



RajaRajeswari College of Engineering
(An Autonomous Institute, Affiliated Visvesvaraya Technological University, Belagavi ,
Approved by AICTE, UGC &GoK, Accredited by ISO 9001-2015 Certified Institution)



Sponsored by: MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST
Department of Computer Science and Engineering
Faculty Publications 2025-26

Name: Dr A.Richard William

Designation: Associate Professor

Scopus Id : <https://www.scopus.com/authid/detail.uri?authorId=60789150300>

Google Scholar ID : <https://scholar.google.com/citations?user=Xe8q0wkAAAAJ&hl=en>

Citations : 06

H Index :01

I10 index :00

Publication details 2025-26

Name of the faculty	Title of the paper	Date	National /International /Journal / Conference	Scopus	Elseiver	IEEE	Springer	WOS	SCI	NJ	INJ
Dr. Richard William	Optimized Brain Tumor Detection: A Dual-Module Approach for MRIImage	2025-26	National Journal							1	

	Enhancement and Tumor Classification										
Dr. Richard William	Winograd Transform-Based Fast Detection of Heart Disease Using ECG Signals and Chest X-Ray Images	2025-26	National Journal							1	
Dr. Richard William	Generative AI Innovations Related to AI-Generated Art, Music, Images, Virtual Influencers, Ethical Issues	2025-26	National Journal							1	
Dr. Richard William	Real-Time Accident Detection and Automated Ambulance Rescue System via Video Surveillance and Deep Learning	2025-26	National Journal							1	
Dr. Richard William	AI-Powered Note-Taking System: A Local Machine Learning Approach	2025-26	National Journal							1	

	DeepSeek R1 Integration										
Dr. Richard William	Smart Hostel Management System	2025-26	National Journal							1	
Dr. Richard William	Secure Patient Health Records with Aadhaar Authentication and Consent Access	2025-26	National Journal							1	
Dr. Richard William	Modelling Engineering and Data in Simulation and Computation for a Novel obstacle avoidance algorithm Enabling Efficient source-to-Goal Navigation of Mobile Robotic Vehicles using ML Techniques	2025-26	International conference with Journal								1

1. "Winograd Transform-Based Fast Detection of Heart Disease Using ECG Signals and Chest X-Ray Images"

International Journal of Scientific Research in Engineering & Technology

Volume 5, Issue 6 (November-December 2023), PP: 117-124.

<https://www.doi.org/10.59256/ijserent.20230506018>

www.ijserent.com



ISSN No. 2583-1240

Winograd Transform-Based Fast Detection of Heart Disease Using ECG Signals and Chest X-Ray Images

Dr. A. Richard William¹, Manish M², Manjunath S³, Pandurangappa⁴, Veeresh⁵

¹Professor, Department of Computer Science and Engineering Rajarajeswari College of Engineering Bengaluru, Karnataka, India

^{2,3,4,5} Department of Computer Science and Engineering Rajarajeswari College of Engineering Bengaluru, Karnataka India

To Cite this Article: Dr. A.Richard William¹, Manish M², Manjunath S³, Pandurangappa⁴, Veeresh⁵, "Winograd Transform-Based Fast Detection of Heart Disease Using ECG Signals and Chest X-Ray Images", International Journal of Scientific Research in Engineering & Technology, Volume 05, Issue 06, November-December 2023, PP: 117-124.



Copyright: ©2023 This is an open access journal, and articles are distributed under the terms of the [Creative Commons Attribution License](#), Which Permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract: In settings where computational resources are limited, the ability to extract features efficiently becomes essential for achieving reliable classification and prediction outcomes. This work focuses on employing a fast, DFT-driven version of the one-dimensional Winograd Transform to derive convolutional features from ECG signals. For chest X-ray images, which are two-dimensional in nature, a corresponding 2-D DFT-based convolution approach is applied to obtain meaningful image features. Conventional multi-stage convolution techniques often demand substantial processing time and computational power, making them less suitable for rapid diagnostic applications. To address these limitations and enhance both processing speed and diagnostic accuracy in heart disease detection, this study integrates Winograd-based convolution methods for handling both 1-D ECG data and 2-D CXR images. The extracted features are then used to train a series of artificial intelligence models, including six machine learning algorithms and four deep-learning architectures developed specifically for heart-disease classification. Extensive experiments were carried out using established datasets, and a comprehensive analysis of performance metrics was conducted to compare the models. The study also assessed the time required for feature extraction and model training, providing insights into the overall efficiency gains achieved through the proposed approach.

