SUMMER READING COURSE 2024

DESIGNING CULTURALLY AWARE CONVERSATIONAL AGENT

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Motivation

01 The need for conversational agents to adapt to diverse cultural contexts is increasing.

02 Existing agents often use generic communication patterns that may not resonate with users

03 The research aims to develop adaptive agents that incorporate cultural differences in communication, improving user engagement

What is Culture ?

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02 Hall defines a series of dichotomies including high- vs. low-contact, high- vs. low-context as well as mono- vs. polychronic [3]

03 Hofstede's cultural dimensions theory suggests that cultures differ across four (sometimes five) key value dimensions: power distribution, gender roles, group coherence, and uncertainty avoidance [4]

Culture and chatbots

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02 Linguistic and cultural differences between Chinese and Western cultures and used this knowledge to design conversational agents that addressed cultural values [6]

03 Despite deep cultural research and the presence of translation experts, some participants felt like they were interacting with a chatbot translated from English [7]

Research Question

How can conversational agents be designed to adapt their communication style based on cultural context to enhance user engagement and satisfaction?

Method (Literature review)

Verbal Communication Keywords: ALLTITLE-ABS-KEY(Any of: Directness, Indirectness, Formality, Politeness, Language use, Cultural communication) AND ALL(culture OR cultural differences)

Paraverbal Communication Keywords: TITLE-ABS-KEY(Any of: Tone, Pitch, Pace, Pauses, Intonation) AND ALL(culture OR cultural differences)

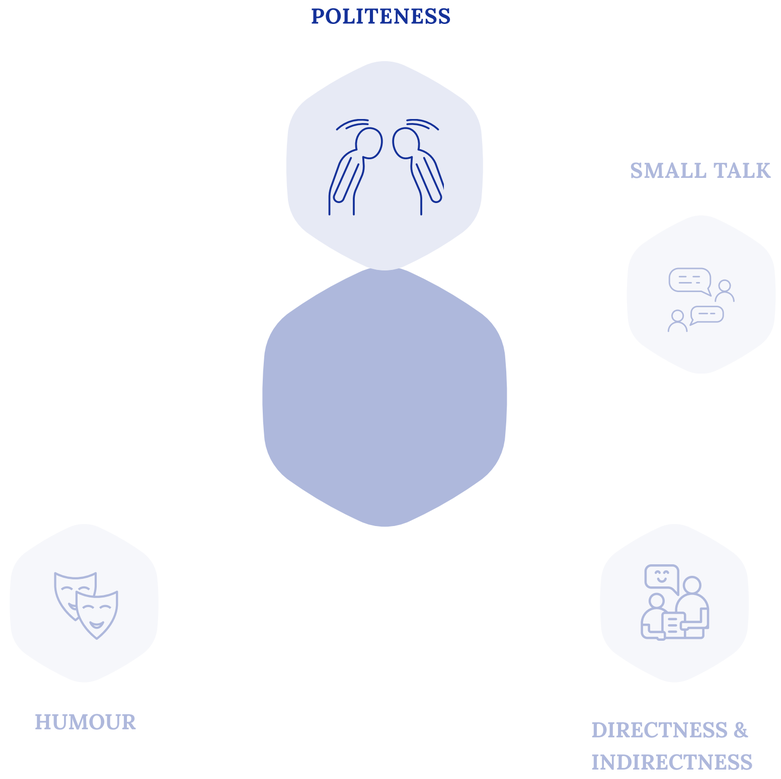
Conversational Agent Design Keywords : TITLE-ABS-KEY(Any of: Conversational agents, Chatbots, Cultural adaptation, Human-computer interaction, User engagement)

Key Factors for Designing Culturally Adaptive Agents

- Verbal Communication
  - Poilteness
  - Small Talk
  - Directness & Indirectness
  - Humor
- Para-Verbal Communication
  - Tone
  - Pitch
  - Pace
  - Expressive Sounds

POLITENESS

Politeness in conversational agents involves interacting with users respectfully and appropriately, using language and communication styles that align with cultural norms [8].



