Understanding Academic Stress: A Novel Approach Using Short-Form Videos

This research introduces the concept of using short-form video content, such as TikTok or Instagram Reels, to estimate chronic mental stress and identify stressors. It highlights the limitations of traditional methods of measuring stress, such as self-reporting scales and physiological measures, and proposes a novel approach using machine learning and multimodal fusion.

What is the Research About?

The study investigates whether students' interaction patterns with short-form videos, such as likes or reactions, can serve as indirect indicators of chronic academic stress. The hypothesis is based on the habitual and unconscious nature of these interactions, potentially bypassing the biases associated with self-reported stress measures.

Research Methodology

The paper describes the methodology used to collect and analyze data. It employed a hybrid fusion-based soft parameter sharing model with joint representation, utilizing pre-trained models such as V-JEPA, Wav2vec, and InsightFace Buffalo L. The model was trained on a dataset of 17,000 training samples, 5,000 test samples, and 5,000 validation samples from the 3MASSIV dataset.

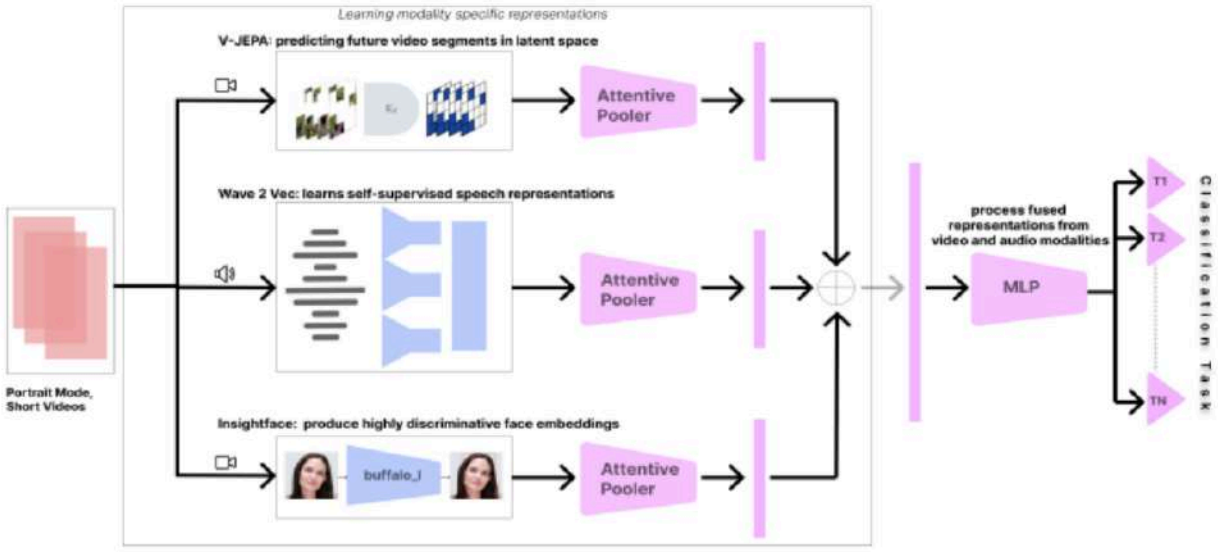

Figure 1:Architecture Diagram of the proposed model

The model utilizes three pre-trained models: V-JEPA, IndicWav2Vec2, and InsightFace-Buffalo L for video, audio, and faces, respectively. Blue blocks represent frozen parameters, and purple blocks represent trainable parameters. Modality-specific representations undergo early fusion and are then passed onto a multi-task learning setup.

Language	Total Videos	Emotional States Covered
Hindi	5,000	11
Tamil	3,000	10
Kannada	2,000	9

Table 1: Dataset Overview

Case Study: Academic Stress Prediction

The paper presents a case study on academic stress prediction using short-form video content. It collected data from 22 participants who were asked to watch and engage with short-form videos, and their responses were analyzed using the proposed model. The results showed correlations between affective states and measured academic stressors, such as faculty or staff as a stressor and confidence.

Figure 2:(a) Screenshot of Chrome Extension Used for data collection.

(b) Screenshot of an android app used for data collection.

Key Findings and Results

The paper presents the results of the case study, including a correlation analysis between affective states and measured academic stressors. It also employs a causal discovery method, Hill Climbing Search, to identify causal relationships between variables.

Correlation Analysis

The researchers identified significant correlations between video engagement patterns and academic stressors. For example:

- Students experiencing time management stressors showed a preference for sad or angry content.
- Academic pressures were linked to content evoking embarrassment.

