

FIT-4-NMP Networking and Brokerage Event

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SPEECH EMOTION REMANENCE

An investigation of affective content remanence in speech

Challenges and goals

Emotions exert a powerful and ubiquitous influence throughout our lives. They change both the way we think and the way we perceive the world and other people. They manifest externally, visually and paralinguistically. Our facial expressions, our body language, our vocal characteristics, the specific words we use or avoid, all of these can reveal the nature of the emotions we are experiencing. Several different emotions may trigger the same facial expression, but **distinct speech features**, while also noting that, when an emotion occurs, the vocal traits change almost instantly.

Each emotion leaves a trace in our voice, specific signatures which can be detected by artificial intelligence (AI) algorithms.

If a human interaction is emotionally triggering for the subject, then their affective response **will not decay instantly** after the interaction ends, but **over a longer time period**.

As an emotionally charged event approaches, in the long-term, the subject experiences higher intensity emotions and will exhibit a correspondingly **increased affective response**.

Our experience

We implemented a speech emotion recognition system based on multilayer perceptron (MLP) deep artificial neural networks (ANNs), which can detect with good performance (up to 72.7% accuracy) the remanent affective content of speech.

Objectives

Automatic detection of patterns in emotional speech associated with behaviors relevant to forensic and law enforcement applications.

Expected impact

Speech emotion recognition systems have important applications for forensics, law enforcement operations, surveillance tasks, emergency services, police investigations, or other operations, especially in the attempt to anticipate and prevent potential criminal acts.

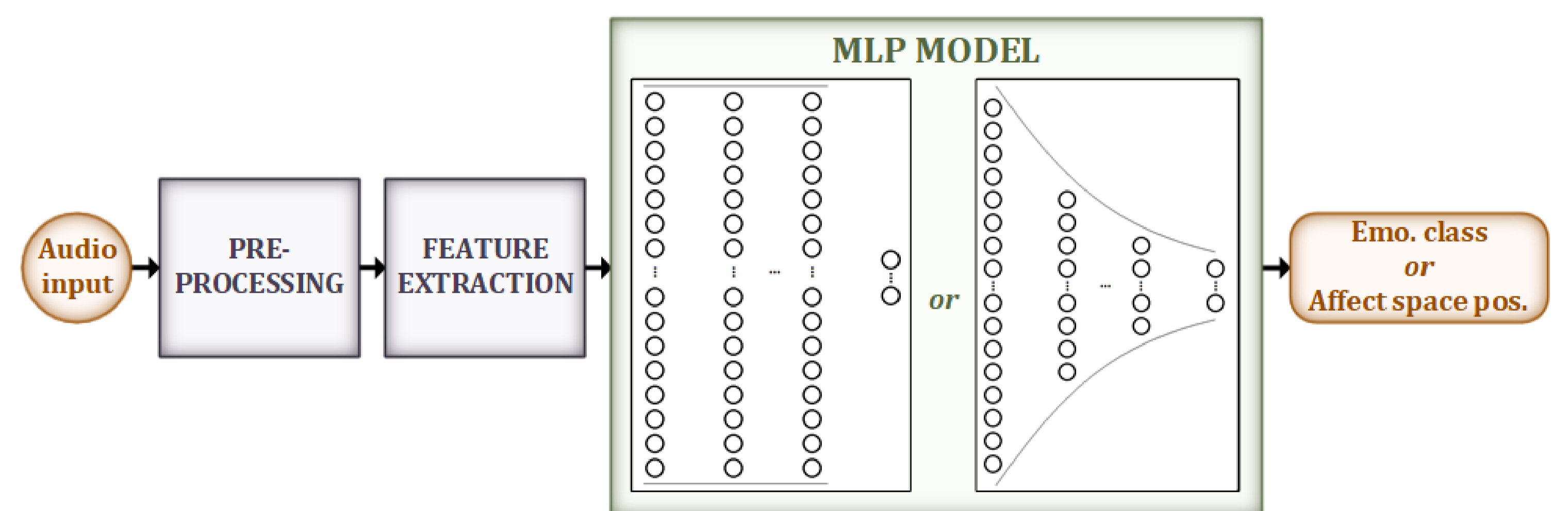


Fig. 1. Proposed speech emotion recognition system using MLP-based ANNs.