- Ouchi et al [9] conducted a comparative study to investigate how the speaking styles of smart speakers affect human listeners.

- Firdaus et al [10] conducted study a that discusses the significance of politeness in enhancing interactions by improving relationships between participants

Politeness

HIGH-CONTEXT CULTURES

- The system should use culturally specific honorifics and titles (e.g., "Mr.", "Ms.", "Dr." in Japanese context) in all interactions
- The system should construct sentences using indirect language (e.g., "Would it be possible to consider this option?" instead of "Consider this option").
- The system should begin and end conversations with formal greetings and closings (e.g., "Good morning," "Thank you for your time").

LOW-CONTEXT CULTURES

- The system should use clear and direct language (e.g., "What can I help you with today?").
- The system should minimize the use of formalities and keep interactions concise (e.g., "Hi," "Thanks").

AGENT

"Good afternoon, **Mr. Tanaka.** How may I assist you today?"

USER

“I would like to return a product.”

AGENT

"I understand. **Could you please** provide the order number?"

USER

"It's 123456."

AGENT

"Thank You. **May I Ask** The Reason For The Return?"

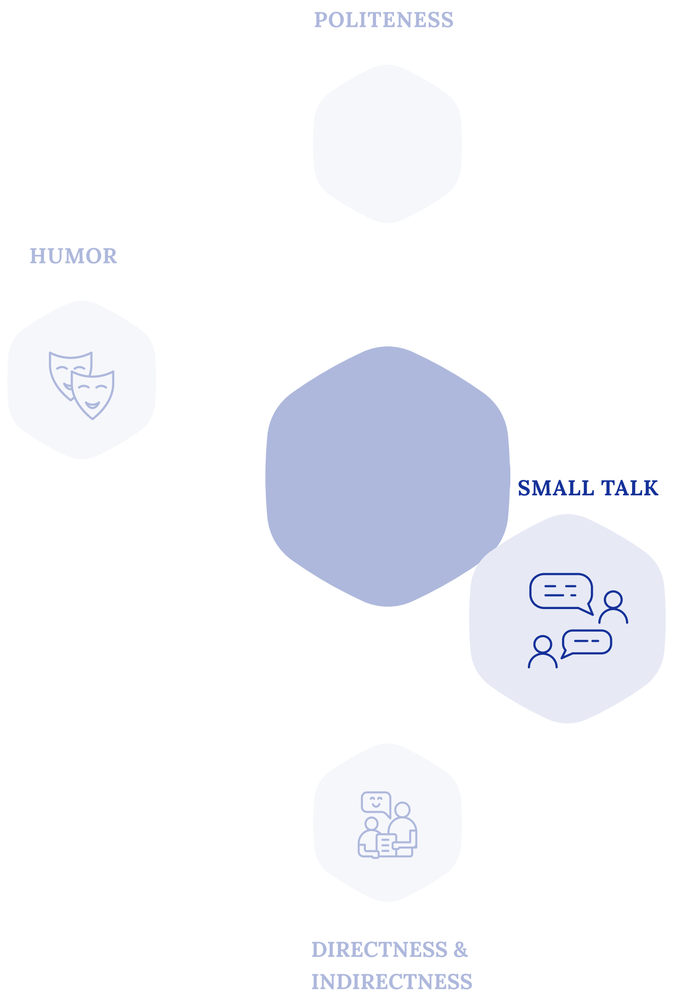
USER

"The product is defective."

*Customer service chatbot assisting with a product return for a Japanese user (high context culture)

SMALL TALK

Small talk in conversational agents refers to the casual, informal conversation that occurs between the agent and the user, often unrelated to the main task at hand [11] .



- Isbister and colleagues [12] designed the Helper agent to facilitate discussions and establish positive impressions between US and Japanese students.

- Endrass et al.[13] examined small talk differences between Asian and Western cultures through literature review and empirical data.

