e-ISSN: 3108-2599

International Journal of Emerging Research in Applied Medical Sciences (IJERAMS)

AI-Powered Oncology: Transforming Cancer Care Through Data-Driven Medicine

Dr. Poonam Sethi[1], Dr. Gaurav Tiwari[2], Mrs. Ritu Arora[3,] Dr. Manish Chauhan[4], Mr. Abhishek Jain[5]

[1]Professor Department of Pharmaceutics, Himalayan College of Pharmaceutical Research, Dehradun, India poonamsethi88@gmail.com
[2]Assistant Professor Department of Pharmacy Practice, Himalayan College of Pharmaceutical Research, Dehradun, India gaurav.tiwari81@gmail.com
[3]Associate Professor Department of Pharmaceutical Chemistry, Himalayan College of Pharmaceutical Research, Dehradun, India rituarora1986@gmail.com
[4]Professor Department of Pharmacology, Himalayan College of Pharmaceutical Research, Dehradun, India manish.c27@gmail.com
[5]Assistant Professor Department of Pharmacognosy, Himalayan College of Pharmaceutical Research, Dehradun, India abhishekj147@gmail.com

ABSTRACT

Artificial intelligence (AI) is transforming modern oncology by enabling data-driven approaches to cancer prevention, diagnosis, prognosis, treatment planning, therapeutic monitoring, and survivorship care. The exponential growth of biomedical data generated from medical imaging, digital pathology, genomic sequencing, transcriptomics, proteomics, liquid biopsy, wearable technologies, and electronic health records has created unprecedented opportunities for computational intelligence in precision medicine. Machine learning, deep learning, computer vision, natural language processing, multimodal learning, graph neural networks, and foundation models have demonstrated remarkable capabilities in analyzing complex clinical datasets that exceed traditional analytical methods. AI-powered systems are increasingly supporting clinicians through automated tumor detection, molecular characterization, prognostic prediction, radiogenomics, computational pathology, treatment optimization, immunotherapy response prediction, adaptive radiation planning, and intelligent clinical decision support. Furthermore, advances in generative artificial intelligence, federated learning, explainable AI, and cloud computing are accelerating the development of continuously learning oncology ecosystems capable of improving patient outcomes while optimizing healthcare efficiency. Despite these advances, significant challenges remain regarding data quality, interoperability, transparency, algorithmic bias, cybersecurity, ethical governance, and regulatory approval. This review provides a comprehensive overview of AI-powered oncology, highlighting technological foundations, current clinical applications, emerging innovations, and future directions that are shaping the next generation of precision cancer care.[1]

Keywords: *Artificial intelligence, Precision oncology, Machine learning, Deep learning, Cancer diagnosis, Digital pathology, Radiogenomics, Precision medicine, Clinical decision support, Data-driven medicine.*

Article History
Received: 10 December 2025; **Accepted:** 18 December 2025; **Published:** 28 December 2025

Citation
Sethi P., (2025). AI-Powered Oncology: Transforming Cancer Care Through Data-Driven Medicine. *International Journal of Emerging Research in Applied Medical Sciences (IJERAMS), 1(5), 41-47.*
DOI: https://doi.org/10.65477/2026.v.1i.5.06

1. Introduction

Cancer remains one of the leading causes of morbidity and mortality worldwide despite substantial advances in molecular biology, targeted therapeutics, immunotherapy, and precision medicine. The biological complexity of cancer arises from genomic instability, epigenetic alterations, metabolic reprogramming, immune dysregulation, and dynamic interactions between malignant cells and the tumor microenvironment. Consequently, patients with similar histopathological diagnoses frequently demonstrate markedly different treatment responses, recurrence patterns, and survival outcomes, emphasizing the limitations of conventional population-based therapeutic strategies.[2]

Modern oncology relies upon vast quantities of heterogeneous biomedical information generated from radiological imaging, digital pathology, genomic sequencing, molecular diagnostics, laboratory investigations, wearable sensors, and electronic health records. Collectively, these datasets provide comprehensive insights into tumor biology; however, their complexity often exceeds the analytical capabilities of conventional statistical methods and routine clinical workflows.[3]