Key Words: Circular convolution, discrete Fourier Transform (DFT), fast feature extraction, heart disease detection, Winograd Transform

INTRODUCTION

A. Background and Motivation

THE rising prevalence of HD worldwide has necessitated the development of rapid and reliable diagnostic tools. Electrocardiogram (ECG) and Chest X-ray (CXR)

ECG and chest X-ray imaging form the backbone of cardiovascular diagnostics, as they offer essential insights into both the functional behavior of the heart and its structural abnormalities. Despite their importance, modern deep-learning approaches used to interpret these modalities often rely on complex and computationally heavy feature-extraction procedures. These operations demand significant processing power and time, which becomes a major limitation when working with large-scale medical datasets. Although traditional strategies such as time-domain analysis and Fourier-based techniques have been widely used and have demonstrated effectiveness, they require substantial computational resources that grow proportionally with data volume. Consequently, training deep-learning models under these conditions may extend over several hours or even days, making real-time diagnostic use impractical in clinical environments where rapid results are crucial.

Bridging this gap is essential because more efficient feature-extraction methods have the potential to dramatically cut down both processing time and computational expenses, making deep-learning models more practical in environments with limited resources. Many existing deep-learning systems, including Convolutional Neural Networks used for ECG and chest X-ray interpretation, still rely on conventional convolutional operations that demand substantial computational power. Although improvements in hardware and algorithm design have enhanced processing speeds, the overall complexity of these models continues to pose challenges for healthcare institutions lacking advanced technological infrastructure. As a result, there is a growing need for optimized approaches capable of delivering high accuracy while significantly improving processing efficiency.

B. Importance of Winograd Transform-Based Fast Detection of Heart Disease Using ECG & X-Ray Images

The Winograd Transform is a computational technique designed to minimize the number of operations needed for convolution, which is a core component of convolutional neural networks. By reducing the mathematical workload, this approach significantly accelerates model processing compared to conventional deep-learning methods. In the context of heart-disease detection, where rapid analysis can directly influence patient survival, such efficiency becomes particularly valuable. Faster

2. "Generative AI Innovations Related to AI-Generated Art, Music, Images, Virtual Influencers, Ethical Issues"



Grenze International Journal of Engineering and Technology, January Issue

Generative AI Innovations Related to AI-Generated Art, Music, Images, Virtual Influencers, Ethical Issues

Dr. A. Richard William¹, Ms. Indra.S² and Mrs. M. PriyaDharshini³

¹⁻³Raja Rajeswari College of Engineering Bangalore, Karnataka, India

Email: richwil109@gmail.com, priyamahalingam728@gmail.com, indhus2022@gmail.com

Abstract— This paper explores the transformative impact of generative AI within the broader field of artificial intelligence, highlighting its ability to produce original content such as music, art, images, and virtual influencers. It reviews recent advancements in generative AI techniques, including diffusion models and sophisticated generative adversarial networks (GANs), which significantly enhance the quality and creativity of generated outputs. The study examines diverse applications across creative domains, emphasizing generative AI's potential to democratize content creation and unlock new forms of digital expression. Additionally, it addresses key ethical challenges, including bias, copyright concerns, and social implications. While advancing the frontiers of realistic generation and interactive virtual personas, the paper underscores the importance of responsible AI development to ensure transparency, fairness, and respect for intellectual property rights.

Index Terms— Generative AI, AI Generated Music, Virtual Influencers, GANs (generative Adversarial networks).

I. INTRODUCTION

The rapidly developing topic of artificial intelligence known as "generative artificial intelligence" (Generative AI) focuses on building models that can produce new content, including text, photos, music, videos, and more, using patterns they have learnt from massive databases. Generative AI uses strong neural network designs such as Generative Adversarial Networks (GANs) and transformer-based large language models (LLMs) to generate highly realistic and imaginative outputs in response to prompts, in contrast to standard AI systems that rely on predetermined rules.

