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VISION VIKSIT BHARAT 2047

EDUCATION 4.0

Enhancing India's Workforce for the AI-Powered Future

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Funded by

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH - SOUTHERN REGIONAL CENTRE
MINISTRY OF EDUCATION, GOVERNMENT OF INDIA
HYDERABAD

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VOLUME - II

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First Edition: 2025

Volume: II

ISBN: 978-93-94004-64-1

Price: ₹ 600

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Printed at
SHANLAXPUBLICATIONS
61, 66 T.P.K. Main Road
Vasantha Nagar
Madurai – 625003
Tamil Nadu, India

Ph: 0452-4208765,
Mobile: 7639303383
email:publisher@shanlaxpublications.com
web: www.shanlaxpublications.com

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE: FOCUSING ON LUNG CANCER DIAGNOSIS AND TREATMENT

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Abstract
By utilizing algorithms and machine learning models, AI can process vast amounts of data, recognize patterns, and make predictions that assist healthcare professionals in making more accurate diagnoses and treatment plans. In clinical settings, AI-powered tools are being used to analyze medical images, predict disease progression, and even identify early signs of conditions such as cancer, heart disease, and neurological disorders, often with greater precision than traditional methods. Artificial Intelligence (AI) is increasingly transforming healthcare by improving diagnostic accuracy, enhancing treatment plans, and streamlining operations. This paper explores the applications of AI in healthcare with a special emphasis on its role in the early detection, diagnosis, and treatment of lung cancer. The integration of AI into radiology, genomics, and personalized medicine holds significant promise in improving patient outcomes. However, challenges regarding data privacy, integration, and ethical concerns must be addressed to fully harness AI's potential in clinical settings.
Keywords: *Artificial Intelligence, Healthcare, Lung Cancer, Machine Learning, Early Detection, Personalized Medicine*

1. Introduction

The integration of Artificial Intelligence (AI) in healthcare has become a catalyst for innovation, offering potential solutions for some of the most complex challenges faced by the medical industry. AI technologies, including machine learning (ML) and deep learning (DL), are being utilized to analyze massive datasets, detect diseases, and assist in clinical decision-making. AI's role extends beyond diagnostics; it is also being integrated into personalized medicine, helping to tailor treatments based on an individual's genetic makeup and medical history. Furthermore, AI-driven robots and virtual assistants are improving surgery precision and enhancing patient management, while natural language processing (NLP) is streamlining documentation and administrative tasks. Despite its benefits, the adoption of AI in healthcare faces challenges such as data privacy concerns, regulatory hurdles, and the need for ongoing human oversight. Nevertheless, as technology advances, AI holds the promise to significantly enhance healthcare delivery, making it more efficient, accessible, and effective for patients worldwide. One of the most critical areas where AI is making a profound impact is in oncology, particularly lung cancer. Early detection and personalized treatment remain key factors in improving survival rates, and AI offers a transformative approach to both.