ARTIFICIAL INTELIGENCE AND MACHINE LEARNING

AIML Monthly Newsletter: 01-01-26 to 31-01-26

1 Department Activities and Achievements

1.1 Guest Lecture on "Exploring the Boundaries of AI: Limitations, Societal Impact and Ethical Considerations"

The **Department of CSE (AI & ML),** School of Engineering, Dayananda Sagar University, successfully organized a guest lecture titled **"Exploring the Boundaries of AI: Limitations, Societal Impact and Ethical Considerations."** The session was delivered by **Dr. Manjeet Rege**, Professor and Chair of Software Engineering and Data Science, St. Thomas University, USA.

The lecture offered insightful perspectives on recent advancements in Artificial Intelligence, with discussions spanning deepfake detection, AI-assisted decision-making, humanoid robotics, Artificial General Intelligence (AGI), and the ethical and safety challenges associated with AI systems. Dr. Rege also highlighted evolving workforce trends, emphasizing the rising demand for AI expertise, enhanced career opportunities, and the shifting employment landscape favouring STEM and healthcare sectors.

In addition, the session addressed pressing global challenges such as climate change and potential future pandemics, underscoring the role of AI as a transformative solution. The event was addressed by **Dr. Jayavrinda Vrindavanam**, Professor & Chairperson, CSE (AI & ML) and concluded with a vote of thanks by **Dr. Mude Nagarjuna Naik**, Associate Professor, CSE (AI & ML).

Dayananda Sagar University

Devarakaggalahalli, Harohalli, Kanakapura Road, Bengaluru South District - 562112

SCHOOL OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

GUEST LECTURE ON

"EXPLORING THE BOUNDARIES OF AI: Limitations, Societal Impact and Ethical Considerations"

Dr. Manjeet Rege

Professor and Chair
Software Engineering and Data Science
St. Thomas University, USA

Targeted Audience:

4th & 6th Semester Students

23 January 2026

11:00 AM

SOE, LH3

CHIEF PATRONS:

- **Dr. D. Hemachandra Sagar**
  Chancellor, DSU
- **Dr. D. Premachandra Sagar**
  Pro-Chancellor, DSU

PATRONS:

- **Dr. B S Sathyanarayana**
  Vice Chancellor, DSU
- **Dr. Prakash S**
  Pro Vice Chancellor, DSU
- **Dr. Puttamadappa C**
  Registrar, DSU
- **Dr. Udaya Kumar Reddy**
  Dean, SOE, DSU
- **Ms. Supriya Mathew**
  Vice President- International Affairs
- **Dr. Sudarshan T S B**
  Dean (R&D), DSU

CONVENER:

- **Dr. Jayavrinda Vrindavanam V**
  Professor & Chairperson CSE (AI & ML), DSU

STAFF COORDINATORS

- **Dr. Mude Nagarjuna Naik**
  Associate Professor, CSE (AI & ML)
- **Ms.Darshini M**
  Student Counsellor, International Affairs, DSU

STUDENT COORDINATORS

Dhruv VM, ENG24AM0165, Kanduri Hari Hara Deeraj ENG24AM0338
4th sem- A Section, CSE(AI & ML)

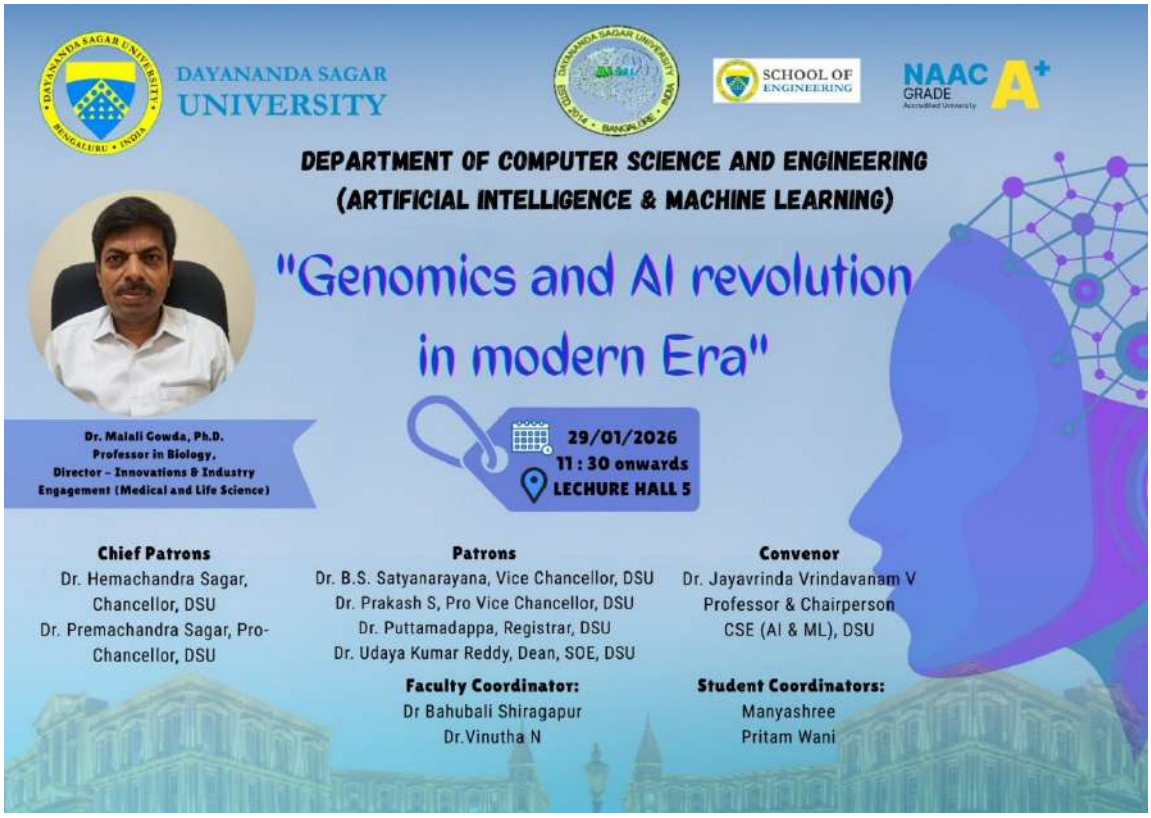

GPS Map Camera
Bengaluru, Karnataka, India
Devarakaggalahalli, Kanakapura Main Rd,
Harohalli, Bengaluru, Karnataka 562112, India
Lat 12.662192° Long 77.450173°
Friday, 23/01/2026 12:10 PM GMT +05:30
Google

1.2 Guest Talk on "Genomics and AI Revolution in the Modern Era"

The **Department of CSE (AI & ML)**, School of Engineering, Dayananda Sagar University, successfully conducted a guest lecture titled **"Genomics and AI Revolution in the Modern Era"** on **29 January 2026** for the **6th semester students** of the department.