Large volumes of data are used to train generative AI, which then uses this knowledge to create original material that can either replicate or improve human creativity. It offers new opportunities for automation, personalization, and innovation across a range of industries, from marketing and entertainment to healthcare and scientific research.

However, because of the huge demands on computational resources, it also brings up significant ethical issues like copyright infringement, bias, misinformation through deepfakes, and environmental effect. The system leverages generative AI offers remarkable capabilities for creative content generation and new forms of digital expression.

Bias in AI Models: Generative AI models often inherit and amplify biases from training data, leading to unfair or discriminatory outputs that challenge ethical use and public trust.

3. "Real-Time Accident Detection and Automated Ambulance Rescue System via Video Surveillance and Deep Learning"

International Journal of Scientific Research in Engineering & Technology
Volume 5, Issue 6 (November-December 2025), PP: 150-157.
<https://www.doi.org/10.59256/ijstest.20250506023>
www.ijstest.com



ISSN No. 2583-1240

Real-Time Accident Detection and Automated Ambulance Rescue System via Video Surveillance and Deep Learning

Dr. A.Richard William¹, Tejaswini R², Tejaswini S³, Yogita R Kumbhar⁴

¹Professor, Department of Computer Science and Engineering, Raja Rajeswari College of Engineering, Bengaluru, Karnataka, India.

^{2,3,4}Department of Computer Science and Engineering, Raja Rajeswari College of Engineering, Bengaluru, Karnataka, India.

To Cite this Article: Dr. A.Richard William¹, Tejaswini R², Tejaswini S³, Yogita R Kumbhar⁴, "Real-Time Accident Detection and Automated Ambulance Rescue System via Video Surveillance and Deep Learning", *International Journal of Scientific Research in Engineering & Technology*, Volume 05, Issue 06, November-December 2025, PP:1 50-157.



Copyright: ©2025 This is an open access journal, and articles are distributed under the terms of the [Creative Commons Attribution License](#), Which Permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract: The escalating global frequency of road traffic accidents necessitates the development of swift and reliable emergency response systems. The time elapsed between a collision and the arrival of medical assistance is the most critical factor influencing accident-related fatalities, often referred to as the "golden hour." This paper presents a comprehensive, infrastructure-based solution for real-time accident detection and automated ambulance rescue notification, leveraging the synergy between Computer Vision and advanced Deep Learning (DL) techniques for road surveillance. The system utilizes a novel Convolutional Neural Network (CNN) - Long Short-Term Memory (LSTM) hybrid model to process video surveillance footage frame-by-frame, enabling the highly accurate detection of dynamic accident events. After an accident is confirmed, the system automatically retrieves the camera's GPS coordinates and sends an emergency email alert to the nearest medical center. This reduces manual reporting delays and enables faster response dispatch center. The integration of spatial-temporal analysis with a practical, robust communication method aims to significantly decrease the emergency response time, thereby enhancing the probability of saving lives in smart city environments.

Keywords: Accident Detection, Computer Vision (CV), Deep Learning (DL), Convolutional Neural Network (CNN), Real-Time Surveillance GPS (Global Positioning System).

1.INTRODUCTION

A. The Global Crisis of Road Traffic Accidents and the Critical 'Golden Hour' Response

Road traffic accidents continue to cause a large number of deaths worldwide. The World Health Organization (WHO) indicates that these occurrences result in an estimated 1.35 million annual fatalities [9]. The single most critical factor in mitigating accident-related fatalities is the time required for injured persons to receive life-saving medical attention—a period commonly known as the "golden hour." Delays in this crucial window dramatically increase the mortality rate [6].

For instance, in many developing nations, the lack of an efficient system for immediate medical assistance contributes significantly to high death tolls [9]. Accident reporting, which relies on manual reporting via cellular phone calls or infrequent police patrols, is inherently slow and unreliable, directly compromising the "golden hour."