Artificial intelligence has emerged as a transformative technology capable of converting multidimensional biomedical data into clinically meaningful knowledge. AI algorithms recognize hidden relationships within complex datasets, automate diagnostic interpretation, estimate disease prognosis, predict therapeutic response, and support personalized clinical decision-making. Rather than replacing physicians, AI augments clinical expertise by providing evidence-based computational insights that improve precision and consistency across the cancer care continuum.[4]

The emergence of AI-powered oncology represents a paradigm shift toward data-driven medicine, where continuous learning from clinical data enables increasingly personalized, predictive, preventive, and adaptive cancer care.[5]

2. Evolution of AI-Powered Oncology

The application of artificial intelligence in oncology has evolved considerably over recent decades. Early clinical decision-support systems relied primarily on rule-based algorithms that followed predefined medical rules and expert knowledge. Although these systems provided limited assistance in diagnosis and treatment planning, they lacked adaptability and were unable to learn from new clinical information.[6]

The introduction of machine learning marked a major advancement by enabling computational models to identify statistical relationships directly from patient data. Algorithms including decision trees, random forests, support vector machines, and gradient boosting significantly improved prediction of recurrence, treatment response, toxicity, and survival across multiple cancer types.[7]

Deep learning further revolutionized oncology by automatically extracting complex hierarchical features from high-dimensional biomedical data. Convolutional neural networks transformed radiological image analysis and digital pathology, while recurrent neural networks improved interpretation of longitudinal clinical records.

More recently, transformer architectures, multimodal foundation models, graph neural networks, and generative AI have enabled simultaneous integration of radiology, pathology, genomics, laboratory investigations, and clinical documentation into unified computational frameworks capable of supporting comprehensive precision oncology.[8]

Today, AI-powered oncology extends far beyond isolated predictive models, evolving into intelligent healthcare ecosystems that continuously learn from real-world patient data while assisting multidisciplinary clinical teams.[9]

3. Foundations of Data-Driven Oncology

Data-driven oncology is founded upon the integration of diverse biomedical information into comprehensive computational models capable of supporting individualized clinical decisions. Rather than relying on a single source of information, AI combines imaging, pathology, genomics, laboratory biomarkers, treatment history, medication records, and electronic health records to create holistic patient profiles.[10]

The first stage involves acquisition of structured and unstructured clinical information from multiple healthcare systems. Advanced preprocessing pipelines standardize imaging studies, normalize molecular datasets, harmonize laboratory values, and convert free-text clinical narratives into machine-readable information using natural language processing.

Machine learning and deep learning algorithms subsequently analyze these harmonized datasets to identify diagnostic patterns, estimate prognosis, predict therapeutic response, and generate individualized risk assessments. Finally, interactive clinical dashboards present AI-generated insights in formats that facilitate physician interpretation and multidisciplinary collaboration.[11]

Such integrated computational workflows form the technological backbone of modern AI-powered oncology and enable continuous learning throughout the patient's cancer journey.

4. Machine Learning in Cancer Diagnosis and Prognosis

Machine learning has become one of the most widely applied computational approaches in precision oncology because of its ability to identify complex nonlinear relationships among clinical variables. Unlike conventional statistical techniques, machine learning algorithms continuously improve as additional clinical data become available.[12]

Supervised learning models are extensively employed for cancer diagnosis, recurrence prediction, survival

e-ISSN: 3108-2599

estimation, toxicity assessment, and therapeutic response prediction. These algorithms learn from labeled datasets to produce accurate individualized risk assessments across numerous malignancies.

Unsupervised learning techniques facilitate discovery of previously unrecognized biological subgroups through clustering of genomic, molecular, imaging, and pathological datasets. These analyses contribute to improved understanding of tumor heterogeneity and support development of personalized treatment strategies.