The session was delivered by **Dr. Malali Gowda, Ph.D.**, Professor in Biology and Director – Innovations & Industry Engagement (Medical and Life Science). The lecture highlighted the transformative role of Artificial Intelligence in genomics, with a focus on its applications in modern biological research, healthcare, and life sciences, offering valuable interdisciplinary insights to the students.

The program commenced with an address by **Dr. Jayavrinda Vrindavanam**, Professor & Chairperson, CSE (AI & ML), who welcomed the gathering and emphasized the importance of interdisciplinary learning. The event was coordinated by **Dr. Bahubali Shiragapur,** Professor, CSE (AI & ML) and **Dr. Vinutha N,** Associate Professor, CSE (AI & ML) as Faculty Coordinators, with **Ms. Manyashree** and **Mr. Pritam Wani**, students of **6th semester**, serving as Student Coordinators. The session witnessed active participation from students and faculty members, contributing to an enriching academic experience.



2 Faculty activities & Achievements

2.1 The College of Physiotherapy (COPT) and the Department of CSE (AI & ML), School of Engineering, Dayananda Sagar University, successfully

collaborated on a research project titled **“Machine Learning Based Gait Abnormality Analysis Using a Novel Cost-Effective Smart Device.”** The work has been published in the E-Souvenir of the 11th International Conference of Physical Therapy (INCPT AIIMS 2025), held at the All-India Institute of Medical Sciences (AIIMS), New Delhi. The main conference took place on **13–14 December 2025**, during which the collaborative research was featured in the official E-Souvenir of the event. Representing Dayananda Sagar University, **Dr. Sathya Guruprasad**, Principal, COPT, DSU, presented the work **in offline mode** at the conference on **13 December 2025**. The faculty members involved in this interdisciplinary collaboration are: **Dr. Sathya Guruprasad**, Principal, College of Physiotherapy (COPT), DSU, **Dr. Sai Bhavani**, Assistant Professor, COPT, DSU, **Dr. Jayavrinda Vrindavanam**, Professor & Chairperson, Department of CSE (AI & ML), School of Engineering, DSU, **Prof. Pradeep Kumar K**, Assistant Professor, Department of CSE (AI & ML), School of Engineering, DSU. This achievement highlights the strong interdisciplinary collaboration between **Physiotherapy and CSE (AI & ML)** at Dayananda Sagar University and reflects the institution’s growing contribution to innovation in **AI-assisted gait analysis and rehabilitation technologies**.

MACHINE LEARNING-BASED GAIT ABNORMALITY ANALYSIS USING A NOVEL COST-EFFECTIVE SMART DEVICE

Sathya Guruprasad 1, Sai Bhavani 2, Jayavrinda Vrindavanam 3, Pradeep Kumar K 4
1 Principal & Professor, College of Physiotherapy, Dayananda Sagar University, Karnataka
2 Assistant Professor, College of Physiotherapy, Dayananda Sagar University, Karnataka
3 Professor & chairperson, Dept. of CSE(AIandML), Dayananda Sagar University, Karnataka
4 Dept. of CSE(AI&ML), Dayananda Sagar University, Karnataka, India 562112

BACKGROUND: Gait disturbances are crucial signs of neurological and musculoskeletal diseases, having a direct impact on the quality of life and the medical condition of individuals. Classical diagnosis relies on the subjective clinical eye of a practitioner, leading to inter-observer variability, the absence of standardised metrics and lack of scalability in low-resource settings. These limitations preclude early diagnosis and objective follow-up.

OBJECTIVE: Making use of machine learning (ML), and the joint effort between Physiotherapy and CSE (AI and ML) departments, deals with the introduction of a new cost-effective system that is capable of identifying gait abnormalities, which may aid clinicians in treatment for data- driven, precise therapy.

DESCRIPTION OF THE INNOVATION: A simulated dataset of 100 patients was created, and it recorded with the main space time characteristics like step length, step count and centerline deviation. Preprocessing steps included feature scaling, generation of asymmetry indices, and label encoding. A Random Forest classifier, given its flexibility to model sophisticated (non-linear interactions, was fitted on the dataset. Short mathematical analysis indicated ranked feature importance of step length, step count and centerline deviation with cross-validation, which guarantees strong qualities. The model had a global accuracy of ~82% and precision and recall values higher than 75 for major classes, but low performance on underrepresented classes was observed, meaning that it should be trained with larger datasets.

NOVELTY AND ADVANTAGES: The novelty of the approach is in the low-cost, wearable and consumer- grade IMU-based prototype, which allows for real-time gait data acquisition suits. Unlike costly lab-based motion capture systems, this system allows edge computing, enabling portability and privacy while at the same time being inexpensive- a perfect fit for community screenings and routine clinical practice. A fastAPI powered user interface enables the easy input of gait measurements with real-time abnormality prediction.

POTENTIAL APPLICATIONS AND FUTURE SCOPE: Anticipated results are an improved diagnostic accuracy, individual provision plan for rehabilitation and monitoring of the mobility changes in the long-term. The model presents the potential of ML in converting gait between subjective and objective assessments. Once real patient data are available, mine combined sensor use will be adapted to optimise generalisation. This scalable, affordable approach has the potential to enable physiotherapists, neurologists, and rehabilitation clinicians alike to 'follow-the-evidence' in driving provision of equitable care.

