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RESEARCH ARTICLE

Revealing AI Innovations in Medicine A Latent Dirichlet Allocation Approach

Amelia[1], Olivia Ava[2]

[1] Edge Hill University

[2] Edinburgh Napier University

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***Corresponding Author:**
Olivia67@gmail.com

ABSTRACT

Healthcare institutions have been revolutionized by artificial intelligence (AI) because it enables diagnostic imaging and personalized pharmaceuticals and medicine creation alongside predictive analytics. Medical researchers face challenges understanding vast medical research databases that hinder their ability to discover new research trends and breakthroughs. This research studies the application of Latent Dirichlet Allocation (LDA) for powerful topic modelling which reveals underlying patterns in AI-driven medical research data. Applying LDA across a substantial healthcare research database reveals important themes alongside emerging topics and knowledge deficiencies within the medical &field. Our research demonstrates that LDA enables researchers to locate the leading AI healthcare technologies which directs ongoing research projects and influences clinical application development. This work shows that LDA provides a valuable tool which strengthens healthcare research through better decision-making and speeds up AI medicine developments.

I. INTRODUCTION

The fast-paced advancement of artificial intelligence (AI) continues to transform numerous industries notably healthcare through this healthcare revolution. AI technologies demonstrate outstanding capabilities for resolving complex healthcare problems through disease recognition as well as optimizing medical treatment design. The combination of machine learning (ML), deep learning (DL) and natural language processing (NLP) and data analytics brings new possibilities to healthcare which boost diagnosis speed and accuracy and deliver personalized treatments and

forecast disease spread [1]. AI development receives increasing acceptance from the healthcare industry to deliver better patient results as well as optimize operational efficiency while decreasing expenses. The tremendous amount of medical AI research creates a knowledge overload which hinders researchers along with clinicians and healthcare professionals from keeping abreast of current developments and breakthroughs in this field. The rapid development of healthcare AI research has led to massive literatures that create practical challenges for researchers who need to study the extensive documentation [2].

The steady increase in medical AI publications each year has generated massive diverse datasets to such an extent that extracting significant findings and tracking shifting trends from these massive data sets has become laborious. The expanding medical AI and healthcare technology field proves too exhaustive for researchers to follow new findings thus restraining their ability to make advancements in these domains. Topic modelling demonstrates its capability to organize text-based data sets thanks to emerging innovations that help researchers find research gaps and detect new developments and scientific trends [3].

Latent Dirichlet Allocation (LDA) represents a frequently applied topic modelling technique which uses probability calculations to identify hidden topics among document collections. Procurement managers can identify fundamental themes through LDA while processing extensive textual information thus making it a critical tool for analyzing complex healthcare industry research areas that utilize AI applications [4]. Through its approach to group together terms and phrases LDA reveals the essential topics that appear within a particular dataset. The method helps researchers identify major topics within a specific field together with evaluations of ongoing research and detection of vacant areas requiring additional research.

The potential of LDA in healthcare lies in discovering both dominant AI technologies and developing trends and innovative fields which generates intelligent data which benefits clinical operations alongside research projects [5]. The research investigates LDA deployment for healthcare documents with a special emphasis on AI-based technological advancements. This analysis explores LDA's capability for discovering hidden medical data patterns at the same time it investigates AI's transformative effects on diagnostic services and personalized medicine applications and drug development along with medical image technologies and healthcare treatment approaches [6].

This work demonstrates LDA's power to discover useful knowledge which also guides research advances and identifies medical AI teaming possibilities with healthcare workers. The medical field utilizes broad-ranging artificial intelligence applications to achieve dramatic clinical performance improvements. The most remarkable medical applications using diagnostics tools powered by AI rely on machine learning to examine medical images, genetic signatures and patient information. Advanced diagnostic tools built by these systems identify diseases including cancer, diabetes and heart disease before standard diagnostic procedures allowing for early treatment for better patient outcomes. The development of AI-enabled personalized medicine matches medical treatments

specifically to individual patient genetic profiles and medical backgrounds to enhance both care quality and operational efficiency.

The drug discovery process stands to benefit from AI because this technology can forecast which drug components work best while optimizing trial strategies [7]. AI-based algorithms now appear inside wearable devices and health applications which monitor patients in real-time enabling dynamic adjustments to treatment protocols. Research growth on AI applications in healthcare creates challenges for extracting valuable information to implement solutions successfully. Easy access to organized research allows better detection of innovative trends while enabling scientists to pinpoint specific investigation needs [8].

