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Machine Learning Driven Emotion Identification For Feedback Analysis In E-learning Platforms

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Abstract

This study addresses a gap in research by focusing on the cognitive and emotional impacts of e-learning platforms, offering a novel approach to assess user experiences. It proposes a non-invasive method to gauge the psychological effects of these platforms by utilizing feedback data in the form of videos, analyzing emotions within the videos to determine user sentiment. This automated process enables quick comprehension of feedback for individuals without specialized knowledge of the system. The study introduces feedback analysis for e-learning platforms using deep learning techniques, specifically focusing on facial expression analysis. Convolutional Neural Networks (CNNs), a type of deep learning model, have gained popularity for their ability to accurately interpret emotions from facial images. These models can efficiently learn and extract crucial features by training on extensive datasets of labeled facial expression images. The application described takes video feedback from various e-learning platforms as input and conducts emotion analysis on the videos.

1. INTRODUCTION

Advanced learning has emerged as a potent method capable of aiding robots in deciphering intricate patterns present in data. Advanced learning holds promise across various domains, including the examination of facial expressions to discern emotions and provide video feedback based on understanding whether the user is content or not. The capacity of computers to identify emotions is pivotal for human-computer interaction and can significantly enrich digital learning environments. Online learning platforms have surged in popularity owing to their flexibility and accessibility to learners. However, the effectiveness of tailored and engaging learning experiences is hampered by their frequent incapacity to perceive and address learners' emotional states. To address this challenge, we are developing systems for emotion identification utilizing advanced learning techniques. These systems proficiently discern and categorize emotions in real-time by scrutinizing facial expressions using specialized neural networks, such as Convolutional Neural Networks (CNNs), which are utilized for scrutinizing user feedback provided to respective digital learning platforms. This presents captivating opportunities for customizing and adjusting learning experiences through the integration of emotion detection technology into digital learning platforms. This study delves into the potential of employing advanced learning and assessing facial expressions in feedback analysis for digital learning environments to discern emotions. We will explore the benefits of emotion recognition in digital learning as well as its criticality in enriching human-computer interaction. Additionally, we will examine the methodologies and strategies employed by advanced learning systems, with a focus on how CNNs interpret facial expressions. Incorporating advanced learning-based emotion identification into feedback systems for digital learning platforms allows for immediate

insight into learners' emotional states, facilitating personalized content and tailored support. Moreover, engaging educational resources that enhance the learning process can be generated by advanced learning models. Despite the numerous advantages of employing emotion detection technology, it is imperative to balance its utilization with respect for user autonomy and privacy. This study will also address the ethical considerations and challenges associated with implementing emotion recognition in digital learning systems.

1.2 Scope of the Project:

The scope of this project entails the implementation of facial emotion detection techniques for feedback analysis within e-learning platforms. It involves developing a robust facial emotion detection model capable of recognizing a variety of emotions displayed in students' facial expressions, including happiness, sadness, surprise, anger, fear, and neutrality. Integration of feedback from instructors and students is essential to continually improve the accuracy and usability of the system. Leveraging computer vision and machine learning algorithms, the project aims to extract emotional cues from students' facial expressions in response to e-learning content and feedback prompts. Real-time processing capabilities will be incorporated to seamlessly integrate the framework into e-learning environments, ensuring efficient analysis of facial expressions. Furthermore, the project emphasizes the consideration of diverse user needs, such as individuals with autism or physical disabilities, to create inclusive and adaptable systems. Continuous improvement and iteration based on ongoing feedback and evaluation will be integral to enhancing the overall effectiveness and user experience of the facial emotion detection system within e-learning platforms.