KEYWORDS: gait analysis, neurological and musculoskeletal diseases, space-time characteristics, Random Forest, cost-effective design wearable sensors, IMU-based prototype, fastAPI

2.2 **Dr. Joshuva Arockia Dhanraj**, Professor, CSE (AI & ML) has been recognized for his outstanding contribution as an **Elsevier Reviewer** through his active involvement in the international peer-review process. In **January 2026**, he successfully completed **27 manuscript reviews** for **13 reputed Elsevier journals**, spanning interdisciplinary areas including Artificial Intelligence, Digital Signal Processing, Energy Systems, Sustainable Computing, and Engineering Sciences. This accomplishment highlights his strong research acumen, academic integrity, and dedication to maintaining high standards of scholarly publishing, thereby bringing significant recognition to the institution.

Review History Report

Joshuva Arockia Dhanraj

From: 1 January 2026 To: 28 January 2026

All dates in GMT

Total journals reviewed for:	**13**
Total reviews completed:	**27**

	Artificial Intelligence Chemistry	1
	Computers & Electrical Engineering	1
	Digital Signal Processing	6
	Energy	2
	Energy Conversion and Management: X	1
	Energy Reports	4
	Environmental and Sustainability Indicators	2

Review History Report

Joshuva Arockia Dhanraj

From: 1 January 2026 To: 28 January 2026

All dates in GMT

	Information Sciences	1
	ISA Transactions	2
	Journal of Agriculture and Food Research	1
	Journal of the Franklin Institute	2
	Results in Engineering	2
	Sustainable Computing: Informatics and Systems	2

2.3 Dr. Joshuva Arockia Dhanraj, Professor, CSE (AI & ML) successfully completed the **AICTE Training and Learning (ATAL) Academy Faculty Development Program** on **"Capacity Building for Wellbeing and Resilience in Higher Education,"** organized by the **National Institute of Technology Warangal** from **19–24 January 2026**. Conducted under the aegis of the **All-India Council for Technical Education (AICTE)**, the program focused on enhancing faculty competencies in fostering wellbeing, resilience, and sustainable academic practices in higher education. This achievement reflects Dr. Joshuva's commitment to continuous professional development and academic excellence.

ATAL/2026/1768558760

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ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

Nelson Mandela Marg, Vasant Kunj, New Delhi -110070

AICTE Training and Learning (ATAL) Academy

Certificate

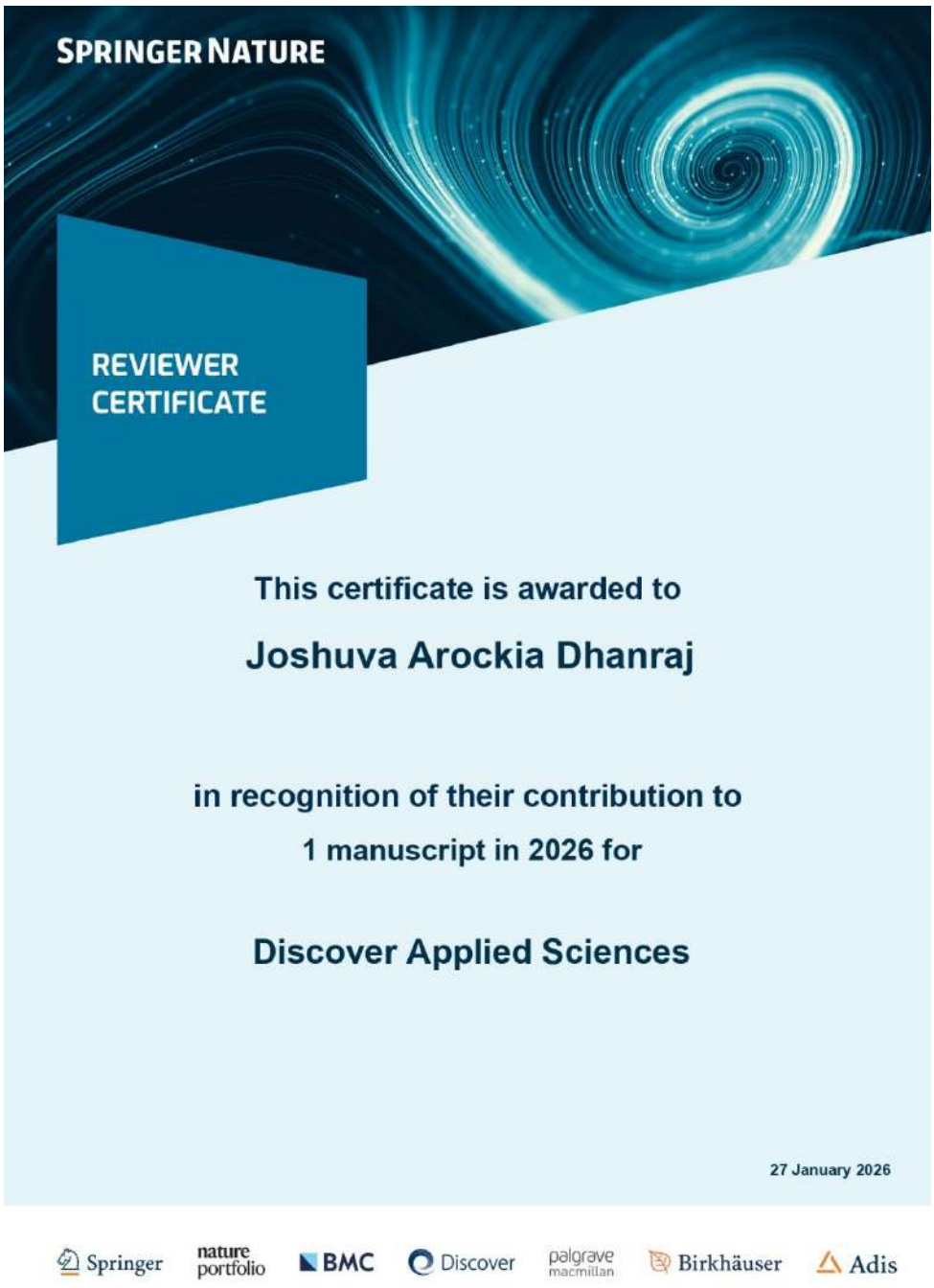
It is certified that ***Dr. A. Joshuva, Professor*** *of* ***Dayananda Sagar University*** *has successfully participated & completed AICTE Training And Learning (ATAL) Academy Faculty Development Program on* ***Capacity Building for Wellbeing and Resilience in Higher Education*** *at* ***National Institute of Technology Warangal*** *from 19/01/2026 to 24/01/2026.*

Priyanka Chawla
Associate Professor Level (AICTE Institute), Coordinator
National Institute of Technology Warangal

Dr. Sunil Luthra
Director & Bureau Head
Training and Learning Bureau, AICTE

2.4 Dr. Joshuva Arockia Dhanraj, Professor, CSE (AI & ML) has been recognized by **Springer Nature** for his valuable contribution as a **peer reviewer**. In **January 2026**, he reviewed a manuscript for the journal ***Discover Applied Sciences***, demonstrating his expertise and commitment

to upholding high standards of scholarly rigor and ethical research dissemination. This recognition highlights his active engagement with the global research community and his continued service to quality academic publishing.