LDA serves as a valuable solution at this point. LDA processing a substantial medical literature collection allows researchers to observe AI healthcare applications while identifying essential themes and pointing out essential research directions for future development. The knowledge assistances from LDA enable healthcare professionals to stay current with AI research discoveries and deploy advanced tools for better patient results. LDA technologies demonstrate the capability to connect the knowledge systems between medical practitioners and AI research teams [9]. The cross-domain communication among healthcare experts and technology developers and scientific researchers becomes possible through LDA which discovers central topics among medical documents and artificial intelligence research approaches. The combined efforts result in creating AI solutions which hold both scientific strength through evidence and clinical value by meeting medical requirements [9].

The research objective explores how Latent Dirichlet Allocation (LDA) functionally discovers new medical AI developments. Healthcare literature analysis enables us to discover the critical themes characterizing the AI and medical field intersection. The ultimate goal of this research establishes methods that will guide upcoming advancements in AI-driven healthcare technologies while sparking inter-disciplinary partnerships to enhance clinical care delivery around the world.

I. Research Findings

A. Latent Dirichlet Allocation (LDA) Explained

The statistical model Latent Dirichlet Allocation (LDA) extracts hidden topic structures from text collections which find broad applications in text analysis. Natural documents with extensive sizes such as academic papers and clinical reports and healthcare literature benefit from LDA analysis to generate hidden thematic patterns that normally stay undetected. imitate adopts a central model where each text in the data comprises various topics which occur through word probability distributions. With its ability to assign probabilities to topics LDA provides researchers with the capability to discover hidden patterns in extensive datasets while simplifying the investigation of hard-to-identify central themes [8]. The analysis through LDA reveals emerging patterns by enabling medical research to detect patterns such as AI diagnostic applications and individualized medications.

i. Applying LDA to AI-Driven Medical Research

The application of LDA offers great value to AI-driven medical research because it transforms intricate unorganized datasets into manageable information. Research using LDA on healthcare literature reveals lasting trends and dominant themes to identify the key gaps in the adoption of Artificial Intelligence throughout different medical disciplines. The LDA algorithm reveals which AI technologies receive the most research interest when applied to diagnostics while also examining treatment optimization and patient care systems. The analysis generated by Latent Dirichlet Allocation assists researchers in locating underserved research areas which serve as navigation points for future studies regarding AI healthcare applications. LDA processes large textual data collections to reveal combinations between medical practices and artificial intelligence breakthroughs enabling medical experts to track evolving advanced medical technology [10].

a. AI Innovations in Healthcare: An Overview:

Healthcare facilities, especially hospitals, run 24/7, which demands high energy for heating, cooling, and running complex medical equipment. According to the World Health Organization, the healthcare sector is responsible for about 4.4% of the global GHG emissions. The U.S. healthcare system alone accounts for nearly 8.5% of the country's total emissions.

ii. AI in Diagnostics and Imaging

Healthcare now experiences an absolute revolution through the convergence of AI systems in diagnostic analysis and imaging applications. The subset of machine learning known as deep learning models effectively interprets medical images at levels of accuracy not previously possible. Through automated analysis these algorithms perform faster and more precisely than human medical professionals in identifying radiological abnormalities in scans [7]. AI diagnostic instruments assist healthcare by lowering human mistakes while developing more efficient processes and speeding up disease discovery particularly for cancer alongside cardiovascular problems and neurological abnormalities. Machine learning diagnostic tools help enhance accuracy and enable faster intervention and customized treatment approaches that generate better care results for patients. Through LDA analyses researchers can determine major advances in AI imaging innovations while identifying unmet needs for future study in existing operational methods.

a. Personalized Medicine and AI

Medical treatments now advance through the transformative principles of personalized medicine which adapts care approaches according to the unique genetic makeup and life history of individual patients. The ability of artificial intelligence to process extensive patient records helps discover treatment patterns which enable doctors to generate personalized healthcare plans. AI algorithms evaluate treatment effectiveness through modelling before identifying disease genetic markers while recommending life style choices that enhance patient wellness [4]. Researchers who analyze personalized medicine research with LDA discover how different artificial intelligence techniques are applied and what patient care domains benefit from these techniques and which new medical treatment approaches develop. The LDA method enables researchers to pinpoint both active AI genomic growth segments and hidden possibilities that represent novel innovation opportunities.