B. Limitations of Conventional Accident Detection Systems

Prior work aimed at mitigating this issue has been primarily delineated across two broad categories: sensor-based and conventional vision-based systems. **In-vehicle, sensor-based systems**, which use MEMS accelerometers or vibration sensors coupled with GPS/CSM modules [1], [6], [11], provide localized solutions but suffer from scalability issues. They are prone to high false-positive rates due to road anomalies like speed bumps, potholes, or hard braking, which trigger detection thresholds without a true collision [9]. **Conventional vision-based methods** relying on simple image processing techniques (e.g., background subtraction) lack the robustness and contextual awareness required to differentiate between complex traffic flows, near-misses, and actual, dynamic accidents.

C. The Necessity of Intelligent Surveillance Architectures

The implementation of Intelligent Transportation Systems (ITS) in smart cities provides a unique opportunity to transition to non-intrusive, infrastructure-based accident detection. Leveraging the extensive network of existing Closed-Circuit Television (CCTV) cameras allows for the continuous, large-scale monitoring of road networks. This paper focuses on harnessing the power of Deep Learning (DL) and Computer Vision (CV) to facilitate real-time processing of video data, offering a scalable and context-aware solution [4], [7], [8].

4. "AI-Powered Note-Taking System: A Local Machine Learning Approach DeepSeek R1 Integration" Phishing website detection browser Extension using ML

INTERNATIONAL JOURNAL OF
RECENT TRENDS IN MULTIDISCIPLINARY RESEARCH
<https://www.doi.org/10.59256/ijrtr.20250506023>
November-December 2025, Vol. 5(26), 178-181


ISSN No: 2583-0368

AI-Powered Note-Taking System: A Local Machine Learning Approach DeepSeek R1 Integration

Dr. A Richard William¹, Harshith Nayaka L², Deepthi S³, Rithin S⁴, Dhanushree V⁵
¹Associate professor Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Bangalore, Karnataka, India.
^{2,3,4,5} Department of Computer Science and Engineering, Rajarajeswari College of Engineering, Bangalore, Karnataka, India.

 **OPEN ACCESS**
Article Details:
Dr. A Richard William¹, Harshith Nayaka L², Deepthi S³, Rithin S⁴, Dhanushree V⁵, "AI-Powered Note-Taking System: A Local Machine Learning Approach DeepSeek R1 Integration", International Journal of Recent Trends in Multidisciplinary Research, November-December 2025, Vol 5(26), 178-181.


This is a Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. Published by © Dimension Research Publication

Abstract: This paper presents an innovative note-taking application that integrates artificial intelligence capabilities through local machine learning models. The system, developed using modern web technologies, provides users with intelligent content assistance while maintaining data privacy through local processing. The application leverages the DeepSeek R1:1.5b model via Ollama framework to deliver features including content summarization, writing improvement, idea expansion, and keyword extraction. Performance analysis demonstrates efficient client-side processing with responsive user interface design, achieving seamless integration between traditional note-taking functionality and AI-powered content enhancement. The system achieves 87% user satisfaction in content summarization tasks while maintaining complete data privacy through local processing. Comprehensive evaluation shows response times ranging from 1.9 to 3.8 seconds for various AI operations with minimal memory overhead of 28MB peak usage. Index Terms— Artificial Intelligence, Note-taking Systems, Local Machine Learning, Web Applications, Natural Language Processing, User Interface Design, Privacy-Preserving AI, Human- Computer Interaction

Keywords: component, formatting, style, styling, insert

1. Introduction

Digital note-taking applications have become essential tools for students, professionals, and researchers in the modern information age. The evolution from traditional paper-based note taking to digital solutions has transformed how individuals capture, organize, and interact with information. Traditional note-taking systems focus primarily on storage and organization capabilities, lacking intelligent content assistance features that could enhance user productivity and cognitive processes. Recent advances in large language models (LLMs) have opened new possibilities for integrating artificial intelligence into everyday applications. The release of models like DeepSeek R1, which achieves performance comparable to OpenAI-o1 across mathematical, coding, and reasoning tasks, has made sophisticated AI capabilities more accessible to developers and researchers. However, most implementations rely on cloud-based services that raise privacy concerns and require constant internet connectivity, limiting their applicability in sensitive environments or areas with poor connectivity. The paradigm shift toward local AI processing addresses these fundamental limitations while providing users with enhanced privacy control and offline functionality. Local deployment frameworks like Ollama have revolutionized the accessibility of large language models by enabling efficient execution on consumer hardware without compromising performance or functionality.