2.5 Dr. Joshuva Arockia Dhanraj, Professor, CSE (AI&ML) is a co-author of the recently published book ***AI Ethics in Engineering: Human Values, Responsible Innovation, and Societal Impact***, now available on **Amazon (Kindle Edition)**. The book offers a concise and insightful examination of ethical principles in artificial intelligence, with a strong focus on human values, responsible innovation, and the societal implications of contemporary engineering practices. This publication underscores Dr. Joshuva's interdisciplinary scholarship and his commitment to embedding ethics and responsibility within engineering education and AI-driven technologies.

AI Ethics in Engineering: Human Values, Responsible Innovation, and Societal Impact

Kindle Edition

by Sriramkumar R (Author), Lakshmanan M (Author), Joshuva Arockia Dhanraj (Author) | Format: Kindle Edition

Artificial Intelligence is rapidly transforming engineering practice, reshaping how systems are designed, decisions are made, and services are delivered. As intelligent technologies increasingly influence human lives, ethical responsibility has become an essential dimension of engineering education and professional practice.

AI Ethics in Engineering: Human Values, Responsibility, and Responsible Innovation presents a clear and thoughtful introduction to the ethical foundations of artificial intelligence. The book explores how human values, professional responsibility, and societal concerns intersect with modern engineering and AI systems. It emphasizes that ethics is not a limitation on technological progress, but a guiding framework for sustainable and humane innovation.

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Reading age	Print length	Language
8 - 18 years	60 pages	English

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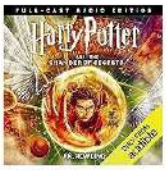

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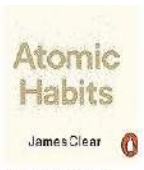

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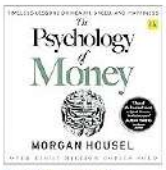
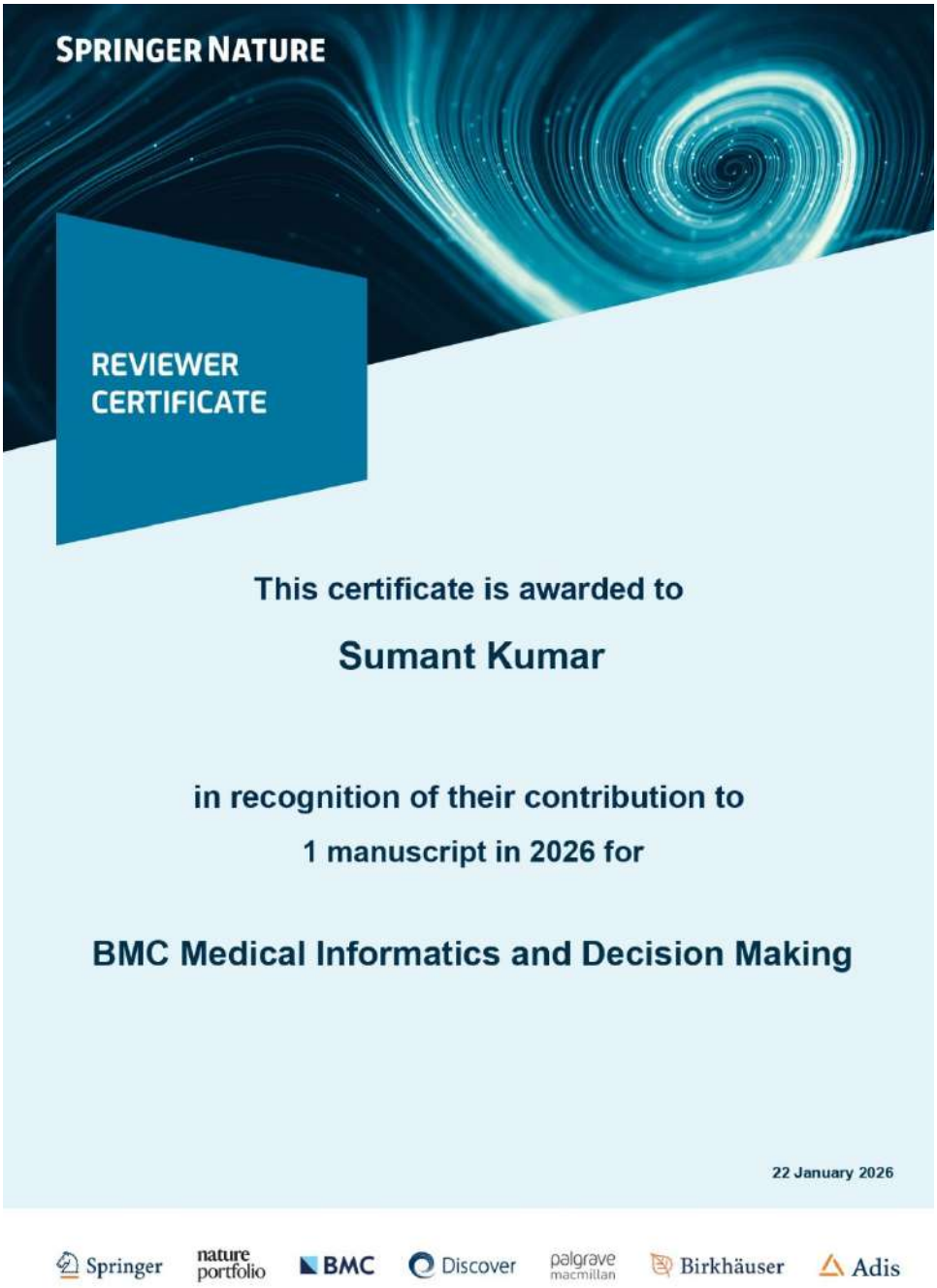


