

## INTISARI

Kecelakaan lalu lintas merupakan salah satu aspek penyebab kematian manusia di dunia. Sementara distraksi saat berkendara adalah salah satu faktor yang menjadi penyebab kecelakaan lalu lintas. Mitigasi terkait distraksi berkendara telah banyak dilakukan, salah satunya dengan deteksi melalui pendekatan *machine learning*. Pada penelitian kali ini bertujuan untuk melakukan pengembangan model dari deteksi distraksi berkendara berdasarkan pergerakan mata melalui pendekatan *deep learning* dengan algoritma *Convolutional Neural Network* (CNN).

Objek yang digunakan pada penelitian ini adalah *dataset* yang dihimpun oleh laboratorium ergonomika Departemen Teknik Mesin dan Industri Universitas Gadjah Mada. *Dataset* memuat rekaman video wajah yang berfokus pada area mata karena memanfaatkan penggunaan *eye tracker* dari 15 responden saat melakukan simulasi menggunakan *driving simulator* yang akan dibagi ke dalam dua kategori, yaitu fokus dan tidak fokus dengan validasi menggunakan *eye tracker*. Tahapan *preprocessing* diterapkan agar didapatkan data gambar berdasarkan data video dan membaginya menjadi 80% data latihan, 20% data validasi sekaligus data *testing*. Pembangunan model CNN menggunakan dua metode, yaitu *transfer learning* dan *build model from scratch*. Metode *transfer learning* memanfaatkan dua model *pretrained*, yaitu MobileNet V2 dan Inception V3.

Setelah proses pelatihan dengan 35 *epoch* pada model *pretrained* Inception V3 dan *build from scratch* serta pelatihan 50 *epoch* pada model *pretrained* MobileNet V2 didapatkan hasil evaluasi pada data *test* terbaik, yaitu mode *pretrained* Inception V3 dengan akurasi dan rerata F1 *score* sebesar 77% dan 0.76. Sementara pada model *pretrained* MobileNet V2 menghasilkan akurasi sebesar 66% dan rerata F1 *score* sebesar 0.63 sedangkan pada *build from scratch* memiliki akurasi sebesar 71% dan rerata F1 *score* sebesar 0.71.

**Kata Kunci:** *driving focus, eye tracking, convolutional neural network, deep learning*

## ABSTRACT

Traffic accidents are one of the leading causes of human fatalities worldwide. Distractions while driving are one of the factors contributing to traffic accidents. Various mitigation efforts have been implemented to address driving distractions, one of which is detection through machine learning approaches. This study aims to develop a model for detecting driving distractions based on eye movements using a deep learning approach with the Convolutional Neural Network (CNN) algorithm.

The object used in this study is a dataset compiled by the ergonomics laboratory of the Department of Mechanical and Industrial Engineering at Universitas Gadjah Mada. The dataset contains video recordings of faces focusing on the eye area, utilizing an eye tracker from 15 respondents during simulations using a driving simulator. The data is divided into two categories: focused and unfocused, validated using the eye tracker. Preprocessing steps were applied to extract image data from the videos, and the data was divided into 80% training data and 20% validation and testing data. The CNN model was developed using two methods: transfer learning and building a model from scratch. The transfer learning method utilized two pretrained models, MobileNet V2 and Inception V3.

After training for 35 epochs with the pretrained Inception V3 model and the model built from scratch, as well as 50 epochs of training with the pretrained MobileNet V2 model, the best evaluation results on the test data were obtained with the pretrained Inception V3 model, achieving an accuracy and average F1 score of 77% and 0.76, respectively. Meanwhile, the pretrained MobileNet V2 model resulted in an accuracy of 66% and an average F1 score of 0.63, whereas the model built from scratch achieved an accuracy of 71% and an average F1 score of 0.71.

**Keywords:** driving focus, eye tracking, convolutional neural network, deep learning