Small Talk

HIGH-CONTEXT CULTURES

- The system should include a library of small talk topics that are culturally relevant.
- The system should initiate small talk at appropriate moments, such as the beginning of a conversation or during pauses.
- The system should allow users to customize their preferences for small talk topics.

LOW-CONTEXT CULTURES

- The system should have templates for concise and direct interactions.
- The system should prioritize task-oriented interactions.

AGENT

Hi there! How are you doing today?

USER

I'm good, thanks. How about you?

AGENT

I'm great, thank you! **By the way, did you catch the local festival over the weekend?** It was quite a colorful event!

USER

Yes, I Did! It Was Amazing. The Performances Were Outstanding.

AGENT

Absolutely! The traditional dances were a real highlight. **It's wonderful to see such vibrant cultural expressions**. By the way, is there anything specific you need help with today?

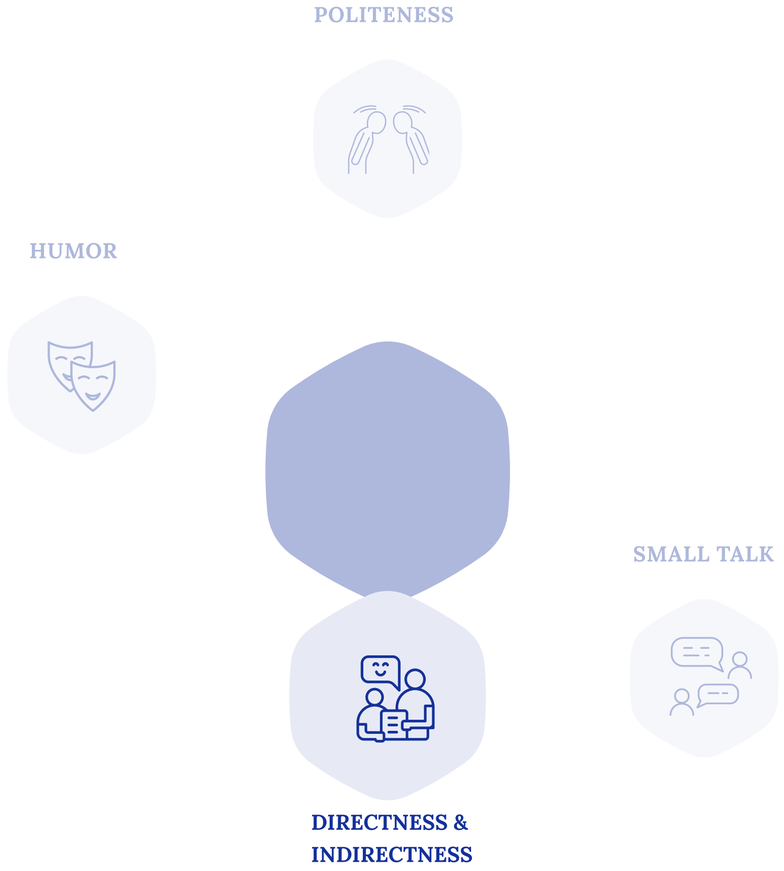
USER

Yes, I Wanted To Check On My Order Status.

*User interacting with an agent to check the status of their order (High Context Culture)

DIRECTNESS & INDIRECTNESS

Directness and indirectness are communication styles that vary greatly across cultures and impact how messages are conveyed and interpreted.



- Juliana et al [14] explored how different communication styles—specifically elaborateness and indirectness—affect user satisfaction in a Spoken Dialogue System.

Directness and Indirectness

HIGH-CONTEXT CULTURES (FAVORING INDIRECTNESS)

- The system should phrase requests and suggestions in a way that is indirect and polite (e.g., “Would it be possible to consider this option?” instead of “Please consider this option”).

- The system should use contextual information to gauge the appropriate level of directness, adjusting its communication style based on the situation (e.g., using more indirect language in sensitive discussions).