The Psychology of Money: Timeless Lessons on Wealth, Greed, and...
Morgan Housel
4.5 out of 5 stars 78,181
Audible Audiobook
#1 Best Seller
₹668.00

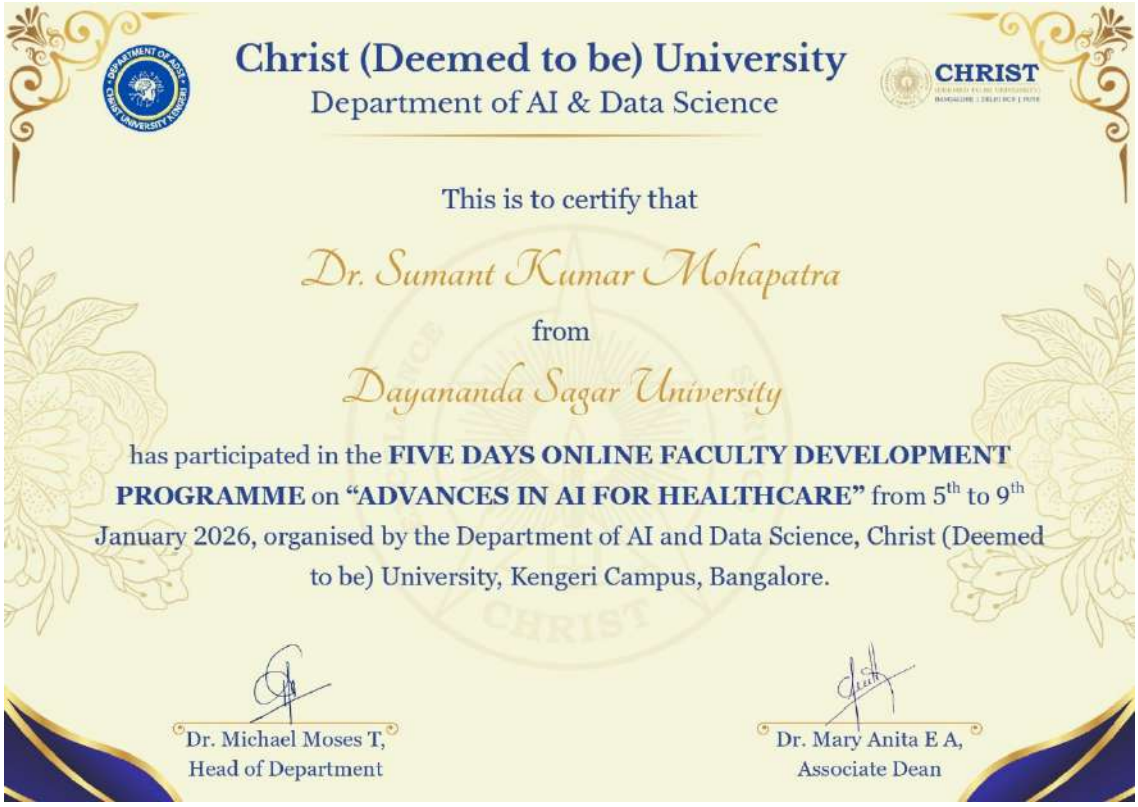
Product details

ASIN : B0GFGF83SZ
Language : English
File size : 1.0 MB
Screen Reader : Supported
Enhanced typesetting : Enabled
X-Ray : Not Enabled
Word Wise : Enabled
Print length : 60 pages

2.6 Dr. Sumant Kumar Mohapatra, Associate Professor, CSE (AI & ML) served as a **peer reviewer** for the journal ***BMC Medical Informatics and Decision Making*** in **2026** and was awarded a **Reviewer Certificate** in recognition of his valuable contribution. This acknowledgment highlights his active engagement in the scholarly peer-review process and his commitment to upholding high standards of research quality and academic excellence.



2.7 Dr. Sumant Kumar Mohapatra, Associate Professor, CSE (AI & ML) participated in a **five-day online Faculty Development Programme (FDP)** titled **"Advances in AI for Healthcare,"** held from **5th to 9th January 2026** and organized by the **Department of AI and Data Science, CHRIST (Deemed to be) University, Kengeri Campus, Bengaluru**. The programme emphasized recent advancements, research trends, and practical applications of Artificial Intelligence in healthcare, contributing to the enhancement of academic and research competencies in this rapidly evolving interdisciplinary field.



2.8 Dr. Mude Nagarjuna Naik, Associate Professor, CSE (AI & ML), presented a research paper titled **"Automated Deep Learning Framework for Multi-Label Skin Cancer Classification Using Balanced Dermatoscopic Data"** at the **Sixth International Conference on Advances in Electrical, Computing, Communications and Sustainable Technologies (ICAECT 2026)**. The conference was held in **hybrid mode** at **Shankaracharya**

Technical Campus (SSTC), Bhilai, Chhattisgarh, India, during **08–09 January 2026**.

2.9 A patent titled **"System and Method for Dual-Site Multimodal Workplace Wellness Monitoring"** has been successfully published in the *Official Journal of the Patent Office, Government of India* (Issue No. 03/2026, dated 16 January 2026). The invention, filed by **Dayananda Sagar University, Bengaluru**, presents an innovative workplace wellness monitoring system that combines an acoustic–thermal smart badge and a biometric desk-mat to capture physiological, environmental, and micro-movement data in real time. Designed with on-device processing and privacy-preserving features, the system enables passive and continuous wellness awareness without medical diagnosis or constant cloud connectivity. The patent was developed by **Dr. M. Lakshmanan, Prof. Sriramkumar R, Dr. Jayavrinda V. Vadakkeparambil, Dr. Joshuva Arockia Dhanraj, Dr. Godhandaraman T,**

and Dr. Mude Nagarjuna Naik, reflecting the institution's strong focus on impactful research and technological innovation.

