Emotion Transformation Feature: A Novel Feature for Deception Detection in Videos

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Introduction

- - Deception detection is crucial in law, business, and security.
- - Humans achieve only ~54% accuracy unaided.
- - Traditional tools (Polygraph, fMRI) are costly and limited.
- - Lack of labeled video datasets hinders model performance.
- - Solution: Emotion Transformation Feature (ETF) using visual modality.

Problem Statement

- - Task: Classify videos as deceptive (1) or truthful (0).
- - Dataset: 121 video clips (61 deceptive, 60 truthful).
- - Objective: Learn $\Phi(X) \rightarrow Y$ for unseen video classification.
- - Challenge: Small dataset → risk of overfitting in deep models.

Proposed Method: ETF Framework

- Stage 1: Emotion Recognition
- - Detect 7 emotions: Happy, Sad, Fear, Anger, Surprise, Disgust, Neutral.
- - Use models trained on CK+ and FER2013 datasets.

- Stage 2: Emotion Transformation Extraction
- - Track emotion changes frame-by-frame.
- - Convert to 7x7 matrix → Flatten to 1x49 vector

Experimental Results

- - Dataset refined to 94 truthful and 94 deceptive clips.
- - DSFD used for face detection; FAN for emotion recognition.
- - Models compared: SVM, DT, RF, kNN.
- - ETF alone performs well, RF best among single features.
- - ETF + Facial + Hand Gestures = 87.59% accuracy (best).

Conclusion

- - ETF: a novel feature combining spatial and temporal emotion data.
- - Outperforms traditional and some deep learning methods.
- - Effective for small datasets.
- - Future work: integrate audio for multi-modal analysis.

Thank You

- Thank you for your attention!
- Any questions?