2. LITERATURE SURVEY

The literature survey encompasses a diverse array of studies examining the integration of facial emotion recognition within e-learning systems. Several researchers have investigated the potential benefits and methodologies associated with this integration. Ayvaz et al. [1] likely delve into the application of facial emotion recognition technology within e-learning platforms, exploring its implications for enhancing user engagement and learning outcomes. Meanwhile, D'Errico et al. [2] may focus on the cognitive aspects of emotions in e-learning processes, shedding light on how emotional states impact students' academic adjustment in online learning environments. Other studies have delved into the technical aspects of emotion recognition systems. For instance, Hassouneh et al. [3] and Shaik and Al Balushi [4] likely discuss the development of real-time emotion recognition systems using machine learning and deep neural networks, with a particular emphasis on analyzing facial expressions for emotion detection. Similarly, Ozdemir et al. [5] and Talegaonkar et al. [6] may explore the effectiveness of deep learning techniques, such as Convolutional Neural Networks (CNNs), in accurately identifying and interpreting facial expressions in real-time scenarios. Furthermore, researchers have examined the practical applications of emotion recognition technology in various contexts. Bartlett et al. [7] may discuss the utilization of facial expression recognition in human-computer interaction, highlighting its role in developing responsive and adaptive systems. Kartali et al. [8] may provide insights into the comparative analysis of different algorithms for real-time facial emotion recognition, assessing their performance and efficiency. Moreover, studies like those by Jain and Sah [9] and Abdulsalam et al. [10] likely explore the integration of emotion recognition technology into feedback systems for educational purposes. These works may discuss the implications of incorporating emotion recognition in student feedback mechanisms and the potential benefits for improving learning experiences. Finally, researchers such as Michel and El Kaliouby [11] and Dukić and Krzic [12] may investigate real-time facial expression recognition techniques using support vector machines and deep learning models, respectively. These studies likely examine the practical applications of emotion recognition technology in educational settings, aiming to enhance student engagement and interaction.

3. OVERVIEW OF THE SYSTEM

3.1 Existing System

Various methods for feedback analysis in e-learning platforms exhibit diverse levels of complexity and efficacy. One prevalent approach involves text-based

sentiment analysis, which entails examining textual feedback provided by students. This method utilizes natural language processing (NLP) techniques to discern sentiment, categorizing it as positive, negative, or neutral. Typically, this approach employs methodologies such as bag-of-words, sentiment lexicons, and machine learning classifiers like Naive Bayes or Support Vector Machines to classify the sentiments expressed in the feedback. By leveraging these techniques, e-learning platforms can gain valuable insights into student perceptions and experiences, aiding in the enhancement of educational content and delivery.

3.1.1 Disadvantages of Existing System

Dependence on Textual Input: Text-based sentiment analysis relies solely on written feedback, potentially overlooking non-verbal cues and subtle emotional expressions.

Limited Nuance: The method may struggle to accurately convey the nuances of emotions, leading to potential misinterpretations of feedback.

Language Nuances and Ambiguity: Accuracy can be affected by factors such as language nuances, sarcasm, and ambiguity, especially in languages or dialects with limited training data.

Less Reliable for Some Languages: Text-based sentiment analysis may be less reliable for languages or dialects with inadequate sentiment lexicons or machine learning models.

3.2 Proposed System

The proposed system for feedback analysis in e-learning platforms integrates face emotion detection methods, harnessing computer vision and machine learning techniques to extract emotional cues from students' facial expressions. Initially, the system collects video recordings or webcam feeds capturing students' interactions with e-learning content, encompassing activities like watching lectures, participating in discussions, or completing assignments. Subsequently, facial detection algorithms are employed to identify and locate faces within the video frames or webcam feeds, discerning facial landmarks and features. Emotion recognition techniques come into play next, utilizing machine learning models—often based on deep learning architectures like Convolutional Neural Networks (CNNs)—to recognize and classify facial expressions into predefined emotion categories such as happiness, sadness, anger, surprise, disgust, fear, or neutrality. The model is trained using labeled facial expression datasets, potentially leveraging transfer learning or fine-tuning pre-trained models like VGG or ResNet to optimize performance. Finally, real-time processing of video feeds enables continuous monitoring and interpretation of students' emotional responses as they engage with e-learning content, facilitating timely adjustments and enhancements to the learning experience.