पेटेंट कार्यालय
शासकीय जर्नल

OFFICIAL JOURNAL
OF
THE PATENT OFFICE

निर्गमन सं. 03/2026	शुक्रवार	दिनांक: 16/01/2026
ISSUE NO. 03/2026	FRIDAY	DATE: 16/01/2026

पेटेंट कार्यालय का एक प्रकाशन
PUBLICATION OF THE PATENT OFFICE

(12) PATENT APPLICATION PUBLICATION

(19) INDIA

(22) Date of filing of Application :26/12/2025

(21) Application No.202541131916 A

(43) Publication Date : 16/01/2026

(54) Title of the invention : System and Method for Dual-Site Multimodal Workplace Wellness Monitoring

(51) International classification	:A61B 5/00, A61B 5/01, A61B 5/0205, A61B 5/11, G06K 9/00	(71)**Name of Applicant :** **1)Dayananda Sagar University** Address of Applicant :Devarakaggalahalli, Harohalli, Kanakapura Road, Bengaluru South District – 562112, Karnataka, India. Karnataka India (72)**Name of Inventor :** **1)M Lakshmanan** **2)Sriramkumar R** **3)Jayavrinda V Vadakkeparambil** **4)Joshuva Arockia Dhanraj** **5)Godhandaraman T** **6)Mude Nagarjuna Naik**
(31) Priority Document No	:NA	
(32) Priority Date	:NA	
(33) Name of priority country	:NA	
(86) International Application No Filing Date	: :01/01/1900	
(87) International Publication No	: NA	
(61) Patent of Addition to Application Number Filing Date	:NA :NA	
(62) Divisional to Application Number Filing Date	:NA :NA	

(57) Abstract :

The invention discloses an adaptive dual-site multimodal workplace wellness monitoring system comprising an acoustic–thermal smart badge and a desk-mat biometric sensor module configured to cooperatively acquire physiological, acoustic, thermal, motion, micromovement, and environmental data during routine workplace activity. The smart badge captures upper-body and environmental parameters using a microphone array, non-contact thermal sensor, inertial measurement unit, and air-quality sensors, while the desk-mat captures wrist-level physiological and micro-movement signals using photo plethysmography, galvanic skin response, thermal contact sensing, and micro-movement detection. Distributed embedded microcontrollers perform local signal preprocessing, feature extraction, and timestamp synchronization, and an embedded multimodal fusion engine integrates heterogeneous sensor features without reliance on continuous cloud connectivity. A personalized rolling baseline learning engine computes statistical deviation using Z-score analysis or Mahalanobis distance to generate a non-diagnostic Wellness Deviation Index on a normalized scale. The system operates passively and in real time, preserves privacy through on-device computation, and supports workplace wellness awareness without medical diagnosis.

No. of Pages : 22 No. of Claims : 10

2.10 The research paper titled **"Nanosatellite and IoT-Enabled Climate–NDVI Data Fusion for Accurate Wheat Yield Prediction"**, authored by **Dr. M. Lakshmanan, Dr. R. Tamilamuthan, Dr. Vegi Fernando A, Prof. Sriramkumar R, Dr. Godhandaraman T, and Dr. Joshuva Arockia Dhanraj**, was presented at the **10th International Conference on Communication and Electronics Systems (ICCES-2025)** and subsequently published in the **IEEE conference proceedings on 21 January 2026**. The study proposes an integrated framework that combines nanosatellite communication, IoT-based field sensing, climate variables, and NDVI data to enhance the accuracy of wheat yield prediction. Advanced machine learning models, including LSTM, XGBoost, and regression techniques, were employed to capture temporal and environmental variations, achieving high predictive performance. This work contributes significantly to precision agriculture by enabling data-driven decision support for sustainable farming and improved food security across diverse agro-climatic regions.

Proceedings of the 10th International Conference on Communication and Electronics Systems (ICCES-2025)
IEEE XPlore Part Number: CFP25AWO-ART; ISBN: 979-8-3315-9756-6

Nanosatellite and IoT-Enabled Climate–NDVI Data Fusion for Accurate Wheat Yield Prediction

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2025 10th International Conference on Communication and Electronics Systems (ICCES) | 979-8-3315-9756-6/25/$31.00 ©2025 IEEE | DOI: 10.1109/ICCES67310.2025.11336986

***Abstract*— Accurate wheat yield prediction is essential for sustainable agriculture, food security, and resource optimization. Traditional estimation methods often fail to adapt to climatic variability and complex soil–crop interactions. This study proposes a nanosatellite- and IoT-enabled framework that fuses climatic variables, soil moisture, and NDVI data to improve prediction accuracy. Multi-source datasets from satellite imagery, IoT field sensors, and agricultural statistics were preprocessed and integrated in the MATLAB environment. Principal Component Analysis (PCA), Recursive Feature Elimination (RFE), and SHAP analysis were used to select dominant predictors. Linear Regression, XGBoost, and Long Short-Term Memory (LSTM) models were trained and evaluated using stratified cross-validation with R^2, RMSE, and MAE metrics. The LSTM model achieved the best performance ($R^2 = 0.91$), demonstrating strong capability to model temporal dependencies. Visualization dashboards and nanosatellite-based communication support real-time monitoring and scalable deployment. The proposed framework provides a reliable decision-support tool for precision agriculture across diverse agro-climatic zones, enabling timely interventions for sustainable wheat production.**

Keywords*— *Wheat Yield Prediction, IoT, Nanosatellite Communication, NDVI, Climate Data Fusion, LSTM, Precision Agriculture, Sustainable Computing.

I. Introduction

Ensuring accurate wheat yield prediction has become increasingly critical for global food security and sustainable agricultural management. Traditional estimation approaches, such as manual surveys and statistical trend models, often fail to capture the nonlinear interactions between climatic variability, soil characteristics, and crop growth, resulting in limited adaptability to dynamic farming environments [1], [2]. With rising climate uncertainties and growing resource constraints, reliable and timely forecasting systems are essential for farmers, agronomists, and policymakers to optimize planning and reduce risks.