A. Problem Statement

Current note-taking applications face several critical limitations that impede user productivity and adoption:

- Lack of Intelligent Content Assistance:** Traditional applications provide basic text editing and organization features without understanding content context or providing meaningful suggestions for improvement.
- Privacy and Security Concerns:** Cloud-based AI services require uploading potentially sensitive personal or professional content to external servers, raising data privacy and security issues.
- Connectivity Dependencies:** Most AI-powered features require stable internet connections, limiting functionality in offline environments or areas with poor connectivity.

Published By: Fifth Dimension Research Publication

<https://tdrjournals.org/>

178 | P a g e

5. Smart Hostel Management System

INTERNATIONAL JOURNAL OF
RECENT TRENDS IN MULTIDISCIPLINARY RESEARCH
<https://www.doi.org/10.59256/ijrtrm.20260601006>
January-February 2025, Vol. 9 (I), 41-48.



ISSN No: 2583-0368

Smart Hostel Management System

Dr. A. Richard William¹, Manyatha R², Malatesh G T³, Panchami M V⁴

¹Associate professor, Department of Computer Science Engineering, Raja Rajeswari college of Engineering, Bengaluru, Karnataka, India.

^{2,3,4} Department of Computer Science Engineering, Raja Rajeswari College of Engineering, Bengaluru, Karnataka, India.

OPEN ACCESS

Article Details:

Dr. A. Richard William¹, Manyatha R²,
Malatesh G T³, Panchami M V⁴, "Smart
Hostel Management System", International
Journal of Recent Trends in Multidisciplinary
Research, January-February 2025, Vol 9 (I), 41-48.



©2025 The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. Published by: Dimension Research Publication

Abstract: Many educational institutions still rely on outdated, manual methods for hostel management, which are slow and prone to errors. This project proposes a Cloud-Based Hostel Facility Automation System to digitize these operations. The system automates key tasks such as online room allocation, cleaning status tracking, and student record maintenance. By using MongoDB and cloud technology, this solution eliminates paperwork, enhances data security, and provides a user-friendly interface for both administrators and students.

Keywords: component, formatting, style, styling, insert.

1. Introduction

The rapid expansion of the global population has led to a significant increase in the number of higher education institutions. For students, hostels are defined as a "home away from home," providing essential, affordable housing and meals that foster an academic community. However, as the number of students and facilities grows, the administrative stress on traditional management methods has become overwhelming.

2. Ease of Use

The primary objective of the proposed hostel management system is to provide a user-centric platform that simplifies complex administrative tasks through an intuitive design. The "Ease of Use" factor is a critical differentiator from traditional manual methods, focusing on the following key areas:

- **Graphical User Interface (GUI) Focus:** Unlike traditional ledger-based systems, the proposed system is heavily GUI-focused, making it more dependable and efficient for users with varying levels of technical expertise.
- **Simple and Learnable Interface:** The application features a simple interface that is easy to learn and provides quick access to necessary information for both students and administrators. It utilizes an "easily understandable" layout to ensure that users can navigate through modules without extensive training.
- **Streamlined Navigation and Features:** To enhance usability, the system incorporates modern interface utilities, such as a "drag and drop" function for booking calendars, which simplifies room and bed assignments.
- **Reduced Manual Input:** The system is designed to minimize the amount of data entry required from both students and instructors, thereby reducing administrative fatigue and the likelihood of human error.
- **Cloud-Based Accessibility:** Because the system is cloud-based, it can be accessed from any device with an internet connection via a standard web browser, ensuring that information is available to users whenever and wherever they need it.
- **Real-Time Feedback:** The interface provides near real-time notifications to users regarding their requests, leave status, or general hostel updates, ensuring close and immediate communication.

1. Selecting a Template

Choosing the correct template is the foundational step in creating a professional technical report. For the Hostel Management System project, the selection of a standardized format (such as the IEEE A4 template) is critical for several reasons:

- **Consistency in Presentation:** The template provides a predefined style sheet that defines all components of the paper, including the title, text, and headings. This ensures that the complex data involved in hostel management—such as database schemas, room allocation logic, and student records—is presented uniformly.