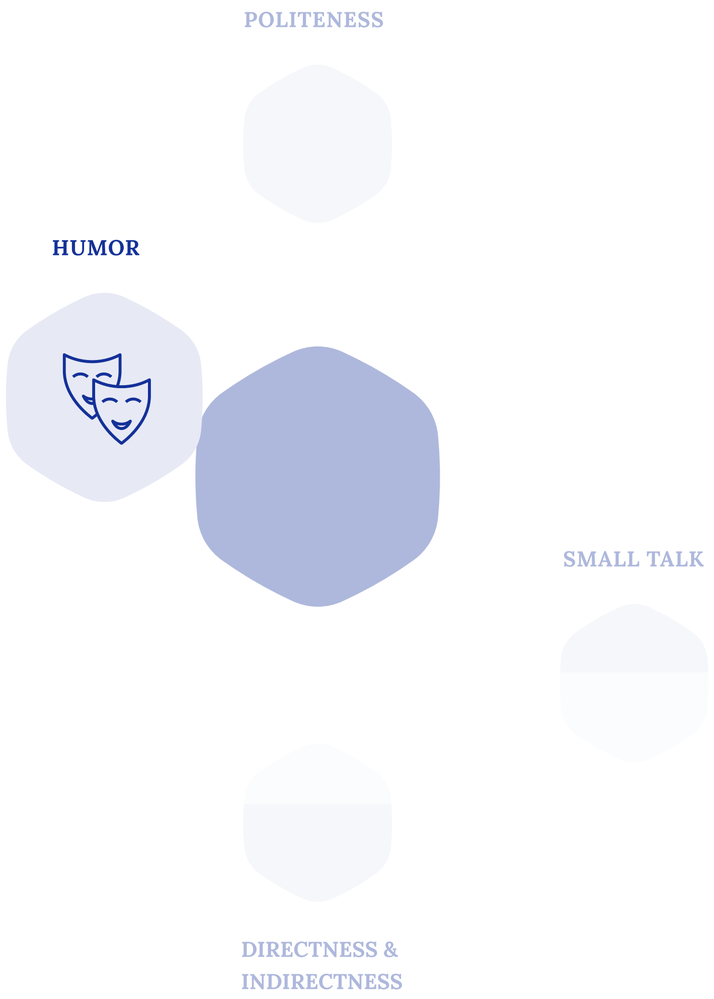
LOW-CONTEXT CULTURES (FAVORING DIRECTNESS)

- The system should deliver instructions and information in a clear, concise, and unambiguous manner (e.g., “Please complete this form” instead of “It might be a good idea to complete this form”).

- The system should focus on delivering task-related information with minimal small talk or indirect language, especially in professional or transactional contexts.

HUMOR

Humor varies significantly across cultures, and what is considered funny in one culture might be seen as inappropriate or offensive in another



- Zargham et al [15] conducted a study to explore the role of humor in conversational agents (CAs).The study emphasized the need for CAs to have cultural sensitivity and appropriate timing to deliver humor effectively.

Humor

HIGH-CONTEXT CULTURES

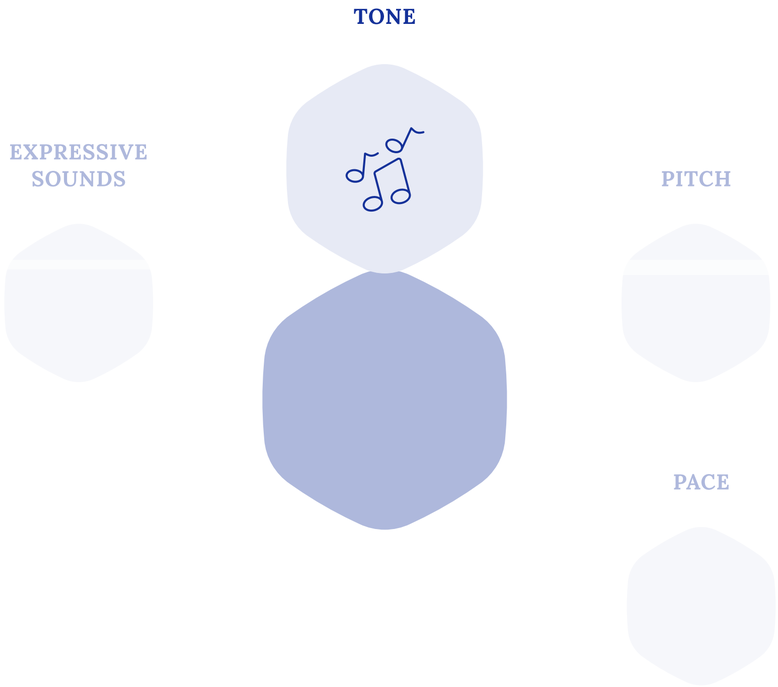
- The system should use culturally appropriate humour, avoiding jokes that rely on wordplay or direct criticism.
- The system should allow users to opt-in or out of using humour in interactions.