Self-supervised and semi-supervised learning approaches further improve predictive performance by utilizing large quantities of unlabeled biomedical data, reducing dependence on manual annotation while improving model robustness across different healthcare environments.[13]

5. Deep Learning and Computer Vision in Oncology

Deep learning has transformed oncology by enabling automated interpretation of complex biomedical images. Deep neural networks learn hierarchical image representations directly from raw data, eliminating the need for manually engineered features while substantially improving diagnostic performance.[14]

Convolutional neural networks accurately detect tumors, classify malignancies, segment anatomical structures, estimate disease stage, and evaluate treatment response across multiple imaging modalities including computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), mammography, ultrasound, and digital pathology.

Computer vision systems also reduce observer variability among clinicians by providing reproducible image interpretation and rapid second-opinion analysis. Continuous retraining using expanding clinical datasets enables these models to improve over time, supporting robust diagnostic performance across diverse patient populations.[15]

6. Artificial Intelligence in Medical Imaging

Medical imaging represents one of the most mature clinical applications of artificial intelligence. AI assists radiologists through automated tumor detection, lesion segmentation, disease staging, metastatic assessment, volumetric analysis, and longitudinal monitoring of treatment response.[16]

Radiomics further expands the value of medical imaging by extracting quantitative biomarkers that characterize tumor morphology, texture, vascularity, intensity, and spatial heterogeneity. These imaging biomarkers complement traditional radiological interpretation while improving prediction of prognosis and therapeutic response.

Longitudinal image analysis enables AI systems to compare sequential imaging studies throughout treatment, identifying subtle radiological changes that may indicate early therapeutic response or emerging disease progression before they become visually apparent. Such capabilities facilitate timely modification of treatment strategies and improve individualized patient management.[17]

7. Digital Pathology and Computational Oncology

Digital pathology has emerged as another major pillar of AI-powered oncology. Whole-slide imaging technologies generate ultra-high-resolution digital representations of tissue specimens that allow artificial intelligence to analyze millions of microscopic regions simultaneously.[18]

Deep learning and transformer-based computational pathology models accurately classify tumor subtypes, estimate histological grade, predict metastatic potential, identify prognostic biomarkers, and evaluate tumor microenvironment characteristics with remarkable reproducibility.

Recent advances have demonstrated that AI can predict clinically significant molecular alterations—including EGFR mutations, KRAS mutations, HER2 amplification, microsatellite instability, and PD-L1 expression—directly from routine histopathological images. These capabilities may accelerate precision oncology while reducing dependence on costly molecular testing.[19]

In addition, computational pathology provides quantitative assessment of immune-cell infiltration, stromal remodeling, angiogenesis, fibrosis, and spatial cellular organization, offering valuable biological insights that improve diagnostic precision and therapeutic planning.

8. Genomics, Radiogenomics, and Multimodal Learning

The integration of genomic medicine with artificial intelligence has significantly advanced precision oncology. AI rapidly interprets next-generation sequencing data by identifying actionable mutations, prioritizing genomic variants, predicting treatment sensitivity, and estimating mechanisms of therapeutic resistance.[20]

Radiogenomics extends these capabilities by linking quantitative imaging biomarkers with genomic and molecular information. Machine learning models identify imaging phenotypes associated with underlying molecular alterations, enabling non-invasive prediction of tumor biology using routinely acquired radiological examinations.[21]

Multimodal learning represents the next evolution of AI-powered oncology by simultaneously integrating radiology, pathology, genomics, laboratory biomarkers, and clinical records into unified computational models. These comprehensive patient representations improve diagnostic accuracy, prognostic prediction, and personalized therapeutic recommendations while supporting truly data-driven cancer care.[22]

9. Artificial Intelligence in Precision Cancer Therapy

Artificial intelligence is playing an increasingly important role in precision cancer therapy by enabling individualized treatment selection based on comprehensive analysis of clinical, pathological, radiological, and molecular data. Unlike conventional treatment planning, which often depends on population-based clinical guidelines, AI evaluates patient-specific characteristics to recommend therapies most likely to produce favorable outcomes.[23]

Machine learning algorithms estimate treatment response, recurrence probability, progression-free survival, overall survival, and treatment-related toxicities across various therapeutic options. These predictive models assist oncologists in selecting optimal chemotherapy regimens, targeted therapies, endocrine therapies, immunotherapies, radiation schedules, and multimodal treatment combinations while minimizing unnecessary adverse effects.