3.2.1 Advantages of Proposed System

Capture Non-Verbal Cues: Integration of face emotion detection methods enables capturing non-verbal cues and subtle facial expressions, providing a more comprehensive understanding of students' emotional responses.

Real-Time Feedback: The system can detect emotions in real-time, allowing for immediate feedback and adjustments to the learning environment.

Enhanced Accuracy: Leveraging computer vision and machine learning techniques enhances the accuracy and reliability of emotion recognition, enabling precise classification of facial expressions into predefined emotion categories.

Personalized Learning: Facilitates personalized learning experiences by tailoring content and delivery based on students' emotional states, leading to increased engagement and satisfaction.

Holistic Approach: Offers a more holistic approach to feedback analysis, empowering educators to create more effective and adaptive learning environments.

3.3 Proposed System Design

In this project work, there are three modules and each module has specific functions, they are:

1. DATA COLLECTION

2. PRE-PROCESSING

3. TRAIN-TEST SPLIT AND MODEL FITTING

3.3.1 DATA COLLECTION

This module acts as a bridge between user and classifier modules. It performs loading of dataset and then does the preprocessing of the data. It requires training and testing data in order to train the classifier. This module also provides higher security by authenticating the user credentials. It then generates results according to the classification and suggests the necessary medication or action to be taken.

3.3.2 PRE-PROCESSING

This model is solely dedicated to the classifiers. The classifiers are pre-equipped with arrhythmia data and severity levels. It takes the ECG data provided by the user and classifies the arrhythmia into severity levels.

Classifiers then generate results providing accuracy and visual representation in the form of graphs.

3.3.3 TRAIN-TEST SPLIT AND MODEL FITTING

Users register themselves with valid credentials and can add their present or past health condition. The users upload their ECG data and then after classification can view the reports and take necessary actions. Users can also view information about the website, contact for support.

3.4 Architecture

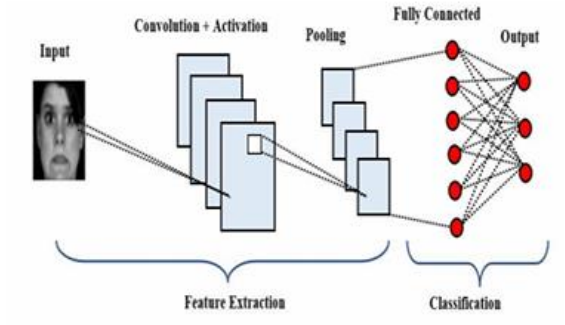
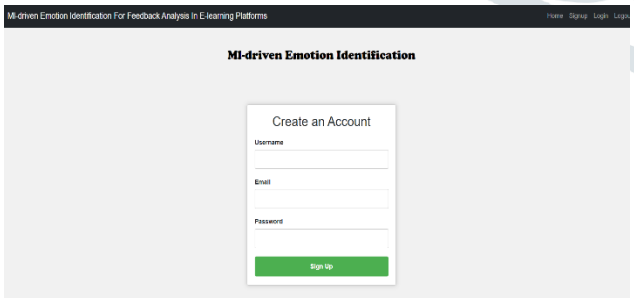


Fig 1: System Architecture

4. RESULT SCREEN SHOTS



5. CONCLUSION

In this project we propose a feedback analysis from human facial expressions on videos uploaded by users in E- learning platform as feedback we develop a web application using flask frame work where multiple E learning users who want to give feedback on various E learning platforms and upload video and view feedbacks on live platform by detecting emotion from video and draw box on face of user and show emotion. In order to extract human facial expressions from feed-back movies and identify emotions, we suggest using two layers of convolutional neural networks. This algorithm uses 2800 photos from the face emotion Image dataset to classify seven different human facial emotions. Human emotions include happiness, sadness, disgust, anger, fear, surprise, and neutrality. The best fit and data generalizability of the model is demonstrated by its comparable training and validation accuracy. We demonstrate feedback analysis form video uploaded by users in E learning platform.

