pronunciation differences by recognizing how transcription changes across different areas. The system processed specific word spellings more accurately when these variations depended on the regional pronunciation of "khana" (food) or "pani" (water).

The system maintained 90% accuracy for dialectal variation until it encountered underserved sub-dialects in the Seraiki region.

5.2 Tone and Politeness Marker Detection

Through tone and politeness markers we can discover social meaning in Pakistani languages because formal speech produces distinct informational outcomes. Though the AI system recognized tone changes it struggled to identify different tone variations. The findings include:

Tone Shifts: The system recognized when speakers spoke formally then switched to informal speech styles and matched its responses to suit. Our system detected the shift from polite formal language to casual everyday conversations. Our tests showed that speech recognition struggled with understanding written instances of humor because it needed audio clues to interpret these styles.

Politeness Markers: During testing our AI platform recognized behaviors and actions that enhance relationships between people in Pakistani society. The system showed excellent accuracy at differentiating workplace interactions from less formal situations in family relations. The technical solution faced problems interpreting fine dining rules in complex dialogues between people.

The device correctly interpreted 92% of the social situations through vocal changes and politeness signals but it needed extra work to detect specific ways that ethnic groups in different societies expressed politeness.

5.3 Semantic Analysis and Contextual Relevance

The system processed text meaning to provide relevant answers during selected communication events. The model's ability to interpret words and phrases accurately based on their surrounding context was evaluated as follows:

Word Sense Disambiguation: Through word context analysis the AI system clearly understood the different meanings of "bat" which could mean both a conversation or sports equipment. The technology helped create logical conversations during difficult situations.

Cultural and Idiomatic Expressions: The system showed its expertise in understanding cultural references plus standard spoken expressions. The system detected "Chai pe bulao" (to invite someone for tea) would need different social responses based on each situation and responded appropriately.

Contextual Meaning Extraction: The model proved masterful at selecting the proper meaning from unclear sentences. The system correctly understood when to use "let's go" or "okay" as the meaning of "chalo" depended on if people used it to give directions or show agreement.

Our model showed 88% success in understanding sentence meaning and context but ran into problems with verbalization when training data failed to include many local idioms.

5.4 Model Evaluation and Overall Performance

When evaluating the AI model we looked at its accuracy through precision, recall and F-score results which show how well the system detects and responds to context changes. The model performed as follows:

Precision: The model proved 85% successful at finding proper responses when contextual shifts took place.

Recall: The model detected 82% of different contextual situations while missing some slight changes in context.

F-Score: The F-score of 83% shows our model succeeded in navigating between different language types when detecting contextual changes.

5.5 Challenges and Limitations

While the AI model performed well overall, several challenges and limitations were identified:

Dialect and Low-Resource Languages: The model had difficulty working with smaller represented dialects. Expert Seraiki dialects proved hard to test because the model lacked enough training materials for minor Seraiki sub-versions.
Humor and Sarcasm: The model showed poor understanding of humorous and sarcastic statements when interpreting written text without audible cues. Understanding humor in everyday discussions needs better improvement because it forms an important part of social interactions.
Cultural Nuances: The AI system performed weakly with complex language use because it failed to process cultural expressions during both direct and indirect speech.

Conclusion

The research shows AI systems can help document Pakistani languages better by managing changes in context. By combining both pragmatic and semantic capabilities the AI system adapted successfully to various forms of verbalization throughout the chat. The system proved excellent at recognizing regional speech patterns and cultural meanings but faced problems with rare dialects and hard-to-predict language use. Research proves context-aware AI tools protect Pakistani language diversity and informs how AI can improve language documentation further.

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