TECHNISCHE UNIVERSITÄT WIEN

CD Lab RecSys

Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA '25) | Yokohama, Japan, April 26—May 01, 2025

# Context over Categories: Implementing the Theory of Constructed Emotion with LLM-Guided User Analysis

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## Overview & Contributions

**Problem:** Traditional emotion analysis relies on oversimplified categories (e.g., Ekman's universal emotions), neglecting context and individual differences.

**Our Approach:** We operationalize Lisa Feldman Barrett's Theory of Constructed Emotion, which emphasizes the crucial role of context in shaping emotions.

**Key Contributions:**

- Novel Framework: A context-aware emotion analysis pipeline using advanced LLM guidance.
- "Context Sphere": A new data construct representing a user's complete online behavior and interactions.
- LLM Adaptation: Demonstrates how to use LLMs for nuanced, context-sensitive emotion analysis.
- Focus: Content moderation and personalized systems.

## Research Question

How can we leverage Large Language Models (LLMs) to analyze emotions in a way that reflects their complex, constructed nature, rather than relying on predefined categories?

## Methodology

### A. Context Sphere Building

**Data Source:** "Der Standard" online newspaper comments and related articles (May 2019, 23,925 users).

**Goal:** Create a comprehensive "context sphere" for each user, encapsulating:

- All comments made by the user.
- Surrounding context (article metadata, conversation threads).
- Interactions with other users (replies, etc.).

**Key Features:**

- **Selective Pruning:** Includes relevant conversation threads up to the user's last comment, balancing context with efficiency.
- **Privacy-Preserving:** Excludes usernames and gender to minimize bias.
- **Markdown Format:** Optimized for readability by both humans and LLMs.

### B: LLM-Guidance

**Core Idea:** Combine the Theory of Constructed Emotion with advanced LLM techniques.

**Key Techniques:**

- **Role-Play Prompting [7]:** The LLM (Gemini-1.5 Pro) impersonates Lisa Feldman Barrett. (Include a small, simplified version of Figure 2 if space allows).
- **Controlled Generation:** A JSON schema guides the LLM's output, ensuring a structured analysis.
- **Meta-Prompting [9]:** A second LLM request generates a concise, human-readable Markdown report using a generalized template to adapt to specific instances.

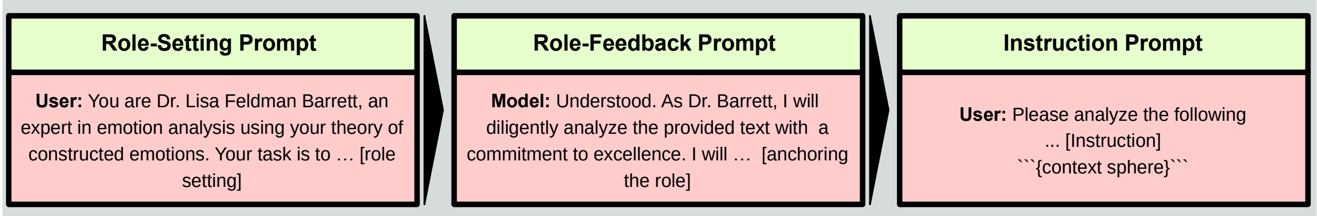


Figure 1: Figure 2: Example of Role-Play Prompting, where the LLM takes on the persona of Lisa Feldman Barrett [7].

**Output Structure:** A multi-class JSON with five main fields the LLM must generate its response into:

- Core Affect Analysis
- Cognitive Appraisal & Conceptualization
- Cultural & Social Context
- Emotion Construction Analysis
- Emotional Dynamics & Changes

***Each field includes sub-fields like "Thought Process," "Analysis," "Observable Patterns," "Anomalous Behaviour" and "Rationale."***