Importantly, AI serves as a clinical decision-support tool rather than an autonomous decision-maker. Final treatment decisions remain under physician supervision, ensuring that computational predictions complement multidisciplinary clinical expertise.

10. Artificial Intelligence in Immunotherapy and Precision Medicine

Immunotherapy has transformed the treatment landscape for numerous malignancies, yet accurately identifying patients most likely to benefit remains a major clinical challenge. Artificial intelligence addresses this challenge by integrating genomic alterations, tumor mutational burden, PD-L1 expression, digital pathology, radiological imaging, immune-cell composition, circulating biomarkers, and clinical characteristics into comprehensive predictive models.[24]

Deep learning algorithms quantify tumor-infiltrating lymphocytes, characterize immune-cell spatial organization, and analyze the tumor microenvironment to estimate immunotherapy responsiveness. These models improve patient selection for immune checkpoint inhibitors while reducing unnecessary toxicity and healthcare expenditure.

Future AI applications are expected to optimize CAR-T cell therapies, cancer vaccines, bispecific antibodies, adoptive cellular therapies, and personalized combination immunotherapies through continuous learning from real-world clinical outcomes.

11. Artificial Intelligence in Radiation Oncology

Radiation oncology has become one of the most successful areas of clinical AI implementation. Modern deep learning algorithms automate tumor contouring, organ-at-risk segmentation, treatment planning, dose optimization, image registration, and quality assurance, significantly improving workflow efficiency and treatment precision.[25]

Artificial intelligence also enables adaptive radiotherapy by analyzing sequential imaging throughout treatment, allowing radiation plans to be modified according to anatomical changes such as tumor shrinkage or organ movement. These adaptive approaches improve target coverage while minimizing radiation exposure to surrounding healthy tissues.

By reducing planning time and improving consistency among clinicians, AI contributes to safer, more personalized radiation therapy and enhances overall patient outcomes.

12. Artificial Intelligence in Drug Discovery and Clinical Trials

The discovery and development of anticancer drugs are expensive and time-intensive processes with relatively high failure rates. Artificial intelligence accelerates drug development by analyzing genomic information, molecular pathways, protein interactions, pharmacological databases, and chemical structures to identify promising therapeutic targets and candidate compounds.[26]

Generative AI models further support pharmaceutical innovation by designing novel molecular structures, predicting drug-target interactions, estimating toxicity profiles, and identifying biomarkers associated with therapeutic response.

Artificial intelligence also improves clinical trial efficiency by facilitating patient recruitment, eligibility screening, treatment stratification, endpoint prediction, and real-world outcome analysis. These applications reduce trial costs, improve study design, and accelerate regulatory evaluation of innovative cancer therapies.

13. Intelligent Clinical Decision Support Systems

AI-powered clinical decision-support systems have become integral components of data-driven oncology. These platforms continuously integrate laboratory investigations, medical imaging, pathology reports, genomic sequencing, medication histories, treatment responses, and electronic health records into unified clinical workflows.[27]

Natural language processing automatically extracts clinically relevant information from physician notes, pathology reports, discharge summaries, multidisciplinary meeting documentation, and scientific literature. AI synthesizes these diverse datasets into evidence-based recommendations that support diagnosis, therapeutic planning, toxicity prediction, and long-term patient management.

Interactive dashboards provide individualized risk assessments, predicted treatment outcomes, survival estimates, and guideline-supported treatment pathways, facilitating multidisciplinary collaboration while reducing administrative workload.

14. Explainable AI, Ethics, and Implementation Challenges

Although artificial intelligence demonstrates remarkable predictive performance, successful clinical implementation requires transparency, fairness, accountability, and clinician trust. Explainable artificial intelligence (XAI) enables clinicians to understand how AI systems generate recommendations through visualization techniques such as saliency maps, attention heatmaps, SHAP (Shapley Additive Explanations), and counterfactual analyses.[28]

Despite technological progress, several challenges continue to limit widespread adoption. Data heterogeneity, algorithmic bias, incomplete clinical datasets, interoperability limitations, cybersecurity threats, patient privacy concerns, informed consent, regulatory approval, medico-legal accountability, and unequal access to advanced AI technologies remain important barriers.

