

Real-time Emotion Recognition using CNN-based Facial Analysis and Emoji Display

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Abstract: *Deep learning approaches are currently having great success across several industries, including computer vision. Yes, it is possible to train a convolutional neural networks (CNN) model to analyse photos and recognise facial expression. In this study, we develop a system that can identify students' facial expressions of emotion. The three parts of our system are facial detection using Haar Cascades, normalisation, and emotion recognition using CNN on the FER 2013 database employing seven different expression kinds. The obtained results demonstrate that face emotion detection is practicable in education, and as a result, it can assist teachers in adapting their presentation to the emotions of the pupils.*

Keywords: Facial expression, Emotion extraction, Convolutional neural networks (CNN), Deep learning, Intelligent classroom management system

REFERENCES

- [1]. R. G. Harper, A. N. Wiens, and J. D. Matarazzo, Nonverbal communication: the state of the art. New York: Wiley, 1978.
- [2]. P. Ekman and W. V. Friesen, "Constants across cultures in the face and emotion," Journal of Personality and Social Psychology, vol. 17, no 2, p. 124-129, 1971.
- [3]. C. Tang, P. Xu, Z. Luo, G. Zhao, and T. Zou, "Automatic Facial Expression Analysis of Students in Teaching Environments," in Biometric Recognition, vol. 9428, J. Yang, J. Yang, Z. Sun, S. Shan, W. Zheng, et J. Feng, Éd. Cham: Springer International Publishing, 2015, p. 439-447. .
- [4]. Krithika L.B and Lakshmi Priya GG, "Student Emotion Recognition System (SERS) for e-learning Improvement Based on Learner Concentration Metric," Procedia Computer Science, vol. 85, p. 767-776, 2016.
- [5]. U. Ayvaz, H. Gürüler, and M. O. Devrim, "USE OF FACIAL EMOTION RECOGNITION IN E-LEARNING SYSTEMS," Information Technologies and Learning Tools, vol. 60, no 4, p. 95, sept. 2017.
- [6]. Y. Kim, T. Soyata, and R. F. Behnagh, "Towards Emotionally Aware AI Smart Classroom: Current Issues and Directions for Engineering and Education," IEEE Access, vol. 6, p. 5308-5331, 2018.
- [7]. D. Yang, A. Alsadoon, P. W. C. Prasad, A. K. Singh, and A. Elchouemi, "An Emotion Recognition Model Based on Facial Recognition in Virtual Learning Environment," Procedia Computer Science, vol. 125, p. 2-10, 2018.
- [8]. C.-K. Chiou and J. C. R. Tseng, "An intelligent classroom management system based on wireless sensor networks," in 2015 8th International Conference on Ubi-Media Computing (UMEDIA), Colombo, Sri Lanka, 2015, p. 44-48.
- [9]. P. Viola and M. Jones, "Rapid object detection using a boosted cascade of simple features," in Proceedings of the 2001 IEEE Computer Society Conference on Computer Vision and Pattern Recognition. CVPR 2001, Kauai, HI, USA, 2001, vol. 1, p. I-511-I-518.
- [10]. Y. Freund and R. E. Schapire, "A Decision-Theoretic Generalization of On-Line Learning and an Application to Boosting," Journal of Computer and System Sciences, vol. 55, no 1, p. 119-139, août 1997.
- [11]. Opencv. opencv.org.
- [12]. Keras. keras.io.

- [13]. Tensorflow. tensorflow.org .
- [14]. aionlinecourse.com/tutorial/machine-learning/convolution-neuralnetwork. Accessed 20 June 2019
- [15]. S. Albawi, T. A. Mohammed, and S. Al-Zawi, “Understanding of a convolutional neural network,” in 2017 International Conference on Engineering and Technology (ICET), Antalya, 2017, p. 1-6
- [16]. ujjwalkarn.me/2016/08/11/intuitive-explanation-convnets/. Accessed 05 July 2019