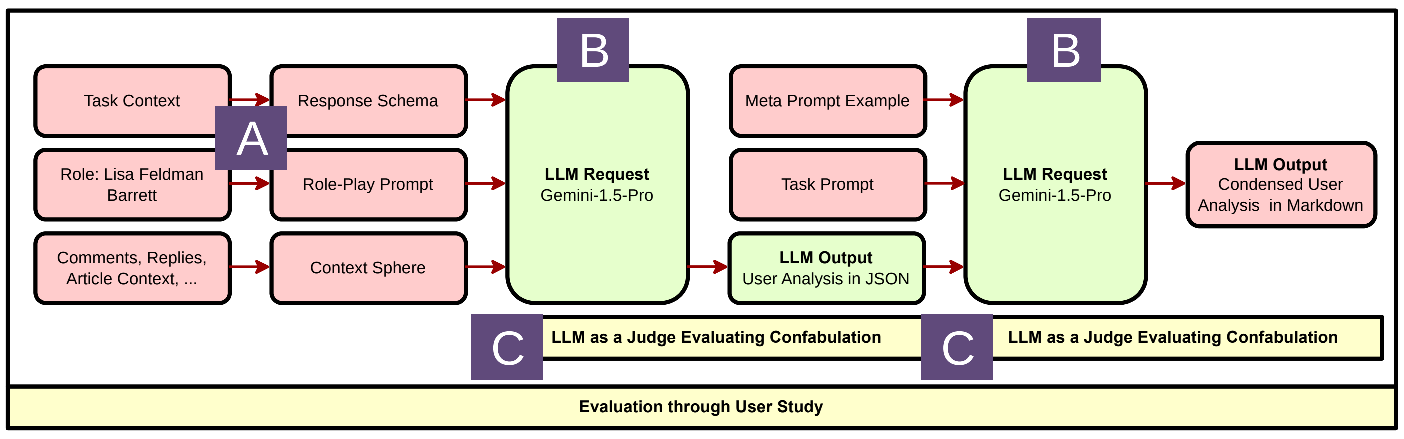


Figure 2: Pipeline from Preprocessing to Final Output - Please note: User Study not part of this Late-Breaking Work Submission.

## Methodology

### C: Evaluation

Uses LLM-as-a-Judge (GPT-4o, Claude / Haiku 3.5, Gemini 1.5 Flash) to assess LLM output

- Detecting *confabulations* [4] (hallucinations) – confident but misleading outputs.
- Enables rapid, iterative development and refinement of the LLM pipeline.

*Cost: Initial JSON analysis: ~$0.035 per user. Full pipeline (including Markdown report): ~$0.072 per user. Complete pipeline, including confabulation checks: ~$0.462*

**Upcoming User Study not part of this Late Breaking Work**

Table 1:Examples output from first LLM request

| Field | Sub-Field | Output |
|---|---|---|
| Core Affect Analysis | Arousal | Generally high, fluctuating between agitated and calmly contemptuous. [...] |
| Cognitive Appraisal & Conceptualization | Analysis | [...] The user's interpretations are often filtered through a lens of skepticism and cynicism, particularly towards opposing political views. [...] |
| Cultural & Social Context | Thought Process | I will examine the cultural and social context by considering the platform ("Der Standard"), the political climate of Austria in May 2019 (pre-election period), and the specific topics discussed (immigration, politics, media). [...] |
| Emotion Construction Analysis | Rationale | [...] Their negative emotional responses are often amplified by their pre-existing beliefs and the context of the online forum. The occasional deviations from this pattern [...] |
| Emotional Dynamics & Changes | Anomalous Observations | The user's positive comment about Fendrich deviates from their usual negative pattern, suggesting a momentary shift in emotional state. [...] |

## Conclusion

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## Conclusion

This work advances emotion analysis by bridging cognitive science and computational systems, paving the way for nuanced, context-aware applications like content moderation and personalization. By operationalizing Barrett's Theory of Constructed Emotion [2] using the "context sphere" and LLMs, we show how dynamic emotion insights can be achieved. As a Late-Breaking Work, we highlight future exploration, including refining the framework and conducting user studies. The advancements have significant implications for developing more accurate and effective human-centered technologies. This approach captures the complexity of human emotions far better than models rooted in Ekman's universal emotions [6]. These contributions address ethical risks highlighted by Crawford [5] and align with responsible AI initiatives [8].

## Limitations and Future Work

This work acknowledges limitations in operationalizing the Theory of Constructed Emotion with current LLMs. The dynamic nature of emotions, as defined by Barrett, poses a challenge for evaluation, lacking a definitive "ground truth" [3].Our current LLM-as-judge evaluation [10], while pragmatic, lacks human validation. Translating Barrett's framework required balancing theoretical flexibility with computational structure. The "context sphere" is a design choice to capture user context, but consistent analysis across diverse users remains a challenge. Future work will address these limitations through user studies, comparing LLM analyses to human interpretation. Scalability and handling potential failure modes, such as overgeneralization or excessive granularity, are also critical areas for future development.

## Contact

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funded by: Christian Doppler Forschungsgesellschaft

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