LOW-CONTEXT CULTURES

- The system should incorporate light, affiliative humour to enhance user engagement (e.g., casual jokes or light-hearted comments).
- The system should adapt the frequency and type of humour based on user feedback and engagement levels

TONE

The tone of a conversational agent refers to the attitude or emotional quality conveyed through the way the agent's words are delivered.



- Hu et al [16] designed a tone-aware chatbot for customer care on social media, incorporating eight identified tones: anxious, frustrated, impolite, passionate, polite, sad, satisfied, and empathetic.

Tone

HIGH-CONTEXT CULTURES

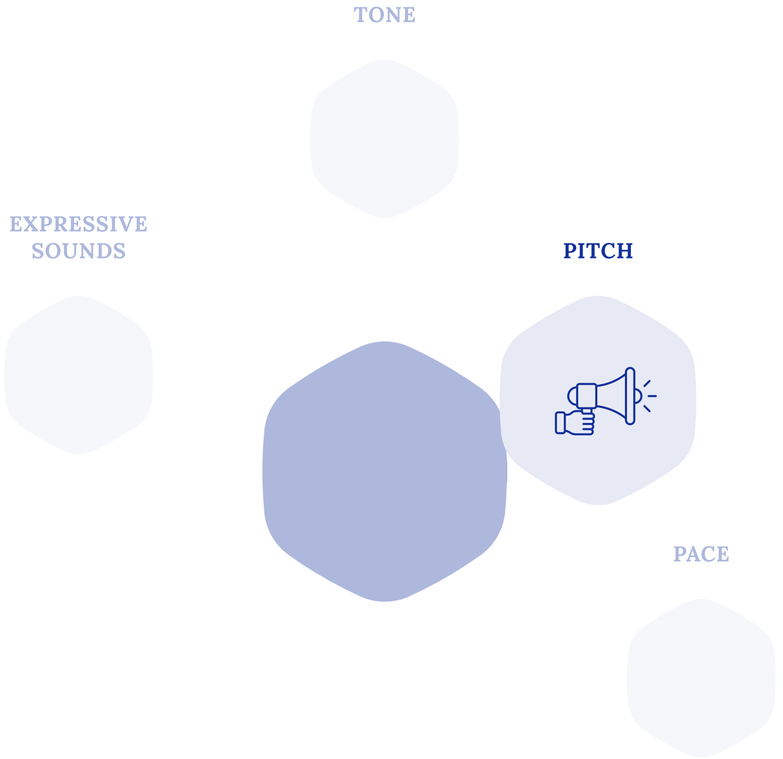
- The system should use a warm and gentle tone in interactions that involve sensitive or emotional topics (e.g., "I understand how difficult this must be for you").
- The system should adjust the tone based on the perceived emotional state of the user, using softer tones for negative emotions and more enthusiastic tones for positive emotions.

LOW-CONTEXT CULTURES

- The system should maintain a neutral and professional tone in task-oriented interactions (e.g., "Please follow the steps below to complete your task").
- The system should vary the tone to match the context of the interaction, using a more upbeat tone for casual or positive interactions (e.g., "Great job! You're almost there!") and a serious tone for urgent or important matters.

