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IMPLEMENTASI SISTEM DETEKSI KANTUK MENGGUNAKAN ALGORITMA *HAAR CASCADE* DALAM PEMBELAJARAN DARING

SKRIPSI

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Sarjana Komputer pada Program Studi Rekayasa Perangkat Lunak

oleh

Arfi Triawan
2002890

PROGRAM STUDI REKAYASA PERANGKAT LUNAK
KAMPUS UPI DI CIBIRU
UNIVERSITAS PENDIDIKAN INDONESIA
2025

IMPLEMENTASI SISTEM DETEKSI KANTUK MENGGUNAKAN ALGORITMA *HAAR CASCADE* DALAM PEMBELAJARAN DARING

Oleh
Arfi Triawan
2002890

Sebuah skripsi yang diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Sarjana Komputer pada Program Studi Rekayasa Perangkat Lunak

Universitas Pendidikan Indonesia
Januari 2025

HALAMAN PENGESAHAN

Arfi Triawan

IMPLEMENTASI SISTEM DETEKSI KANTUK MENGGUNAKAN ALGORITMA *HAAR CASCADE* DALAM PEMBELAJARAN DARING

disetujui dan disahkan oleh pembimbing:

Pembimbing I

Asyifa Imanda Septiana, S.Pd., M.Eng.

NIP 920190219920228201

Pembimbing II

Hendriyana, S.T., M.Kom.

NIP 920190219870504101

Mengetahui,

Ketua Program Studi Rekayasa Perangkat Lunak

Mochamad Iqbal Ardimansyah, S.T., M. Kom.

NIP 920190219910328101

PERNYATAAN BEBAS PLAGIARISME

Saya yang bertanda tangan di bawah ini:

Nama	:	Arfi Triawan
NIM	:	2002890
Program Studi	:	Rekayasa Perangkat Lunak
Judul Skripsi	:	Implementasi Sistem Deteksi Kantuk Menggunakan Algoritma *Haar Cascade* Dalam Pembelajaran Daring

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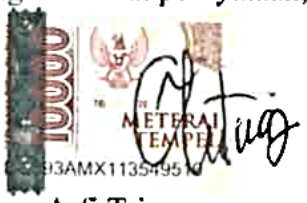

Arfi Triawan

NIM 2002890

IMPLEMENTASI SISTEM DETEKSI KANTUK MENGGUNAKAN ALGORITMA *HAAR CASCADE* DALAM PEMBELAJARAN DARING

ARFI TRIAWAN

NIM 2002890

ABSTRAK

Tujuan dilakukannya penelitian ini adalah untuk menganalisis apakah pengembangan model sistem deteksi kantuk menggunakan algoritma *Haar Cascade* memiliki nilai akurasi yang baik. Selain itu, tujuan lain dari penelitian adalah mengimplementasikan sistem deteksi kantuk ke dalam *website* pembelajaran daring. Metode penelitian meliputi pengembangan model dari *dataset* mata '*MRL Eye Dataset*' dengan jumlah gambar sebanyak 84.498 gambar dan *dataset* mulut '*Yawn Dataset*' dengan jumlah gambar sebanyak 5.119 gambar dideteksi fitur mata dan mulutnya menggunakan algoritma *Haar Cascade* serta pengimplementasian sistem deteksi kantuk disertai daftar video YouTube yang di-*embed*. Hasil utama yang didapatkan adalah nilai akurasi dari pengembangan model deteksi kantuk senilai 99.73% dan nilai *loss* ada pada angka 2.23%. Saat pengujian, sistem deteksi kantuk memiliki nilai akurasi di angka 85% yang ditentukan dalam 4 skenario uji coba dengan melibatkan 20 responden. Adapun kesimpulan yang bisa diambil yaitu nilai akurasi dari pengembangan model sistem deteksi kantuk lebih besar (99.73%) daripada nilai akurasi dari pengujian langsung pada responden (85%) yang bisa disebabkan oleh faktor kurang tepatnya nilai *threshold* yang ditentukan, kondisi pencahayaan yang tidak terlalu terang saat responden melakukan pengujian, dan kepala responden yang menunduk sehingga model tidak bisa mendeteksi wajah.

Kata Kunci: Sistem Deteksi Kantuk, *Eye Aspect Ratio, Mouth Aspect Ratio, Haar Cascade, Confusion Matrix*, Pembelajaran Daring

IMPLEMENTATION OF DROWSINESS DETECTION SYSTEM USING HAAR CASCADE ALGORITHM IN ONLINE LEARNING

ARFI TRIAWAN

NIM 2002890

ABSTRACT

The purpose of this research is to analyze whether the development of a drowsiness detection system model using the Haar Cascade algorithm has a good accuracy value. In addition, another goal of the research is to implement the drowsiness detection system into an online learning website. The research method includes developing a model from the eye dataset 'MRL Eye Dataset' with a total of 84,498 images and the mouth dataset 'Yawn Dataset' with a total of 5,119 images to detect eye and mouth features using the Haar Cascade algorithm and implementing a drowsiness detection system with a list of embedded YouTube videos. The main result obtained is that the accuracy value of the drowsiness detection model development is 99.73% and the loss value is 2.23%. During testing, the drowsiness detection system has an accuracy value of 85% which is determined in 4 test scenarios involving 20 respondents. The conclusion that can be drawn is that the accuracy value of the drowsiness detection system model development is greater (99.73%) than the accuracy value of direct testing on respondents (85%) which can be caused by factors such as the inaccurate threshold value determined, lighting conditions that are not too bright when the respondent is testing, and the respondent's head bowing so that the model cannot detect the face.

Keywords: Drowsiness Detection System, Eye Aspect Ratio, Mouth Aspect Ratio, Haar Cascade, Confusion Matrix, Online Learning

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