b. AI in Drug Discovery and Development:

AI is rapidly transforming the pharmaceutical industry, particularly in drug discovery and development. Machine learning algorithms are used to predict molecular interactions, optimize the design of new drug compounds, and identify potential candidates for clinical trials. This use of AI

significantly reduces the time and cost associated with drug development, which traditionally involves extensive trial and error. Furthermore, AI can help identify biomarkers for diseases, enabling earlier diagnosis and more targeted treatments. By applying LDA to this field, we can uncover the most prominent trends in AI-driven drug discovery, such as the use of neural networks for predicting drug efficacy or the application of AI in optimizing clinical trial designs. LDA can also highlight gaps in drug development, such as areas where AI models are not yet fully integrated or where the efficacy of AI predictions is still under debate [11].

c. Uncovering Hidden Trends in AI Medical Research Using LDA

Latent Dirichlet Allocation provides healthcare researchers a modern algorithm to detect concealed structures and thematic relationships within extensive literature collections. Through analyses of thousands of research papers as well as clinical trial reports and medical journals LDA detects persistent subjects and new patterns in AI-driven healthcare practice. Topic modelling functions as an important analytical method that helps researchers study massive documents to detect recurring information patterns related to diagnostics and treatment plans and patient outcomes. When researchers combine LDA their studies resist information overload while categorizing complex data sources to highlight AI medicine developments more clearly [12].

iii. Emerging AI Trends Revealed by LDA

The analysis using Latent Dirichlet Allocation enables researchers to identify emerging trends within AI medical research through discoveries of novel predictive analytics technologies as well as AI-assisted surgery systems and virtual health assistant implementations. Studies using LDA deliver guidance to scientists alongside healthcare professionals about upcoming trends in AI together with predictions of what innovative technologies will lead advancement. Through LDA researchers can identify developing fields including mental healthcare applications of artificial intelligence and AI integration into patient education programs [5]. The research data provides guidance to scientists and healthcare professionals by identifying potential development priorities.

B. Integrating LDA into Healthcare Research Strategies

The visual analysis generated by LDA delivers important findings which guide researchers to select and prioritize essential domains related to artificial intelligence applications in healthcare delivery. Researchers can achieve better research alignment through LDA which discovers prominent fields of study within large research paper datasets to help researchers focus on important expanding trends. The strategic targeting system optimizes resource allocations by directing investigations toward fields which show the highest potential for innovation. Healthcare professionals through AI-driven insights together with researchers can enhance their contributions to medical AI technology advancements [13].

i. Improving Collaboration and Cross-Disciplinary Insights

The Lesk Discipline Architecture (LDA) acts as a key mechanism to establish cooperation between researchers along with healthcare professionals and data scientists. Through the detection of mutual interests and major themes LDA serves as a connection mechanism for medical science to partner with AI theorists and clinical software developers. Research initiatives between multiple disciplines generate science-based AI tools designed for practical medical settings which lead to improved patient and clinical staff welfare.

ii. Future Outlook: AI and LDA in Shaping Healthcare

a. Advancements in AI and Future Healthcare Applications:

Medical experts anticipate substantial evolution of healthcare AI technologies during the upcoming years in precision diagnostics alongside robotic surgery and predictive analytics. The tracking of healthcare AI advancements requires LDA to analyze research developments occurring in artificial intelligence healthcare systems. LDA uses emerging technological patterns to identify future medical AI innovations which will influence patient healthcare allowing providers to explore coming medical AI developments. The analysis of present marketplace dynamics through LDA enables accurate predictions for AI applications that will settle as industry standards while identifying obstacles to general adoption [14].

b. The Role of LDA in Bridging the Gap Between AI and Clinical Practices:

The application of AI technologies lags behind their research achievements as clinical practitioners continue to develop their utilization. The Large Deviations Analysis system joins research and practice by evaluating whether existing AI tools are ready for medical application or need additional development. The examination of healthcare literature through LDA detects practical ways AI research papers turn into operational applications that follow professional healthcare requirements. AI technologies will become directly usable at clinics as clinicians receive seamless access through such advances which enhance the delivery of healthcare and patient treatment [15].