PTICH

Pitch is a vital component of the auditory expression of conversational agents and adapting it based on context, cultural sensitivity, and user preferences ensures a more personalized and engaging user experience.



- The study by Lubold et al.[17] explored the impact of pitch adaptation in a learning companion. Their research found that acoustic-prosodic entertainment, where the pitch of a dialogue system adapts to that of the user, can improve conversational flow, rapport, and naturalness in interactions.
- Niculescu et al.[18] examined the effects of voice pitch on the perceived quality of interaction with a social robot.

Pitch

HIGH-CONTEXT CULTURES

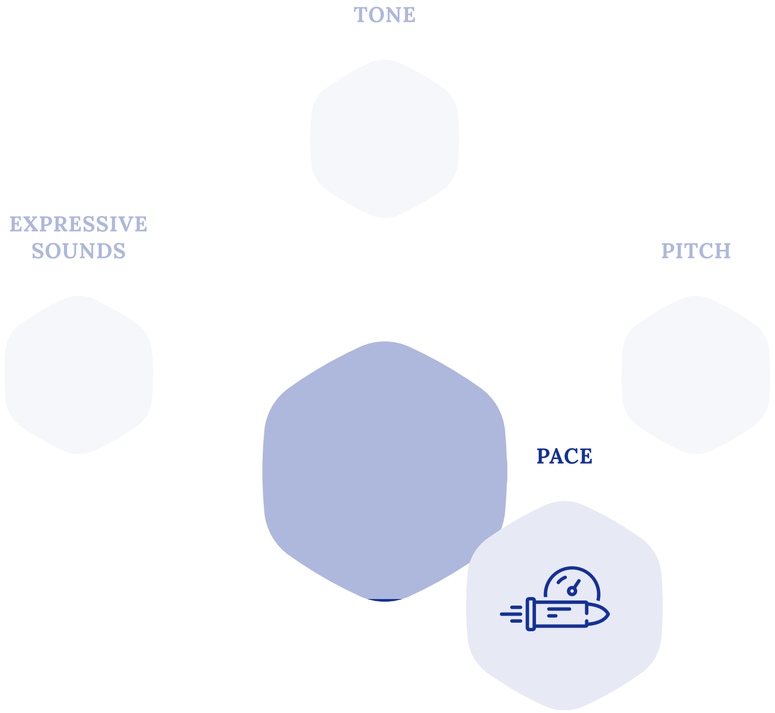
- The system should use a moderate pitch variation to convey politeness and deference during interactions (e.g., slightly lower pitch when making requests or offering assistance).
- The system should adapt pitch based on the user's emotional state, using a softer pitch to provide comfort during sensitive or emotional discussions.

LOW-CONTEXT CULTURES

- The system should use a consistent and clear pitch to convey confidence and professionalism in task-oriented interactions (e.g., a steady, medium pitch when providing instructions).
- The system should vary pitch to match the context of the conversation, using a higher pitch to express enthusiasm or encouragement during positive interactions (e.g., when delivering positive feedback or encouragement).

PACE

Pace is the speed of a conversational agent's communication, including speech rate and pauses. Adapting to cultural preferences enhances engagement and satisfaction.



- Hoegen et al [19] developed an agent capable of matching the user's conversational style in terms of prosody, pace, and content.The findings revealed that participants preferred and trusted the agent more when it matched their conversational style, particularly those with a High Consideration style.

- Work by Aneja et al [20] examined how an embodied conversational agent, SIVA, adapted its pace and expressive style based on the user’s behavior.

