DIGITAL CAR TURNING AND BREAKING INDICATOR

COURSE PROJECT REPORT
Submitted by

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Under the guidance
of
PROF. SIJI JOSE

To
APJ Abdul Kalam Technological University
In partial fulfillment of the requirements for the award of the Degree of
Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence)

Department of Computer and Engineering Science (Artificial Intelligence)

ADI SHANKARA INSTITUTE OF ENGINEERING AND TECHNOLOGY,
KALADY
NOVEMBER 2024

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NOVEMBER 2024

ADI SHANKARA INSTITUTE OF ENGINEERING AND TECHNOLOGY, KALADY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE)

CERTIFICATE

Certified that this is a bonafide record of the course project entitled

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Faculty in Charge

ACKNOWLEDGMENT

We would like to express our heartfelt gratitude to all those who contributed to the successful completion of this course project. This endeavor was a collaborative effort, and we are sincerely thankful for the support, guidance, and assistance provided by various individuals and resources.

First and foremost, we extend our appreciation to Prof. **SIJI JOSE**, whose expertise and unwavering support played a pivotal role in shaping our project. Their valuable insights and constructive feedback were instrumental in refining our ideas and enhancing the overall quality of our work.

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Furthermore, we are grateful to **Department of Artificial Intelligence and Data Science of Adi Shankara Institute of Engineering and Technology** for providing us with the necessary resources and a conducive learning environment. The facilities and access to research materials greatly facilitated our project development. In conclusion, this course project would not have been possible without the collective effort and support of everyone involved.

VISION AND MISSION OF THE DEPARTMENT

VISION

To be in the frontier of AI technology through quality of education, collaborative research and produce globally competitive, industry ready engineers with social commitment.

MISSION

M1: Achieve excellence in the educational experience, fostering collaborative research through state-of-the-art infrastructure and innovative elements.

M2: Establish industry collaboration to address interdisciplinary challenges across diverse applications.

M3: Inspire students to develop into ethical, Innovative and entrepreneurial leaders through a socially-centered program

CONTENTS

AIM

Design and implement a digital logic system to control the turning and braking indicators of a car, ensuring safe and efficient communication to other road users.

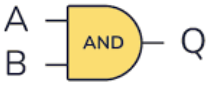
INTRODUCTION

In modern transportation systems, effective communication between vehicles is crucial for ensuring road safety and preventing accidents. The turning and braking indicator system is a vital component of a vehicle's safety features, providing critical visual cues to other road users about the driver's intentions. This project focuses on designing a digital logic system to control the turning and braking indicators of a car, integrating safety features and efficient communication protocols.

Conventional turning and braking indicator systems rely on mechanical and analog components, which can be prone to failures and lack flexibility. The advent of digital logic systems has enabled the development of more reliable, efficient, and customizable solutions. This project leverages digital logic design principles to create a turning and braking indicator system, incorporating features such as automatic turn signal cancellation, hazard light activation during sudden braking, and manual override capabilities. The primary objective of this project is to design a digital logic system that controls the turning and braking indicators of a car, ensuring safe and efficient communication to other road users.

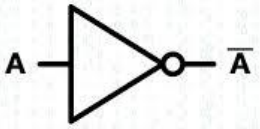
LOGIC GATES USED:

1. **AND GATE:** The AND gate is named so because, if 0 is false and 1 is true, the gate acts in the same way as the logical "and" operator. The output is "true" when both inputs are "true." Otherwise, the output is "false." In other words, the output is 1 only when both inputs are 1.



A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

2. **NOT GATE:** A logical inverter, sometimes called a NOT gate to differentiate it from other types of electronic inverter devices, has only one input. A NOT gate reverses the logic state. If the input is 1, then the output is 0. If the input is 0, then the output is 1.



2 input NOT gate

A	$\overline{A}$
0	1
1	0

THEORY

The digital car braking and turning indicator system employs a logical network of AND, OR, and NOT gates to ensure safe and efficient indication of braking and turning intentions.

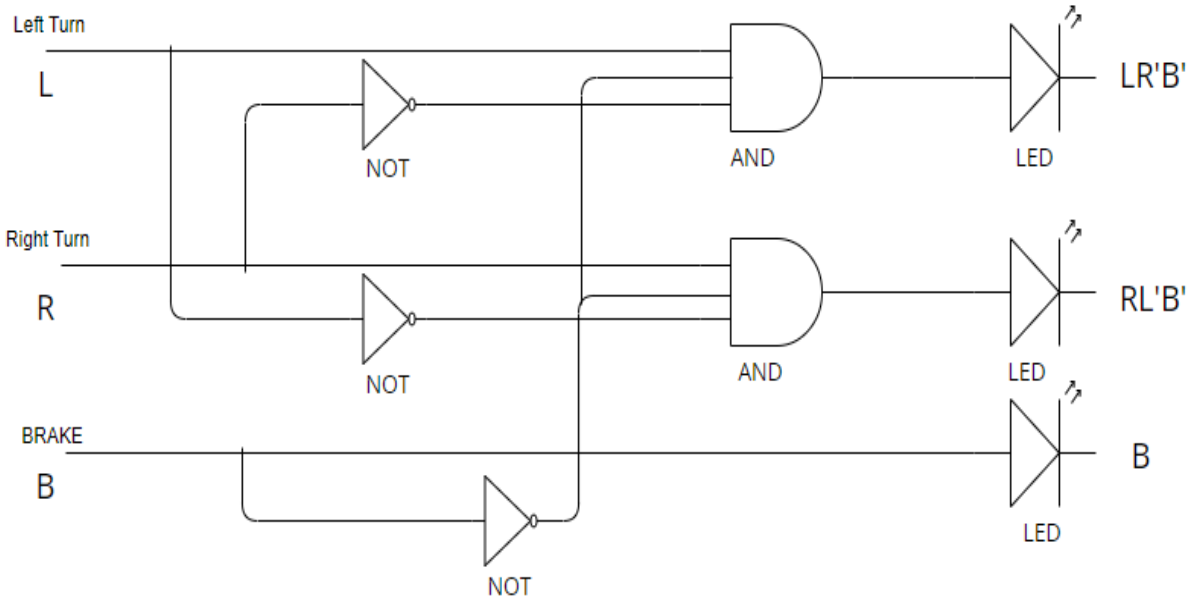
When the brake pedal is pressed (B), the brake lights (BL) activate, alerting surrounding drivers. Concurrently, the system inhibits turn indicator activation to prevent confusing signals.

For turn signals, the left (L) and right (R) switches are logically evaluated. When the left switch is on and the right switch is off (L AND NOT R), the left turn indicator (LTI) activates, provided the brake pedal is not pressed (NOT B). Similarly, when the right switch is on and the left switch is off (R AND NOT L), the right turn indicator (RTI) activates, again contingent upon the brake pedal's release (NOT B). This logical framework prevents simultaneous activation of conflicting indicators, enhancing road safety and driver visibility.

Logic Functions:

1. Brake Lights (BL): B (brake pedal press activates brake lights)
2. Left Turn Indicator (LTI): L AND NOT R AND NOT B (left turn indicator on when left switch is on and right switch as well as brake is off)
3. Right Turn Indicator (RTI): R AND NOT L AND NOT B (right turn indicator on when right switch is on and left switch as well as brake is off)

LOGIC CIRCUIT



THANK YOU