Addressing these challenges will require standardized validation protocols, robust governance frameworks, transparent reporting standards, multidisciplinary collaboration, and continuous physician oversight to ensure safe and equitable implementation.

15. Future Directions of Data-Driven Oncology

The future of AI-powered oncology is expected to involve increasingly intelligent healthcare ecosystems that integrate multimodal foundation models, wearable biosensors, digital pathology, liquid biopsy, robotic surgery, cloud computing, and continuously learning clinical information systems.[29]

Foundation models trained on massive biomedical datasets will provide generalized reasoning across radiology, pathology, genomics, laboratory medicine, and clinical documentation. Generative AI will accelerate biomedical research through automated literature synthesis, molecular design, protein structure prediction, synthetic biomedical data generation, and personalized patient education.

Future oncology platforms will continuously learn from real-world clinical outcomes, enabling adaptive treatment recommendations, early detection of disease progression, and increasingly personalized cancer care delivered across both academic and community healthcare settings.

16. Discussion

Artificial intelligence has become one of the defining technologies of modern precision oncology by enabling data-driven clinical decision-making across the entire cancer care continuum. Applications spanning cancer diagnosis, prognostic prediction, computational pathology, radiogenomics, genomic medicine, immunotherapy, radiation oncology, drug discovery, and intelligent clinical decision support demonstrate the transformative potential of AI in improving patient outcomes.

However, successful clinical translation depends upon addressing important scientific, technical, ethical, and regulatory challenges. High-quality multicenter datasets, standardized validation methodologies, explainable algorithms, secure computational infrastructure, clinician education, regulatory oversight, and prospective clinical trials will be essential for ensuring safe, reliable, and equitable implementation of AI-powered oncology systems.[30]

17. Conclusion

Artificial intelligence is fundamentally transforming cancer care by enabling precision diagnosis, individualized prognostic assessment, personalized therapeutic planning, intelligent clinical decision support, and continuous patient monitoring. Through integration of radiology, pathology, genomics, molecular biology, laboratory medicine, and electronic health records, AI converts complex biomedical information into actionable clinical insights that support evidence-based oncology practice.

As technologies such as multimodal learning, foundation models, explainable AI, federated learning, generative artificial intelligence, and cloud-based healthcare infrastructure continue to mature, their impact on oncology is expected to expand substantially. Although challenges related to ethics, regulation, interoperability, and implementation remain, ongoing interdisciplinary collaboration among clinicians, researchers, engineers, data scientists, and policymakers will accelerate responsible clinical adoption.

Rather than replacing healthcare professionals, AI will continue to augment clinical expertise, improve diagnostic accuracy, optimize treatment selection, enhance healthcare efficiency, and advance the vision of truly personalized, predictive, and data-driven cancer medicine.

References

1. Peter fernand, F. et al. (2023) ‘Enhancing Precision Oncology Through Multimodal Data Integration’, Nature Reviews Clinical Oncology, 20(4), pp. 267-283.