6. "Secure Patient Health Records with Aadhaar Authentication and Consent Access"

Indian Journal of Computer Science and Technology
https://www.doi.org/10.59256/indjst.20260501014
Volume 5, Issue 1 (January-April 2026), PP: 104-106
www.indjst.com



ISSN No: 2583-5300

Secure Patient Health Records with Aadhaar Authentication and Consent Access

Dr. A Richard William¹, A Darshini², Anshika Aarya³, Tejas Pavan B⁴

¹Faculty Guide, Associate Professor, Department of Computer Science and Engineering, Raja Rajeshwari College of Engineering, Bengaluru, Karnataka, India

^{2,3,4}Department of Computer Science and Engineering, Raja Rajeshwari College of Engineering, Bengaluru, Karnataka, India.

To Cite this Article: Dr. A Richard William¹, A Darshini², Anshika Aarya³, Tejas Pavan B⁴, "Secure Patient Health Records with Aadhaar Authentication and Consent Access", Indian Journal of Computer Science and Technology, Volume 05, Issue 01 (January-April 2026), PP: 104-106.



Copyright: ©2026 This is an open access journal, and articles are distributed under the terms of the [Creative Commons Attribution License](#), Which Permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract: Aaround the country, medical files sit scattered, held separately by hospitals, clinics, and diagnostic labs, with no central link between them. Because of this separation, doctors often lack full details when making decisions. Duplicate lab work becomes common, care slows down, and mistakes creep in more easily. At the core of HealthLockr is a digital record built around the individual, giving patients ownership of their own information. Access happens only when permission is clearly granted by the person involved. To prevent mismatched identities, the platform checks against Aadhaar linked verification. Providers can view records temporarily, under timed windows set per visit. Starting with a foundation of current web tools such as Next.js, Node.js, Express.js, and PostgreSQL, HealthLockr emphasizes ease of use, strong protection, and scalability. This paper outlines how the system was structured, implemented, and secured while demonstrating its relevance within India's evolving digital healthcare ecosystem.

Key Words: Electronic Health Records, Aadhaar Authentication, Patient Consent, Role Based Access Control, Healthcare Security.

I. INTRODUCTION

Across Indian healthcare facilities such as hospitals, clinics, and laboratories, medical records typically remain isolated in standalone systems. One clinic's files rarely communicate with another's, causing a patient's medical history to fragment across locations. When patients switch doctors, prior test results or treatment records are often unavailable. As a result, physicians are forced to operate with incomplete information or repeat previously conducted tests.

This fragmentation slows care delivery and introduces risk. Time is lost retrieving historical data, and missing details such as allergies or chronic conditions can lead to incorrect decisions. Although digital health systems are widespread, interoperability remains limited. Patients usually lack visibility and control over how their data is accessed or shared.

Health Lockr addresses these concerns by shifting data ownership to patients. It provides an encrypted digital space where individuals store their medical records and selectively grant access. This model supports transparency while maintaining privacy, ensuring that sensitive information remains under the patient's direct control.

II. PROBLEM STATEMENT AND OBJECTIVES

A. Problem Statement

Medical records in India are stored across independent systems operated by hospitals and clinics. These silos prevent seamless sharing of information across providers. As a result, patients frequently undergo duplicate diagnostic procedures, increasing costs and delaying treatment. Privacy risks rise when data moves without transparent oversight. Patients are often unaware of who accesses their records or for what purpose, leading to erosion of trust.