6. REFERENCES

[1] Ayvaz, Uğur; Gürüler, Hüseyin; Devrim, Mehmet Osman "USE OFFACIAL EMOTION RECOGNITION IN E-LEARNINGSYSTEMS"

[2] D'Errico Francesca, Paciello Marinella, De Carolis Bernardina,Vattanid Alessandro Palestra Giuseppe, Anzivino Giuseppe Cognitive Emotions in E-Learning Processes and Their Potential Relationship with Students' Academic Adjustment

[3] Mahammad, F. S., & Viswanatham, V. M. (2020). Performance analysis of data compression algorithms for heterogeneous architecture through parallel approach. The Journal of Supercomputing, 76(4), 2275-2288.

[4] Karukula, N. R., & Farooq, S. M. (2013). A route map for detecting Sybil attacks in urban vehicular networks. Journal of Information, Knowledge, and Research in Computer Engineering, 2(2), 540-544.

[5] Farook, S. M., & NageswaraReddy, K. (2015). Implementation of Intrusion Detection Systems for High Performance Computing Environment Applications. Inter national journal of

Scientific Engineering and Technology Research, 4(0), 41.
[6] Sunar, M. F., & Viswanatham, V. M. (2018). A fast approach to encrypt and decrypt of video streams for secure channel transmission. World Review of Science, Technology and Sustainable Development, 14(1), 11-28.
[7] Mahammad, F. S., & Viswanatham, V. M. (2017). A study on h. 26x family of video streaming compression techniques. International Journal of Pure and Applied Mathematics, 117(10), 63-66.
[8] Devi,S M. S., Mahammad, F. S., Bhavana, D., Sukanya, D., Thanusha, T. S., Chandrakala, M., & Swathi, P. V. (2022).” Machine Learning Based Classification and Clustering Analysis of Efficiency of Exercise Against Covid-19 Infection.” Journal of Algebraic Statistics, 13(3), 112-117.
[9] Devi, M. M. S., & Gangadhar, M. Y. (2012).” A comparative Study of Classification Algorithm for Printed Telugu Character Recognition.” International Journal of Electronics Communication and Computer Engineering, 3(3), 633-641.
[10] Devi, M. S., Meghana, A. I., Susmitha, M., Mounika, G., Vineela, G., & Padmavathi, M. MISSING CHILD IDENTIFICATION SYSTEM USING DEEP LEARNING.
[11] V. Lakshmi chaitanya. "Machine Learning Based Predictive Model for Data Fusion Based Intruder Alert System." journal of algebraic statistics 13, no. 2 (2022): 2477-2483.
[12] Chaitanya, V. L., & Bhaskar, G. V. (2014). Apriori vs Genetic algorithms for Identifying Frequent Item Sets. International journal of Innovative Research &Development, 3(6), 249-254.
[13] Chaitanya, V. L., Sutraye, N., Praveeena, A. S., Niharika, U. N., Ulfath, P., & Rani, D. P. (2023). Experimental Investigation of Machine Learning Techniques for Predicting Software Quality.
[14] Lakshmi, B. S., Pranavi, S., Jayalakshmi, C., Gayatri, K., Sireesha, M., & Akhila, A. Detecting Android Malware with an Enhanced Genetic Algorithm for Feature Selection and Machine Learning.
[15] Lakshmi, B. S., & Kumar, A. S. (2018). Identity-Based Proxy-Oriented Data Uploading and Remote Data Integrity checking in Public Cloud. International Journal of Research, 5(22), 744-757.
[16] Lakshmi, B. S. (2021). Fire detection using Image processing. Asian Journal of Computer Science and Technology, 10(2), 14-19.
[17] Devi, M. S., Poojitha, M., Sucharitha, R., Keerthi, K., Manideepika, P., & Vasudha, C. Extracting and Analyzing Features in Natural Language Processing for Deep Learning with English Language.