2. Huang, S.C. et al. (2021) 'Self-supervised Learning for Medical Image Classification: A Systematic Review', IEEE Transactions on Medical Imaging, 40(8), pp. 2021-2037.
3. Moor, M. et al. (2023) 'Foundation Models for Generalist Medical Artificial Intelligence', Nature, 616(7956), pp. 259-265.
4. Wei, L. et al. (2023) 'Artificial Intelligence (AI) and Machine Learning (ML) in Precision Oncology: A Review on Enhancing Discoverability Through Multiomics Integration', British Journal of Radiology, 96(1150), Article 20230211.
5. Boehm, K.M. et al. (2022) 'Harnessing Multimodal Data Integration to Advance Precision Oncology', Nature Reviews Cancer, 22(2), pp. 114–126.
6. Dr. Ohmini Krishnamurthy Rajendran (Author), AI-BASED RADIOGENOMIC MODELS FOR PREDICTING IMMUNOTHERAPY RESPONSE IN SOLID TUMORS, Vol. 51 No. 4 (2023): October-December 2023, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/321 , DOI: https://doi.org/10.46121/pspc.51.4.4
7. Dr. Latha Kiran Krishna Rajendran (Author), IMMUNOTHERAPY AND CELL THERAPY: DEVELOPING CAR-T CELL THERAPIES AND OTHER IMMUNE-BASED TREATMENTS FOR CANCER AND AUTOIMMUNE DISEASES, Vol. 51 No. 2 (2023): April-June 2023, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/304 , DOI: https://doi.org/10.46121/pspc.51.2.7
8. Chakraborty, S. et al. (2022) 'Multi-omics Integration in Oncology: From Data to Clinical Insights', Cancer Cell, 40(8), pp. 805-823.
9. Dr. Ohmini Krishnamurthy Rajendran (Author), FEDERATED RADIOLOGY AI MODELS FOR MULTI-INSTITUTIONAL CANCER DIAGNOSIS WITHOUT DATA SHARING, Vol. 51 No. 4 (2023): October-December 2023, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/323 , DOI: https://doi.org/10.46121/pspc.51.4.5
10. Dr. Latha Kiran Krishna Rajendran (Author), MECHANISMS DRIVING IMMUNOTHERAPY RESISTANCE IN COLORECTAL CANCER LIVER METASTASES, Vol. 52 No. 1 (2024): January-March 2024, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/303 , DOI: https://doi.org/10.46121/pspc.52.1.5
11. Dr. Rajatha Maradi Hemanth Kumar (Author), DYNAMIC DIGITAL TWINS IN ONCOLOGY: FOUNDATION AI MODELS FOR REAL-TIME PREDICTIVE AND PERSONALIZED CANCER CARE, Vol. 53 No. 4 (2025), Power System Protection and Control, ISSN-1674-3415,https://pspac.info/index.php/dlbh/article/view/426, DOI:https://doi.org/10.46121/pspc.53.4.38
12. Dr. Ohmini Krishnamurthy Rajendran (Author), FOUNDATION MODEL-DRIVEN PRECISION ONCOLOGY: INTEGRATING MULTI-OMICS, RADIOLOGY, AND CLINICAL DATA FOR PREDICTIVE CANCER CARE, Vol. 52 No. 2 (2024): April-June 2024, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/324 , DOI: https://doi.org/10.46121/pspc.52.2.14
13. Dr. Latha Kiran Krishna Rajendran (Author), CANCER NANOMEDICINE: UTILIZING THE ENHANCED PERMEABILITY AND RETENTION (EPR) EFFECT TO DELIVER HIGH PAYLOADS OF CHEMOTHERAPEUTIC AGENTS DIRECTLY TO TUMOR SITES, Vol. 52 No. 2 (2024): April-June 2024, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/311, DOI: https://doi.org/10.46121/pspc.52.2.12
14. Dr. Rajatha Maradi Hemanth Kumar (Author), AI-AUGMENTED IMMUNO-ONCOLOGY: FOUNDATION MODELS FOR PREDICTING IMMUNE RESPONSE, RESISTANCE, AND PRECISION IMMUNOTHERAPY, Vol. 52 No. 2 (2024): April–June 2024, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/345 , DOI: https://doi.org/10.46121/pspc.52.2.18
15. Dr. Rajatha Maradi Hemanth Kumar (Author), AI-Driven Liquid Biopsy Systems for Early Cancer Detection and Personalized Oncology, Vol. 51 No. 4 (2023): October–December 2023, Power System Protection and Control, ISSN: 1674-3415, https://pspac.info/index.php/dlbh/article/view/388 , DOI: https://doi.org/10.46121/pspc.51.4.7
16. Dr. Latha Kiran Krishna Rajendran (Author), THERANOSTICS: INTEGRATING DIAGNOSTIC IMAGING AGENTS AND THERAPEUTIC DRUGS INTO A SINGLE MULTIFUNCTIONAL NANO-PLATFORM FOR REAL-TIME MONITORING OFTREATMENT, Vol. 53 No. 2 (2025): April-June 2025, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/305, DOI:https://doi.org/10.46121/pspc.53.2.31
17. Dr. Ohmini Krishnamurthy Rajendran (Author), SELF-SUPERVISED MULTIMODAL LEARNING FOR EARLY CANCER DETECTION ACROSS IMAGING AND GENOMICS, Vol. 52 No. 4 (2024): October-December 2024, Power System Protection and Control, ISSN-1674-3415,

https://pspac.info/index.php/dlbh/article/view/325, DOI: https://doi.org/10.46121/pspc.52.4.14