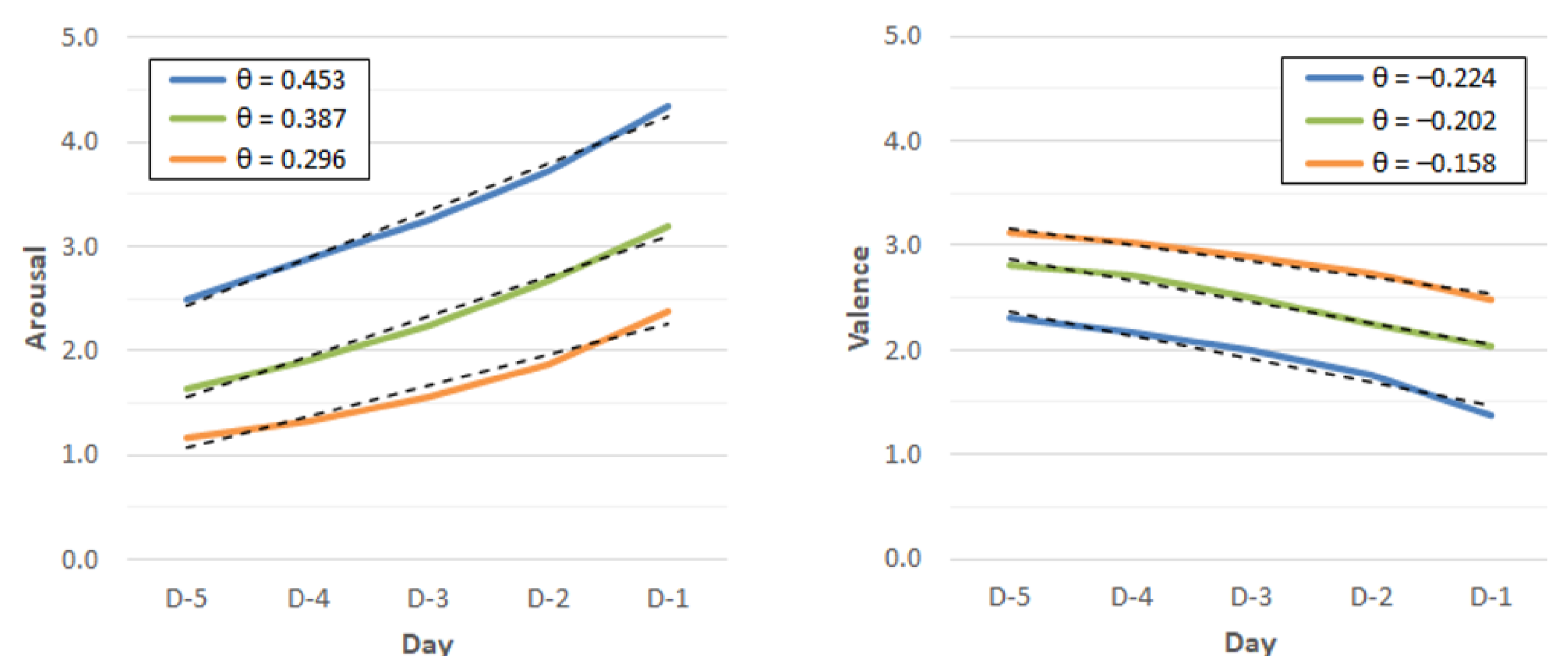


Fig. 2. Arousal and valence evolution vs. day, for each timestamp. Blue lines represent initial values, while the values after 15 and 30 min. are illustrated in green and orange, respectively. Linear regression trendlines are illustrated with black dashed lines, with θ representing the trendline slope.

Known partners:

- University "Politehnica" of Bucharest
- IMT Bucharest

Needed profiles:

- Speech emotion recognition systems
- Machine learning
- Law enforcement

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Additional information

S. Mihalache et al., *Lasting emotions – An investigation of short- and long-term affective content remanence in speech*, Romanian Journal of Information Science and Technology, Vol. 25, Iss. 1, pp. 201–214, 2022.