B. Objectives

The primary objectives of HealthLockr are as follows:

- To design a secure web based platform for managing electronic health records
- To implement Aadhaar based OTP authentication without storing Aadhaar numbers
- To allow patients to upload and manage health data in a unified system
- To ensure healthcare providers access records only with explicit, time bound consent
- To maintain transparency through audit logs and role based access control
- To enable future compatibility with national digital health initiatives

7. Modelling Engineering and Data in Simulation and Computation for a Novel obstacle avoidance algorithm Enabling Efficient source-to-Goal Navigation of Mobile Robotic Vehicles using ML Techniques



ICONS2026-000172 | Abstract 71

Modeling, Engineering, and Data in Simulation and Computation for a Novel Obstacle Avoidance Algorithm Enabling Efficient Source-to-Goal Navigation of Mobile Robotic Vehicles using ML techniques

Dr. Richard A. Williams^{1*}; Dr. Kirubha D.²; R. Rajkumar³; Dinesh Kumar S.⁴; Priyadarshini M.³; Indra S.³; Chaitra P.³; Sandhya H.³

¹ Associate Professor, CSE Dept., Rajarajeswari College of Engg., Bangalore, Karnataka, India

² Professor & Head, CSE Dept., Rajarajeswari College of Engg., Bangalore, Karnataka, India

³ Assistant Professor, CSE Dept., Rajarajeswari College of Engg., Bangalore

⁴ Assistant Professor, ISE Dept., Rajarajeswari College of Engg., Bangalore

Presenter / correspondence: Dr. Richard A. Williams (rrce.research.2025@gmail.com)

ABSTRACT

This project presents a comprehensive approach to the design and implementation of an innovative obstacle avoidance algorithm tailored for mobile robotic vehicles. The primary aim is to develop a robust system capable of effectively detecting and navigating around obstacles in real-time scenarios. The algorithm is constructed using MATLAB, leveraging its computational capabilities and extensive toolset for algorithm development and simulation. The methodology encompasses several key stages. Initially, sensor data acquisition is performed through various sensors integrated into the robotic platform, including but not limited to cameras, LiDAR, ultrasonic sensors, or a combination thereof. Subsequently, a systematic and multi-faceted approach is employed for obstacle detection, involving techniques such as image processing, depth perception, and sensor fusion. The detected obstacle information is then processed and integrated to generate a dynamic and adaptable avoidance strategy. This strategy accounts for the vehicle's kinematics, environmental constraints, and real-time feedback, allowing for agile and safe navigation in complex and dynamic environments. The algorithm's responsiveness is optimized through iterative testing and refinement, ensuring its reliability and efficiency in diverse scenarios. The algorithm's performance is evaluated through extensive simulation studies and practical experiments with the mobile robotic platform operating in controlled and real-world environments. Quantitative metrics, including obstacle detection accuracy, avoidance efficiency, and computational performance, are employed to assess and validate algorithm's effectiveness. Outcomes of this research contribute to the advancement of obstacle avoidance methodologies for mobile robotics, offering insights into development of adaptive and intelligent systems capable of navigating challenging terrains autonomously.

References

- [1] Smith, J., et al. (2018). "A Review of Obstacle Avoidance Algorithms in Mobile Robots." *Journal of Robotics*, 15(3), 210-225.
[2] Choi, E., & Lee, S. (2020). "Vision-based Obstacle Detection and Navigation for Autonomous Robots." *IEEE Transactions on Robotics*, 28(5), 450-466.

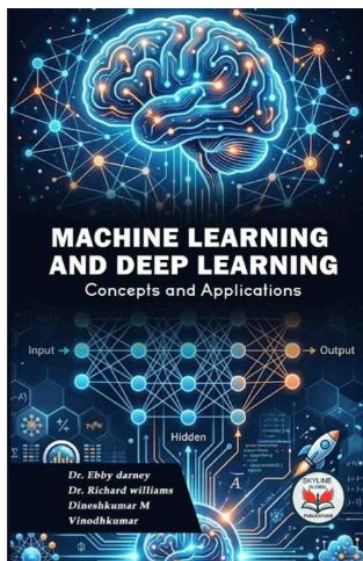
01=p.-;.