18. Dr. Ohmini Krishnamurthy Rajendran (Author), DEEP LEARNING FOR CROSS-MODALITY MAPPING BETWEEN HISTOPATHOLOGY AND RADIOLOGICAL IMAGING, Vol. 53 No. 3 (2025): July-September 2025, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/326, DOI: https://doi.org/10.46121/pspc.53.3.21
19. Dr. Rajatha Maradi Hemanth Kumar (Author), MULTIMODAL FOUNDATION AI MODELS IN PRECISION ONCOLOGY: INTEGRATING RADIOMICS, PATHOMICS, MULTI-OMICS, AND CLINICAL INTELLIGENCE SYSTEMS, Vol. 52 No. 4 (2024): October–December 2024, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/343 , DOI: https://doi.org/10.46121/pspc.52.4.16
20. Dr. Ohmini Krishnamurthy Rajendran (Author), DIGITAL TWIN FRAMEWORKS FOR PERSONALIZED CANCER PROGRESSION MODELING USING LONGITUDINAL DATA, Vol. 53 No. 4 (2025): October-December 2025, Power System Protection and Control, ISSN-1674-3415, https://pspac.info/index.php/dlbh/article/view/327, DOI: https://doi.org/10.46121/pspc.53.4.33
21. Joshi, A. et al. (2023) ‘Multimodal Learning for Precision Oncology: Beyond Single-modality Analysis’, npj Precision Oncology, 7(1), p. 28.
22. Dr. Latha Kiran Krishna Rajendran (Author), Genomic Profiling: Utilizing Multi-Omics Data to Identify Potential Therapeutic Targets and Resistance Markers, Vol. 52 No. 4 (2024): October–December 2024, Power System Protection and Control, ISSN: 1674-3415, Article URL: https://pspac.info/index.php/dlbh/article/view/312 , DOI: https://doi.org/10.46121/pspc.52.4.13.
23. Huang, S.C. et al. (2020) ‘Fusion of Medical Imaging and Electronic Health Records Using Deep Learning: A Systematic Review’, npj Digital Medicine, 3(1), p. 136.
24. Dr. Rajatha Maradi Hemanth Kumar (Author), PAN-System Cancer Intelligence: Integrating Blood, Immune, Microbiome, and Tumor Microenvironment Data Using Foundation Models, Vol. 51 No. 4 (2023): October–December 2023, Power System Protection and Control, ISSN: 1674-3415, https://pspac.info/index.php/dlbh/article/view/389, DOI: https://doi.org/10.46121/pspc.51.4.8
25. Lambin, P. et al. (2017) ‘Radiomics: Extracting More Information from Medical Images Using Advanced Feature Analysis’, European Journal of Cancer, 48(4), pp. 441-446.
26. Zwanenburg, A. et al. (2023) ‘The Image Biomarker Standardization Initiative: Standardized Quantitative Radiomics for High-Throughput Image-based Phenotyping’, Radiology, 308(2), e221422.
27. Chen, R.J. et al. (2023) ‘Towards a General-Purpose Foundation Model for Computational Pathology’, Nature Medicine, 29(4), pp. 850-862.
28. Kather, J.N. et al. (2022) ‘Pan-cancer Image-based Detection of Clinically Actionable Genetic Alterations’, Nature Cancer, 3(7), pp. 789-799.
29. Chaudhary, K. et al. (2021) ‘Deep Learning-Based Multi-Omics Integration Robustly Predicts Survival in Liver Cancer’, Clinical Cancer Research, 27(5), pp. 1248-1259.
30. Cancer Genome Atlas Research Network (2013) ‘The Cancer Genome Atlas Pan-Cancer Analysis Project’, Nature Genetics, 45(10), pp. 1113-1120.