

ABSTRAK

Pembelajaran daring menjadi solusi yang diterapkan dalam penyelenggaraan kegiatan belajar mengajar guna menghindari penyebaran virus Covid-19. Selama pembelajaran daring berlangsung, teridentifikasi beberapa permasalahan diantaranya konsentrasi yang menurun dan hambatan dalam memberikan *feedback* verbal maupun non-verbal. Beberapa penelitian sebelumnya membuktikan adanya pengenalan emosi berdasar ekspresi wajah dapat memberikan informasi kepada pengajar berupa *feedback* non-verbal serta tingkat konsentrasi peserta didik. Dalam beberapa penelitian terkait pengenalan emosi, terdapat permasalahan seperti *overfitting* dan permasalahan lain yang tidak terkait dengan emosi, salah satunya variasi pose kepala.

Pada penelitian ini, metode *Viola-Jones* dan *Convolutional Neural Network* (CNN) diterapkan dalam proses pengenalan emosi wajah melalui sebuah sistem monitoring emosi dan tingkat konsentrasi pada pembelajaran daring. Penggunaan gabungan *cascade classifier* diterapkan dalam sistem untuk dapat mendeteksi wajah dengan pose kepala beragam. Beberapa teknik regularisasi diterapkan dalam pembuatan model untuk menghindarkan model dari *overfitting*.

Hasil dari pengujian didapatkan bahwa metode yang diterapkan mampu mendeteksi wajah dengan akurasi 98% pada sudut 0° dan 65% pada sudut $>0^\circ$. Model yang dibuat dalam penelitian ini mempunyai akurasi 67% dan penggunaan teknik regularisasi mampu menghindarkan model dari *overfitting*. Implementasi sistem pada pembelajaran yang dilakukan melalui *Zoom Meeting* mendapat hasil cukup baik, di mana dari 22 peserta yang ada 18 wajah dapat terdeteksi dan dikenali emosinya.

Kata kunci : citra ekspresi wajah, hyperparameter, CNN, deteksi wajah, pengenalan emosi wajah, Viola Jones

ABSTRACT

Online learning is a solution that is applied in the implementation of teaching and learning activities to avoid the spread of the Covid-19 virus. During online learning, several problems were identified, including decreased concentration and obstacles in providing verbal and non-verbal feedback. Several previous studies have proven that the recognition of emotions based on facial expressions can provide information to teachers in the form of non-verbal feedback and the level of concentration of students. In several studies related to emotion recognition, there are problems such as overfitting and other problems that are not related to emotions, one of which is variations in head poses.

In this study, the Viola-Jones method and the Convolutional Neural Network (CNN) were applied in the facial emotion recognition process through an emotion monitoring system and the level of concentration in online learning. The combined use of a cascade classifier is implemented in the system to be able to detect faces with various head poses. Several regularization techniques are applied in modeling to prevent the model from being overfitted.

The results of the test showed that the method applied was able to detect faces with an accuracy of 98% at an angle of 0° and 65% at an angle of $>0^\circ$. The model made in this study has an accuracy of 67% and the use of regularization techniques is able to prevent the model from overfitting. The implementation of the system in learning carried out through Zoom Meetings got quite good results, where from 22 participants there were 18 faces that could be detected and their emotions recognized.

Keywords: facial expression image, hyperparameter, CNN, face detection, facial emotion recognition, Viola Jones