Emotion Recognition and Sentiment Analysis Fusion

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Project Objectives

Objective: To enhance a spoken dialog system by fusing sentiment analysis and emotion recognition, providing a nuanced understanding of user emotions.

Key Goals:

- Identify and interpret user’s emotions and sentiments from speech, text and image(multimodal data).
- Adapt system responses dynamically based on the emotional context, focusing on negative emotions to improve user satisfaction.

Statement of Value

Why It’s Worth Doing:

- Improves User Experience: Helps systems respond empathetically to user emotions, especially in high-stress scenarios.
- Broad Applications: Useful for customer service, assistive technology, and in-car systems, where quick adaptation to user needs is critical.
- Enhances Human-Computer Interaction: The fusion approach enriches emotional understanding, moving beyond simple positive/negative sentiment classification.

State of the Art and Relevant Works

Sentiment Analysis (SA):

- Focuses on identifying the polarity of users' statements (positive, negative, neutral) through document, sentence, or aspect-level analysis.
- Commonly achieved with machine learning or lexicon-based approaches.

Emotion Recognition (ER):

- Detects specific emotions (e.g., anger, boredom) using acoustic features and dialog context.
- This study specifically targets negative emotions that may lead to dialog abandonment, impacting user engagement.

Fusion Approach:

- Combines SA and ER outputs using probabilistic models to create a comprehensive emotional profile for the user.
- Adapts responses based on detected emotional states, optimizing the system's flexibility and error correction capabilities.

Approach

Algorithms:

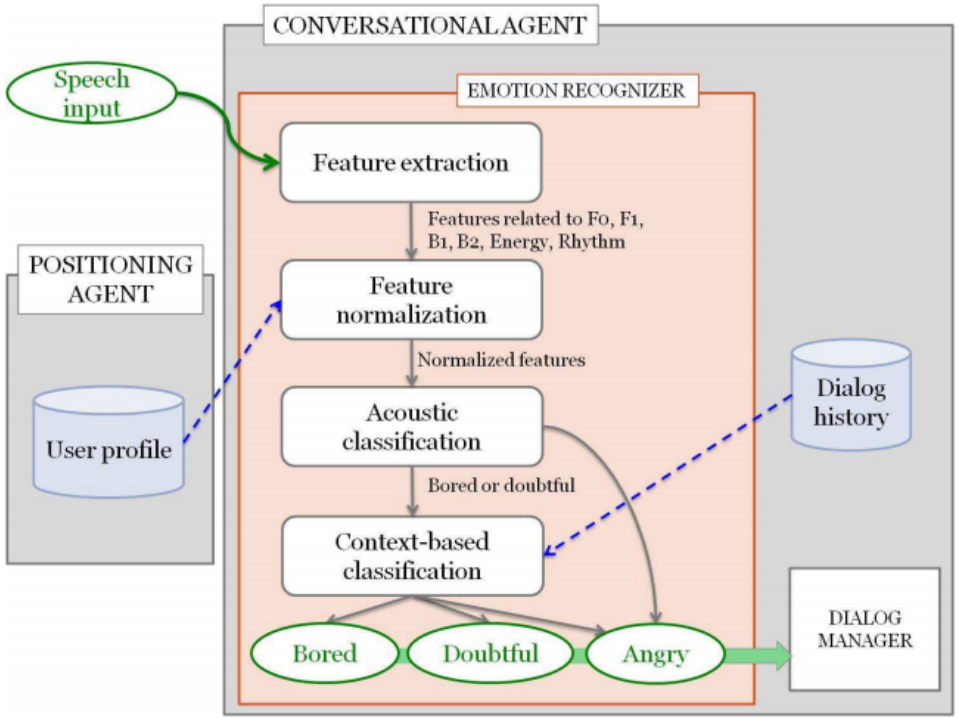
- Multilayer Perceptron (MLP) for emotion classification.
- SA model extends typical sentiment classification to categorize specific human emotions based on a modified Hourglass model.

Tools and Techniques:

- Acoustic Analysis: Extracts vocal features such as pitch, formants, energy, and rhythm.
- Dialog Context Integration: Uses parameters like dialog depth and width to infer user frustration or satisfaction.

Data Sources:

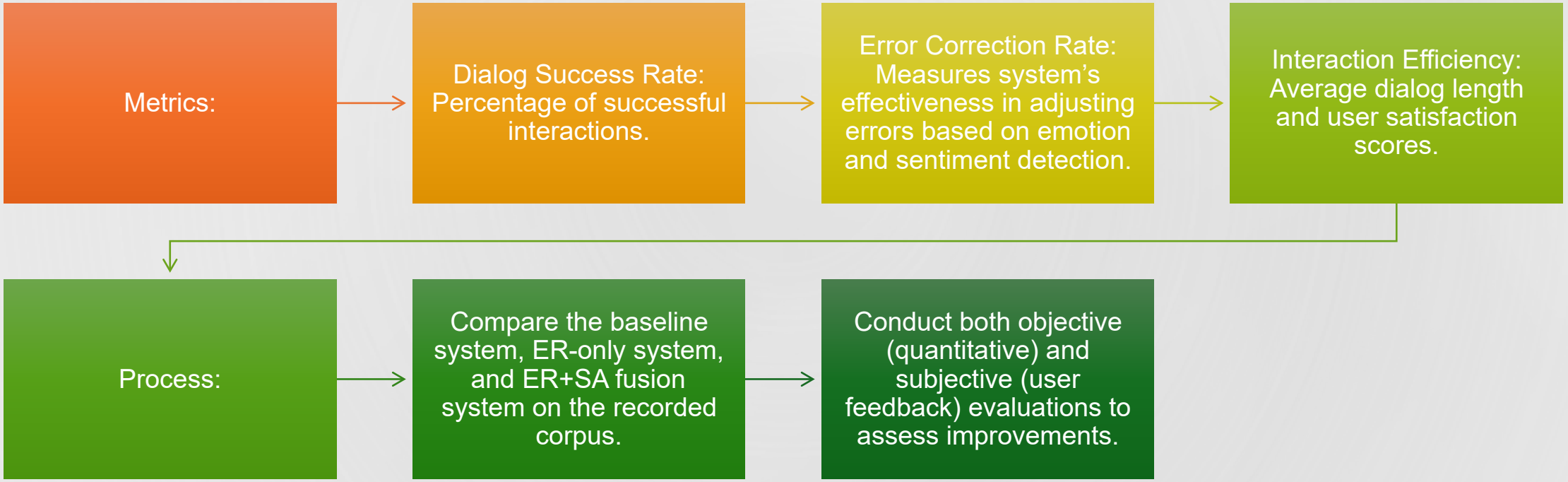
- Corpus of spoken interactions labeled for sentiment and emotion, enabling model training and testing.



Deliverables

- Enhanced Dialog System: Implementation of the SA and ER fusion within a dialog manager.
- User Interaction Data: Recorded and annotated corpus of dialog interactions for further analysis.
- Performance Metrics: Success rate, error correction rate, and dialog duration metrics.
- Documentation: Detailed report on the methodology, system modifications, and evaluation findings.

Evaluation Methodology



THANK YOU