



**LINE CROSSING DETECTOR SYSTEM FOR REAL-TIME
OVER-TAKING VEHICLE DETECTION**

FINAL THESIS

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**UNIVERSITAS
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**INFORMATICS STUDY PROGRAM
FACULTY OF COMPUTER SCIENCE
INTERNATIONAL UNDERGRADUATE PROGRAM
UNIVERSITAS MERCU BUANA
JAKARTA
2024**



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**Submitted as one of the requirements for
presentation at the final thesis defense**

INFORMATICS STUDY PROGRAM

FACULTY OF COMPUTER SCIENCE

INTERNATIONAL UNDERGRADUATE PROGRAM

UNIVERSITAS MERCU BUANA

JAKARTA

2024

PAGE OF STATEMENT OF ORIGINAL WORK

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I declare that this thesis report is the result of my own work and not plagiarism, and all sources, both cited and referred to, have been stated correctly. If turns out that my thesis report contains elements of plagiarism, then I am ready to receive academic sanctions that apply at Mercu Buana University

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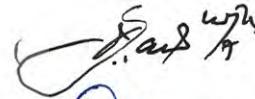
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PREFACE

In an era of advancing technology and evolving transportation systems, safety remains an essential pillar for the seamless functioning of our roadways. The proposal titled "Line Crossing Detector System For Real-Time Over-Taking Vehicle Detection" marks a significant step towards ensuring heightened safety measures within the realm of vehicular movement.

This report serves as a requirement to obtain my undergraduate degree in the Informatics program at the Faculty of Informatics, University of Mercu Buana. I would like to express my sincere appreciation to the following who have supported and guided me throughout this journey:

1. **Prof. Dr. Andi Adriansyah, M.Eng** as Rector Universitas Mercu Buana.
2. **Dr. Bambang Jokonowo, S.Si., M.TI.** as Deputy Dean of the International Department of Informatics Engineering, Universitas Mercu Buana.
3. **Dr. Hadi Santoso, S.Kom., M.Kom** as head of Study Program of Informatics Engineering, Universitas Mercu Buana
4. **Prastika Indriyanti, S.Kom., M.Cs.** as my Academic Supervisor.
5. **Mohamad Yusuf, S.Kom., M.C.S** as my Research Supervisor.
6. **My Family**, whose unwavering support and prayers have been a source of strength throughout this journey.

I am aware that this report may have some limitations due to my limited knowledge and experience in terms of content and presentation. Therefore, I humbly welcome any suggestions, input, or constructive criticism from various parties. May this paper serve as a catalyst for further discourse, sparking curiosity, and fostering a deeper understanding of image detection subject.

Jakarta, 23rd May 2024



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STATEMENT OF APPROVAL FOR THE PUBLICATION OF FINAL PROJECT FOR ACADEMIC PURPOSES

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ABSTRACT

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Title of Research Proposal : Line Crossing Detector System For Real-Time
Over-Taking Vehicle Detection
Supervisor : Mohamad Yusuf, S.Kom., M.C.S

This study introduces a novel method for detecting overtaking vehicles by integrating Virtual Line Detection with the YOLOv8n algorithm. The objective is to enhance road safety by accurately identifying and tracking vehicles as they overtake, which is crucial for preventing. The research demonstrates the effectiveness of this approach, achieving a detection accuracy rate of 80.95% using line crossing detection techniques. This high level of accuracy underscores the potential of the system to reliably identify overtaking maneuvers in traffic conditions. Furthermore, this innovative method holds promising implications for enhancing safety riding by providing real-time alerts to drivers and preventing infrastructure loss resulting from traffic incidents. The findings suggest that integrating advanced detection algorithms like YOLOv8n with virtual line detection can be a viable solution for modern traffic safety challenges.

Keywords: YOLOv8n, Vehicle Detection, Line Crossing Detector, CNN.

ABSTRAK

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Judul Proposal Penelitian : Line Crossing Detector System For Real-Time
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Penelitian ini memperkenalkan metode baru untuk mendeteksi kendaraan yang sedang melampaui kendaraan lain dengan mengintegrasikan *Line Crossing Detector* dengan algoritma YOLOv8n. Tujuannya adalah untuk meningkatkan keselamatan jalan dengan mengidentifikasi dan melacak kendaraan yang mendahului secara akurat, yang sangat penting untuk mencegah kecelakaan. Penelitian ini menunjukkan efektivitas dari metode deteksi yang diusulkan mencapai tingkat akurasi deteksi sebesar 80,95% menggunakan teknik deteksi lintasan garis. Tingkat akurasi yang tinggi ini menunjukkan potensi sistem untuk mengidentifikasi manuver kendaraan saat mendahului dengan. Selain itu, metode inovatif ini memiliki implikasi menjanjikan untuk meningkatkan keselamatan berkendara dengan memberikan peringatan *real-time* kepada pengemudi dan mencegah kerugian infrastruktur akibat insiden lalu lintas. Hasil penelitian ini menunjukkan bahwa mengintegrasikan algoritma deteksi canggih seperti YOLOv8n dengan deteksi garis virtual dapat menjadi solusi yang layak untuk tantangan keselamatan lalu lintas modern.

Kata Kunci: YOLOv8n, Vehicle Detection, Line Crossing Detector, CNN.

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