c. Unleashing the Full Potential of AI in Healthcare:

Through Latent Dirichlet Allocation (LDA) healthcare providers can harness meaningful potential to advance AI-powered innovations in their field. Clinical literature analysis through LDA methods helps researchers find hidden systematics in addition to identifying AI application trends and knowledge gaps within healthcare datasets [16]. LDA will be indispensable for the healthcare sector's AI technological adoption while guiding research advancement and creating better interdisciplinary connections and improved treatment results. The ongoing evolution of AI and healthcare research will benefit from LDA which reveals important findings to help AI innovations maximize their potential in transforming healthcare for future success.

iii. Leveraging LDA for Global Healthcare Advancements

Through artificial intelligence (AI) healthcare professionals worldwide now diagnose and treat diseases with improved methods for disease management. The distribution of AI technology integration within healthcare operates unevenly throughout multiple global healthcare systems. Healthcare infrastructure together with economic status technological readiness and cultural acceptance influence the methods by which medical institutions apply AI principles in their clinical work. The machine learning approach Latent Dirichlet Allocation (LDA) enables topic modelling to discover new healthcare industry developments while detecting medical field difficulties and innovative practices worldwide. Through an analysis of worldwide health databases combined with healthcare policies and AI research materials LDA generates crucial insights regarding AI technology implementation across countries to improve healthcare results and service delivery [17].

C. LDA in Global Health Policy Research

Health policies in the world experience continuous change because each country deals with distinctive medical difficulties which span from infectious diseases through non-communicable diseases encompassing cardiovascular diseases and diabetes. LDA represents a strong analytical method which helps policymakers scan lengthy healthcare policy documents together with international reports and research studies to identify severe healthcare issues. Through global health challenge identification and AI for healthcare innovation classification LDA assists policymakers to direct their actions toward strategies showing the most results [5].

i. Identifying Global Health Challenges

Through LDA researchers can discover shared medical difficulties present across diverse nations. Evidence identification by LDA reveals important themes from health reports worldwide when monitoring infectious diseases including malaria and tuberculosis and analyzing the growing health issues in aging populations. The analysis of term frequencies and thematic elements in these documents enables LDA to deliver strategic health intelligence that guides policymakers toward better funding decisions along with research direction setting and intervention development [18].

a. Tracking Global Innovations in Healthcare Technology

Through LDA researchers can follow the advancements of healthcare technology including artificial intelligence solutions and machine learning programs. The assessment of academic research with clinical trial data along with technological progress enables LDA to discover current AI developments which affect health systems globally. Through LDA analysts can spotlight the creation of AI-driven diagnostic instruments together with predictive models for outbreak detection and AI-enhanced customized medical solutions. Healthcare organizations alongside governments need vital information to determine resource allocation and establish international cooperation for modernizing healthcare technology [19].

b. Supporting Global Health Policy Development:

The LDA system assists global health policymakers to establish effective policies through its identification of persistent healthcare elements that connect various national healthcare systems. WHO reports and health agendas and cross-country health data analyzed by LDA provide insights about the worldwide focus in healthcare. LDA supplies analytical knowledge needed to build policies which match international health plans with existing challenges across countries.

c. Evaluating Cross-Country AI Healthcare Adoption:

The implementation of AI technologies across healthcare settings differs significantly among nations because they maintain variable access to resources alongside contrasting health infrastructure and the speed of technological readiness. Developed healthcare systems have begun implementing AI into their entire sequence of diagnostic activities and therapeutic recommendations and hospital oversight and medical staffing. Conversely, underserved healthcare markets of both low- and middle-income regions remain slow to integrate AI into their processes. LDA analyses research publications alongside policy documents and health technology reports across countries to evaluate how fast and how well AI initiatives are being implemented in different healthcare environments [20].

d. Comparing AI Integration in Healthcare Systems

LDA demonstrates utility for evaluating healthcare systems' current AI integration status. Further examination of AI adoption throughout developed and developing nations helps LDA distinguish countries that use AI successfully to enhance patient healthcare outcomes versus nations where AI use remains limited. Early disease detection through imaging systems is an example of how advanced economies utilize AI because countries short on resources employ artificial intelligence for telemedicine to eliminate healthcare barriers. The analysis of this data allows LDA to discover effective models which other healthcare systems could implement [21].