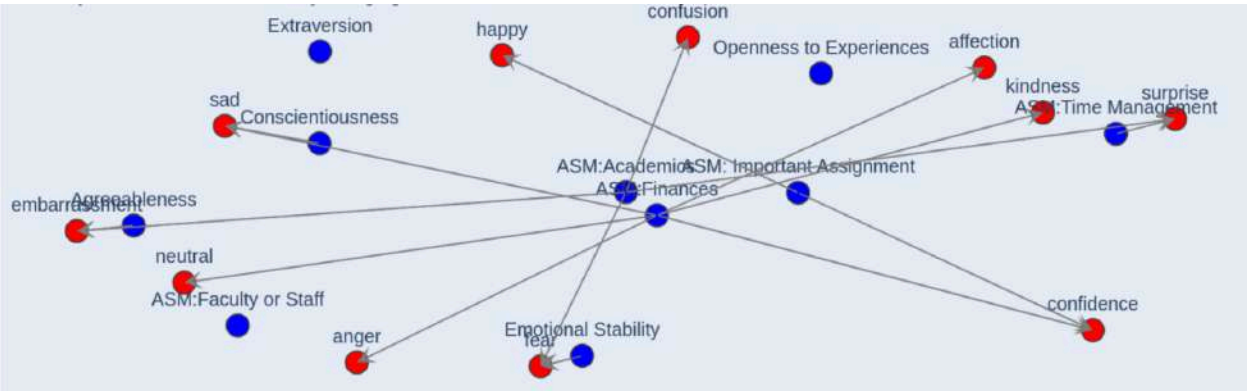

Figure 3: Causal Relationships Identified

Causal Discovery

Using the Hill Climbing Search algorithm, the study unveiled causal links such as:

- Financial stress leading to the consumption of sad content, especially among conscientious individuals.
- Academic stress combined with emotional instability resulting in engagement with fear-related videos.

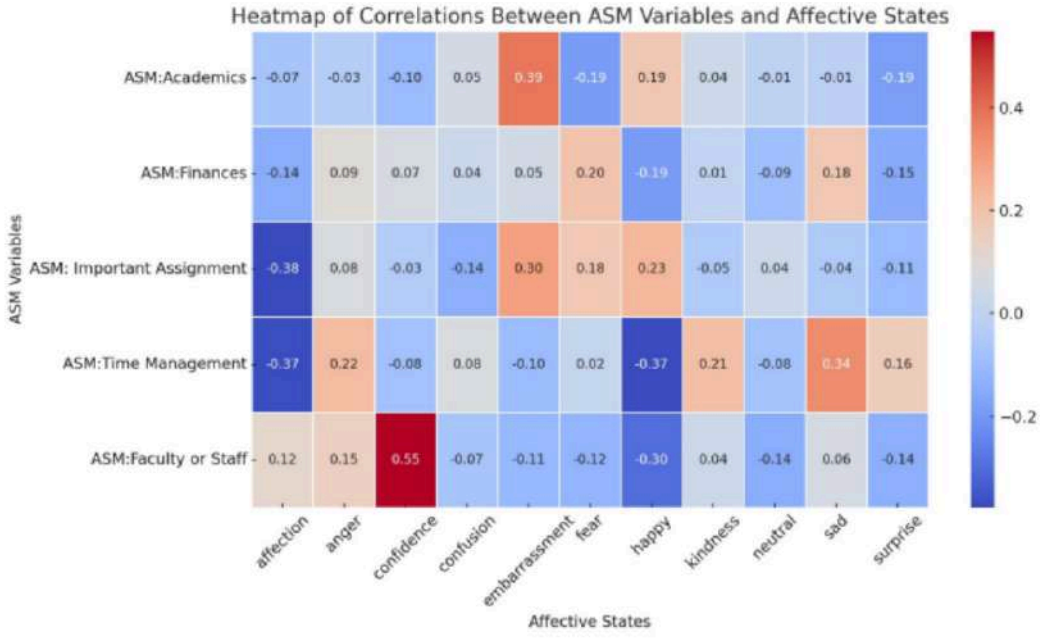

Figure 4:Correlation analysis of effective states of consumed content with measured academic stressors.

Discussion

The paper discusses the implications of the findings and proposes future research directions, such as improving the representation learning step, exploring various combinations of feature extraction and multimodal fusion techniques, and incorporating techniques from causal representation learning.

Implications and Future Directions

This novel approach shows promise for non-invasive stress estimation, offering insights that could shape mental health interventions. Future research could explore:

- Expanding datasets to improve model generalizability.
- Analyzing additional engagement metrics like viewing time and comments.
- Increasing participant diversity to strengthen findings.

Conclusion

The paper concludes that short-form video content can be used as an indirect estimator of chronic mental stress and identifies plausible stressors. It highlights the potential of this approach for early detection and intervention of mental health issues, particularly among adolescents and young adults.

Overall, the paper presents a novel approach to estimating chronic mental stress and identifying stressors using short-form video content and machine learning. While the results are promising, the paper acknowledges the limitations of the study and proposes future research directions to improve the methodology and generalizability of the findings.