Pace

HIGH-CONTEXT CULTURES

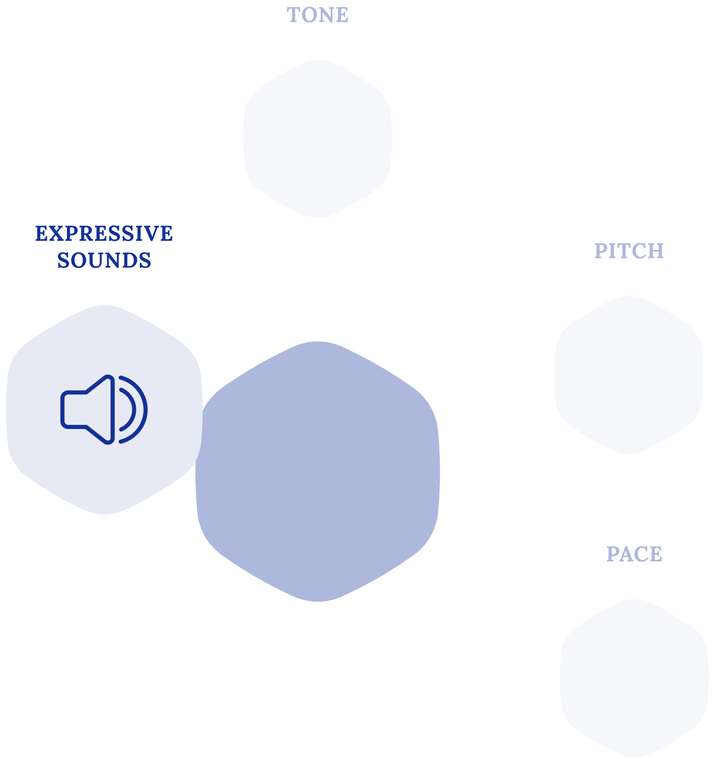
- The system should implement a slower, more deliberate pace in conversations, allowing time for reflection and consideration before responding (e.g., incorporating slightly longer pauses between statements).
- The system should adjust the pacing dynamically based on the complexity of the information being communicated, slowing down for more intricate or sensitive topics.

LOW-CONTEXT CULTURES

- The system should maintain a brisk, efficient pace in task-oriented interactions, minimising unnecessary pauses to convey decisiveness and clarity (e.g., quick responses in transactional exchanges).
- The system should allow users to customise the pace of conversation to match their personal preferences, offering options for both rapid and more measured dialogue styles.

EXPRESSIVE SOUNDS

Expressive sounds are non-verbal vocalizations such as "mm-hmm," "uh-huh," laughter, sighs, and other auditory cues that convey emotion, engagement, and feedback in conversations.



- Ceha and Law [20] a study to explore how adding expressive auditory gestures, like interjections and brief musical sounds, to a voice-based pedagogical agent influences human-agent interaction and learning outcomes

Expressive Sounds

HIGH-CONTEXT CULTURES

- The system should use subtle and culturally appropriate expressive sounds that align with the user's emotional state and the context of the conversation (e.g., gentle “hmm” or “oh” during thoughtful moments).
- The system should allow users to customise the type and frequency of expressive sounds based on their preferences.

LOW-CONTEXT CULTURES

- The system should use clear and direct expressive sounds to emphasise key points or convey enthusiasm (e.g., “great!” or “fantastic!” during positive feedback)
- The system should limit the use of expressive sounds to avoid cluttering the conversation, ensuring they are used only when they add value to the interaction.

Discussion

01 The literature review highlighted several key factors that are crucial for designing culturally adaptive conversational agents.

02 The findings underscore the complexity and richness of human communication. Each factor plays a pivotal role in making interactions more natural and culturally appropriate.

03 These findings underscore the necessity for conversational agents to adapt their communication styles dynamically based on cultural contexts.

Limitations & Future Work

01 The study primarily focuses on high-context and low-context cultural distinctions. However, culture is a complex and multi-faceted concept that varies significantly within these broad categories

02 While the study includes diverse cultural contexts, there may be regions or cultures that are underrepresented

03 Different application domains (e.g., customer service, healthcare, education) have unique communication requirements that are not comprehensively addressed in this study.

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THANK YOU!

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