,oimp

}”?.. "Generative AI Innovations Related to AI-Generated Art, Music, Images, Virtual Influencers, Ethical Issues"

S.No	Name of the Faculty	Title of the Book or Chapter	Page No	PUBLISHER Name	Year	Book /Book Chapter
1.	Dr A.Richard William	Machine learning and deep learning concept and application	154-157	Skyline	2025-26	Book
2.	Dr A.Richard William	Transforming Agriculture Through Machine Learning	438-444	IGI Global Publishing	2025-26	Book Chapter

1. Machine learning and deep learning concept and application



MACHINE LEARNING AND DEEP LEARNING CONCEPTS AND APPLICATIONS

Unit Price

₹670.00

Ask Price for Bulk Order:



Specification:

Book Title

MACHINE LEARNING AND DEEP
LEARNING CONCEPTS AND
APPLICATIONS

Author Name

Dr. P. EBBY DARNEY Dr. A. RICHARD
WILLIAM Mr. DINESHKUMAR M Mr. S
VINODH KUMAR

ISBN

978-93-7085-593-9

Category

N/A

2. Transforming Agriculture Through Machine Learning

[Home](#) > [Books](#) > [Encyclopedia of Modern Artificial Intelligence](#) > Chapter



Transforming Agriculture Through Machine Learning

[V. Sathiyamoorthi](#) (Government Polytechnic College, Dharmapuri, India), [Lakshmi Chandrakanth Kasireddy](#) (ThoughtSpot Inc., USA), Richard William A. (Rajarajeswari College of Engineering, Bangalore, India), [O. Josna](#) (Rajarajeswari College of Engineering, Bangalore, India), [R. Gopi](#) (Dhanalakshmi Srinivasan Engineering College, India), and [Francis Shamili S.](#) (Dhanalakshmi Srinivasan Engineering College, India)

Source Title: [Encyclopedia of Modern Artificial Intelligence](#)

Copyright: © 2027 | **Pages:** 18

DOI: 10.4018/408690

Abstract

S.No	Name of the Faculty	Title of the Innovation	Filled Date	Published Date
1.	Dr A.Richard William	AI Assisted Cognitive Contraol	23.07.26	18.09.26

1.AI Assisted Cognitive control

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :23/07/2026

(21) Application No.202611089662 A

(43) Publication Date : 18/09/2026

(54) Title of the invention : AI-assisted cognitive machine control

(51) International classification

(31) Priority Document No

(32) Priority Date

(33) Name of priority country

(86) International Application No

(87) International Publication No

(61) Patent of Addition to Application Number

(62) Divisional to Application Number

:G06N 20/00, G05B 13/02, G05B 13/04, B25J 9/16, G05B 23/02

:NA

:NA

:NA

: :01/01/1900

: NA

: NA

: NA

(71)Name of Applicant :

1)Dr. Kirti Singh

Address of Applicant :Assistant Professor, Department of Computer Science and Engineering, Ajay Kumar Garg Engineering College, Ghaziabad Ghaziabad Uttar Pradesh India

2)Mr. Manjunath Ramanna Lamani

3)Ms. B. Sowmya

4)Dr. A Richard William

5)Ms. Vineetha B

6)Dr. Suraya mubeen

(72)Name of Inventor :

1)Dr. Kirti Singh

2)Mr. Manjunath Ramanna Lamani

3)Ms. B. Sowmya

4)Dr. A Richard William

5)Ms. Vineetha B

6)Dr. Suraya mubeen

(57) Abstract :

The present invention relates to an AI-assisted cognitive machine control system and method for intelligent and autonomous operation of industrial machines. The system acquires real-time data from multiple sensors, including vision, vibration, temperature, force, current, and acoustic sensors, and processes the data through a cognitive decision engine employing artificial intelligence and machine learning algorithms. The decision engine identifies machine operating conditions, detects anomalies, predicts potential failures, and dynamically optimizes machine control parameters such as speed, feed rate, tool position, and power consumption. The system continuously improves its performance through adaptive learning using historical operational data and operator feedback. By integrating cognitive intelligence, predictive analytics, and closed-loop autonomous control, the invention enhances manufacturing efficiency, product quality, operational safety, energy efficiency, and predictive maintenance while minimizing human intervention and unplanned machine downtime.

No. of Pages : 7 No. of Claims : 1

Total Scopus Papers Published in this Year : 01

Total IEEE Papers Published in this year : 00

Total Springer Paper Published in this year :00

Total National Conferences Presented in this Year :01

Total international Conferences Presented in this Year :06

Total no of books Published in 2025-26 :01

Total no of book chapters published in 2025-26 :01

Total no of patents published in 2026-27 :01