Recent advancements in artificial intelligence (AI) and machine learning (ML) have significantly improved the capacity of predictive systems to handle complex, multi-source agricultural datasets [3], [4]. Techniques such as artificial neural networks, ensemble learning, and deep learning models have demonstrated promising results in modeling yield outcomes when combined with meteorological data, soil parameters, and vegetation indices [5], [6]. In parallel, the integration of remote sensing technologies has enhanced spatial and temporal monitoring capabilities. For instance, the Normalized Difference Vegetation Index (NDVI) derived from satellite imagery is widely recognized as a robust indicator of crop health and productivity [7]. Additionally, advances in IoT-enabled sensor networks and nanosatellite communication enable real-time data acquisition and reliable transmission, bridging gaps in conventional monitoring systems [8]. Several studies have highlighted the potential of multi-modal data fusion approaches that combine climate records, remote sensing imagery, and ground-based observations for yield forecasting [9], [10]. However, challenges remain in ensuring system scalability across diverse agro-climatic zones, improving communication reliability for real-time decision support, and enhancing the interpretability of AI models for domain experts.

This research addresses these gaps by proposing an integrated nanosatellite- and IoT-enabled communication framework for wheat yield prediction. By leveraging NDVI and climate data in combination with advanced ML techniques such as XGBoost and Long Short-Term Memory (LSTM) networks, the proposed framework aims to provide accurate, scalable, and actionable predictions that support sustainable precision agriculture. Unlike traditional yield prediction models that rely solely on either ground observations or remote sensing, our framework combines nanosatellite communication for data continuity, IoT-enabled sensing for in-situ validation, and NDVI-based vegetation monitoring. This integration addresses data gaps in real time and improves both spatial and temporal resolution, which is critical for accurate forecasting under climate variability.

II. Literature Review

Crop yield forecasting has evolved from traditional regression and statistical models to modern data-driven approaches powered by artificial intelligence (AI). Early

2.11 The book titled **“AI Ethics in Engineering: Human Values, Responsible Innovation, and Societal Impact”**, authored by **Prof. Sriramkumar R, Dr. Lakshmanan M, and Dr. Joshuva Arockia Dhanraj**, offers a timely and insightful exploration of ethical considerations in modern engineering and artificial intelligence. Published as a **Kindle Edition in January 2026**, the book examines how rapidly evolving AI technologies influence human values, professional responsibility, and societal well-being. It emphasizes the importance of responsible innovation by integrating ethical frameworks into engineering design, decision-making, and deployment practices. Written in a clear and accessible manner, the book serves as a valuable resource for students, educators, researchers, and professionals, highlighting the need for sustainable, human-centric, and ethically grounded technological development.

Read sample

AI Ethics in Engineering: Human Values, Responsible Innovation, and Societal Impact

Kindle Edition

by Sriramkumar R (Author), Lakshmanan M (Author), Joshuva Arockia Dhanraj (Author) | Format: Kindle Edition

Artificial Intelligence is rapidly transforming engineering practice, reshaping how systems are designed, decisions are made, and services are delivered. As intelligent technologies increasingly influence human lives, ethical responsibility has become an essential dimension of engineering education and professional practice.

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Reading age	Print length	Language
8 - 18 years	60 pages	English

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Product details

ASIN : B0GFGF83SZ
Language : English
File size : 1.0 MB
Screen Reader : Supported
Enhanced typesetting : Enabled
X-Ray : Not Enabled
Word Wise : Enabled
Print length : 60 pages

2.12 The research paper titled **"AI-Powered Portable Kit for Early Detection of Lung and Chest Diseases in Rural Areas"**, authored by **Prof. Sriramkumar R, Dr. Naga Subramanian G, R. Dr. Tamilamuthan, Dr. Suresh Kumar V, Dr. B. T. Geetha, and Dr. M. Lakshmanan**, was presented at the **6th International Conference on IoT Based Control Networks and Intelligent Systems (ICICNIS-2025)** and subsequently published in the **IEEE conference proceedings on 01 January 2026**. The work proposes an innovative AI-enabled portable diagnostic system for early detection of pulmonary diseases such as tuberculosis, pneumonia, COPD, and lung cancer, with a strong focus on rural and under-resourced regions. By integrating edge-based deep learning models, offline processing, and privacy-preserving mechanisms, the solution offers a low-cost, real-time diagnostic aid for community health workers. This publication highlights the authors' contribution to advancing healthcare accessibility through intelligent and socially impactful technological innovation.

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AI-Powered Portable Kit for Early Detection of Lung and Chest Diseases in Rural Areas

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***Abstract*— Achieving efficient diagnosis of pulmonary conditions in rural and forested areas is faced with a lot of challenges as the access to complex diagnostic facilities is limited. The paper presents a portable diagnostic system, which is AI-enabled, programmed to detect pulmonary pathology in real-time, offline and includes pulmonary tuberculosis (TB), pneumonia, chronic obstructive pulmonary disease (COPD), and lung carcinoma. The platform envisioned is inclusive of a low-cost digital imaging sensor, an edge-AI processing unit, and a mobile-app interface, thus being applicable to implement it in a local clinic and among community health workers. The base AI system is a hybrid Convolutional Neural Network (CNN) and Vision Transformer (ViT) system, and it is run on-the-edge with the use of compressed chest X-ray images or sensor feed. To enhance the interpretability of the model, a lightweight Grad-CAM visualization layer is added to help the non-specialists understand the outcome of the diagnosis. Local storage gives protection to data privacy and an optional blockchain-enabled record-management protocol (which switches on when network connectivity is detected). The use of field-level validation with a simulated dataset produced an average accuracy on classification of 93.7 per cent on a variety of diseases even when hardware conditions were tight. The system is designed to be low-powered, inexpensive and expandable in the rural health care systems. The current application highlights the potential of the combination of artificial intelligence and portable medical equipment to reduce the diagnostic inequalities in under-resourced populations.**

Keywords*— *AI in healthcare, portable diagnostic kit, lung disease detection, rural health, edge computing, deep learning, Vision Transformer.