[18] Kumar JDS, Subramanyam MV, Kumar APS. Hybrid Chameleon Search and Remora Optimization Algorithm-based Dynamic Heterogeneous load balancing clustering protocol for extending the lifetime of wireless sensor networks. Int J Commun Syst. 2023; 36(17):e5609. doi:10.1002/dac.5609
[19] David Sukeerthi Kumar, J., Subramanyam, M.V., Siva Kumar, A.P. (2023). A Hybrid Spotted Hyena and Whale Optimization Algorithm-Based Load-Balanced Clustering Technique in WSNs. In: Mahapatra, R.P., Peddoju, S.K., Roy, S., Parwekar, P. (eds) Proceedings of International Conference on Recent Trends in Computing. Lecture Notes in Networks and Systems, vol 600. Springer, Singapore. https://doi.org/10.1007/978-981-19-8825-7_68
[20] Murali Kanthi, J. David Sukeerthi Kumar, K. Venkateshwara Rao, Mohmad Ahmed Ali, Sudha Pavani K, Nuthanakanti Bhaskar, T. Hitendra Sarma, “a fused 3d-2d convolution neural network for spatial-spectral feature learning and hyperspectral image classification,” j theor appl inf technol, vol. 15, no. 5, 2024, accessed: apr. 03, 2024. [online]. available: www.jatit.org
[21] prediction of covid-19 infection based on lifestyle habits employing random forest algorithm fs mahammad, p bhaskar, a prudvi, ny reddy, pj reddy journal of algebraic statistics 13 (3), 40-45
[22] machine learning based predictive model for closed loop air filtering system p bhaskar, fs mahammad, ah kumar, dr kumar, sma khadar, ...journal of algebraic statistics 13 (3), 609-616
[23] kumar, m. a., mahammad, f. s., dhanush, m. n., rahul, d. p., sreedhara, k. l., rabi, b. a., & reddy, a. k. (2022). traffic length data based signal timing calculation for road traffic signals employing proportionality machine learning. journal of algebraic statistics, 13(3), 25-32.
[24] kumar, m. a., pullama, k. b., & reddy, b. s. v. m. (2013). energy efficient routing in wireless sensor networks. international journal of emerging technology and advanced engineering, 9(9), 172-176.
[25] kumar, m. m. a., sivaraman, g., charan sai, p., dinesh, t., vivekananda, s. s., rakesh, g., & peer, s. d. building search engine using machine learning techniques.
[26] “ providing security in iot using watermarking and partial encryption. issn no:
[27] 2250-1797 issue 1, volume 2 (december 2011)
[28] the dissemination architecture of streaming media information on integrated cdn and p2p, issn 2249-6149 issue 2, vol.2 (march-2012)
[29] provably secure and blind sort of biometric authentication protocol using kerberos, issn: 2249-9954, issue 2, vol 2 (april 2012)
[30] d.lakshmaiah, dr.m.subramanyam, dr.k.satya prasad,” design of low power 4- bit cmos braun multiplier based on threshold voltage techniques”, global journal of research in engineering, vol.14(9),pp.1125-1131,2014.

[31] r sumalatha, dr.m.subramanyam, “image denoising using spatial adaptive mask filter”, ieee international conference on electrical, electronics, signals, communication & optimization (eesco-2015), organized byvignans institute of information technology, vishakapatnam, 24 th to 26th january 2015. (scopus indexed)
[32] p.balamurali krishna, dr.m.v.subramanyam, dr.k.satya prasad, “hybrid genetic optimization to mitigate starvation in wireless mesh networks”, indian journal of science and technology,vol.8,no.23,2015. (scopus indexed)
[33] y.murali mohan babu, dr.m.v.subramanyam,m.n. giri prasad,” fusion and texure based classification of indian microwave data – a comparative study”, international journal of applied engineering research, vol.10 no.1, PP. 1003-1009, 2015. (SCOPUS INDEXE