I. Introduction

Tuberculosis (TB), pneumonia, chronic obstructive pulmonary disease (COPD), and lung cancer are causing a shocking rate of yearly deaths worldwide, making resulting respiratory and pulmonary disorders a significant public-health concern at the global scale. According to the reports drawn by the World Health Organization, most of these incidences occur in the developing nations where there is poor access to proper health care and diagnostic facilities. In India, as well as many other low-income settings, rural and tribal societies tend to utilize small health posts or mobile healthcare services that do not have such imaging modalities, lab-facilities, or even specialist doctors. In turn, diagnostic delays remain one of the major predictors of high case-fatality rates and lengthy treatment periods. More recently, researchers have sought to adopt the use of digital and intelligent technologies as one of the ways through which to strengthen the publichealth systems. Nivethitha et al. [1] have stressed the potential of data-driven tools and automation to transform the world of early disease detection and prevention because of their applicability in enhancing the decision-making process of community health workers. Similarly, Isangula and Haule [2] designed a cough-audio classifier, which specifically works in a rural environment, and can identify respiratory infections using voice samples, which proves that standalone diagnostic solutions can deliver functionality even in the conditions of limited connectivity. Alam and Enam [3] also established that the computation analysis and signal based methods have helped accelerate the respiratory diagnosis by reducing the dependency on the specialist interpretation.

2.13 A collaborative book chapter authored by faculty members of the Department of CSE (AI & ML), Dayananda Sagar University (DSU), and Dayananda Sagar Academy of Technology and Management (DSATM), Bengaluru, has been published by **Taylor & Francis / CRC Press,** a reputed international publisher. The publication reflects the strong research culture, academic excellence, and collaborative spirit of the institutions, contributing to advancements in the field of **Artificial Intelligence and Machine Learning.** The chapter appears in the book titled *Emerging Technologies in AI, Computation, Communication, and Cybersecurity* (**Chapter 12**), with the title ***"Comparative Analysis of Machine Learning Models for Lung Cancer Detection"*** (**DOI: 10.1201/9781003739791**). The work represents an **inter-campus collaborative research effort between DSU and DSATM,** along with contributions from other reputed institutions. The authors of the chapter include **Prof. Pradeep Kumar K and Mr. Chethan K Murthy, 8th Sem Student from DSU;** Dr. Salma Itagi (Sai Vidya Institute of Technology); Prof. Jeevaraj R (Global Academy of Technology); Dr. Mary Jasmine (CHRIST University); and **Prof. Nethra H L, Dr. C. Nandini, and Prof. Manasa Sandeep from DSATM.** This publication highlights strong inter-campus and inter-institutional research collaboration, enhancing interdisciplinary research, academic visibility, and the international research output of DSU and DSATM.

Artificial Intelligence, Computation, Communication and Network Security

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OF PARTICIPATION

This certificate is proudly presented to

Pradeep Kumar K., Chethan K Murthy., Salma Itagi., Jeevaraj R., Mary Jasmine., Nethra H L., C Nandini., Manasa Sandeep.

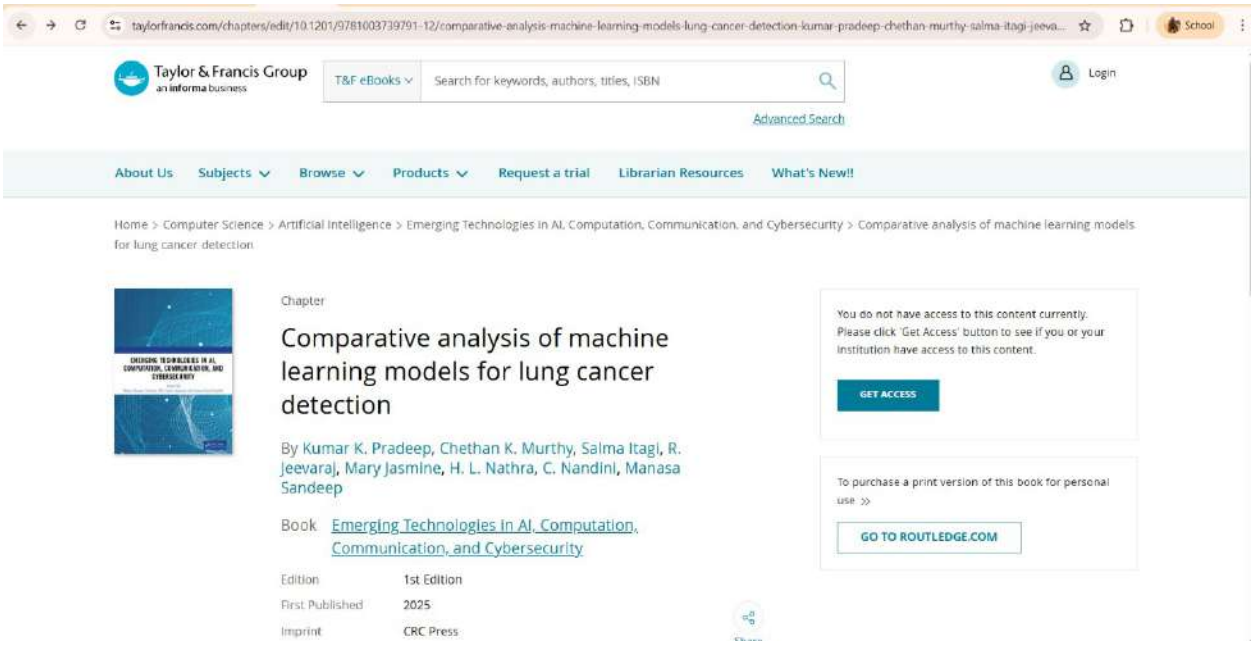
In recognition of outstanding contribution as presenter of the oral presentation entitled

Comparative Analysis of Machine Learning Models For Lung Cancer Detection

at the First International Conference on Artificial Intelligence, Computation, Communication and Network Security (AICCoNS 2025) held inthe University of Wollongong in Dubai, 5-6 June 2025.

Professor Mai El Baradei
School of Computer Science

Dr. Manoj Kumar
Editorial Chair, AICCoNS 2025, UOWD, UAE



3 Student Achievements

3.1 Mr. Shareng S (USN: **ENG23AM0275**), a **6th semester C Section student of CSE (AI & ML)**, along with his team members Barkath Nisha (ENG23CS0235), Chandana R (ENG23CS0537), and Abburi Manasa (ENG23CS0240), secured the **Second position** in the **VIVITSU Hackathon**, held at **Gokaraju Rangaraju Institute of Engineering and Technology (GRIET), Hyderabad**, on **30th and 31st January 2026**. The team was awarded a **cash prize of ₹5,000** in recognition of their innovative solution and technical excellence. This achievement highlights the students' problem-solving skills, teamwork, and the strong culture of innovation fostered within the CSE (AI & ML) program.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