e. Identifying Barriers to AI Adoption in Developing Countries

Healthcare AI adoption remains challenging for low-resource countries which suffer from insufficient infrastructure and minimal technological expertise and limited financial capabilities. Through literature analysis LDA identifies barriers which hinder AI adoption in healthcare across developing regions. Documents from global health organizations and local healthcare systems and regional technology providers make up the content evaluated. Through the study of developing countries' principal implementation barriers LDA aids the creation of specialized tactics to enhance AI acceptance across these regions [22].

ii. Examining the Impact of AI on Healthcare Access

Through AI technologies communities receive better healthcare access even in areas where the need is significant. The analysis of AI-linked patterns in healthcare accessibility and equity performs best when LDA serves as the assessment tool. AI-based telemedicine systems bring experts to reach rural patients whereas machine learning tools optimize resources for low-income settings. The identification of key AI technologies influencing healthcare access allows LDA to help countries direct their AI funding toward strategies which deliver optimal outcomes for people in underserved populations [9].

iii. Evaluating Best Practices for Scaling AI in Global Health

Through LDA practitioners can find effective techniques to implement AI technology at scale in disparate healthcare setups [23]. Multiparty analysis of cross-national AI research projects and field tests reveals effective methods for applying and expanding AI systems. The evaluation process of AI implementations spans from analyzing electronic health records (EHR) to predictive analysis for outcome improvements and the enhancement of medical imaging through AI. The analysis from LDA produces actionable feedback that allows countries to implement AI technology in ways that create long-term benefits for both healthcare workers and patients.

D. Synthesizing Insights for Global Health Collaboration

The growing trend toward global healthcare requires international teamwork which enables better management of health emergencies alongside better patient outcomes and stronger healthcare delivery systems. Through assessing healthcare systems across different countries LDA helps create a shared understanding of international health issues enabling wider understanding of local challenges as well as emerging trends and innovative approaches. Through its ability to connect knowledge across different countries LDA drives the development of adaptable universal healthcare solutions which lead to better global medical results. More organizations should adopt LDA to support policymakers and healthcare providers and researchers through tracking health trends while evaluating artificial intelligence functions and identifying best practices globally.

Through LDA analysis of healthcare policy third-country AI integration and developing innovations experts worldwide can join forces and overcome mutual healthcare challenges to optimize patient outcomes [18].

E. The Impact of LDA on AI Health Research Funding and Investment

The introduction of Artificial Intelligence (AI) in healthcare has created important advances in medical diagnostics along with individual treatments and medications and therapeutic algorithms. Quick advancements in this domain call for large-scale funding to maintain scientific investigation and create new progressive solutions. Strategic resource management in AI-driven healthcare becomes complicated because this field evolves so rapidly. The analysis benefits from Latent Dirichlet Allocation (LDA) which serves as an effective solution. Through its application to healthcare literature researchers alongside investors and funding organizations can detect upcoming trends together with new innovation zones and potential risks. LDA searches extensive datasets to discover essential research subjects which allows funding to flow optimally to maximum-potential areas of scientific breakthrough. LDA transforms healthcare funding research by identifying potentially transformative investments while showing funding organizations the best AI-driven healthcare options [9].

i. Identifying High-Impact Research Areas for Investment

AI healthcare exploration exists across a broad field where investigators continuously produce new breakthroughs including technological advancements and practical implementations. The potential to better health outcomes from this development comes with difficulties managing financial resources among important research initiatives. Through LDA investors along with funding bodies can generate meaningful insights from extensive academic literature collections to identify key research themes showing growing interest. The analysis of key terms and concepts through LDA helps researchers pinpoint research subareas of AI healthcare that show the highest levels of discussion and promise significant returns [5].

a. Mapping AI Trends in Healthcare:

LDA produces healthcare AI trend maps from analysis of discussion patterns within recent medical publications and clinical trial documentation and healthcare innovation records. Through its analysis LDA reveals which AI technologies represent the fastest growing sector including machine learning diagnostics and AI driven treatment plans and drug discovery methods [8]. Longitudinal study of emerging trends enables funding bodies to determine future healthcare sector directions which helps them allocate investments toward transformative areas.

b. Targeting Underserved Areas in AI Healthcare:

While much of the focus in AI healthcare is on high-profile areas like diagnostic imaging or personalized medicine, there are many underserved areas that can benefit from AI interventions. LDA can identify emerging areas within healthcare literature where research is gaining traction but may still be underfunded. For example, LDA might uncover growing interest in AI-powered tools for mental health care, rural healthcare access, or healthcare delivery in low-resource settings. Identifying these less-publicized but high-impact areas can help direct investment where it is most needed, driving innovation in critical, underserved fields [24].

i. Cost-Effectiveness of AI Healthcare Solutions

Healthcare expenses reduce with artificial intelligence because the technology enhances medical diagnostics along with administrative workflows and treatment delivery. As an example, LDA enables research paper analysis about predictive analytics thus helping to decrease unnecessary tests while minimizing hospital readmissions and medical errors. Investors would gain a better economic understanding of AI healthcare solutions through LDA analysis of literature volumes that showcase cost-saving applications thus fostering additional cost-effective solution investments [4].

II. Conclusion

Latent Dirichlet Allocation (LDA) shows substantial ability to guide funding allocations while leading investment decisions in rapidly moving AI-powered healthcare applications. Using large bodies of healthcare literature LDA identifies new research fields while predicting medical financial outcomes and detecting rising industry trends. LDA locates crucial research areas which enables organizations to direct their funds towards the solutions that demonstrate the highest promise. Healthcare investors and funding bodies can use research and technology assessments from LDA to examine AI technology cost analyses and estimate return on investment and funding feasibility across AI healthcare services. The ongoing transformation of healthcare by AI depends on LDA to ensure both strategic investment and system growth together with enhanced healthcare outcomes. Through LDA applications in AI healthcare investigation and development our global healthcare systems will evolve faster toward cost-efficient accessible healthcare delivery platforms.

III. References

1. AL Hashmi, S. M., Hashem, I. A. T., & Al-Qudah, I. (2024). Ar=ficial intelligence applica=ons in healthcare: a bibliometric and topic model-based analysis. *Intelligent Systems with Applica3ons*, *21*, 200299.
2. Gondal, M. N., Shah, S. U. R., Chinnaiyan, A. M., & Cieslik, M. (2024). A systematic overview of single-cell transcriptomics databases, their use cases, and limitations. Frontiers in Bioinformatics, 4, 1417428.
3. Gondal, M. N., & Chaudhary, S. U. (2021). Navigating multi-scale cancer systems biology towards model-driven clinical oncology and its applications in personalized therapeutics. Frontiers in Oncology, 11, 712505.
4. Gondal, M. N., Butt, R. N., Shah, O. S., Sultan, M. U., Mustafa, G., Nasir, Z., ... & Chaudhary, S. U. (2021). A personalized therapeutics approach using an in silico drosophila patient model reveals optimal chemo-and targeted therapy combinations for colorectal cancer. Frontiers in Oncology, 11, 692592.
5. Khurshid, G., Abbassi, A. Z., Khalid, M. F., Gondal, M. N., Naqvi, T. A., Shah, M. M., ... & Ahmad, R. (2020). A cyanobacterial photorespiratory bypass model to enhance photosynthesis by rerouting photorespiratory pathway in C3 plants. Scientific Reports, 10(1), 20879.
6. Gondal, M. N., Sultan, M. U., Arif, A., Rehman, A., Awan, H. A., & Arshad, Z. (2021). & Chaudhary, SU (2021). TISON: a next-generation multi-scale modeling theatre for in silico systems oncology. BioRxiv, 5.

7. Gondal, M. N., Butt, R. N., Shah, O. S., Sultan, M. U., Mustafa, G., Nasir, Z., ... & Chaudhary, S. U. (2021). A personalized therapeutics approach using an in silico drosophila patient model reveals optimal chemo-and targeted therapy combinations for colorectal cancer. Frontiers in Oncology, 11, 692592.
8. Gondal, M. N., Mannan, R., Bao, Y., Hu, J., Cieslik, M., & Chinnaiyan, A. M. (2024). Pan-tissue master regulator inference reveals mechanisms of MHC alterations in cancers. Cancer Research, 84(6_Supplement), 860-860.
9. Bao, Y., Qiao, Y., Choi, J. E., Zhang, Y., Mannan, R., Cheng, C., ... & Chinnaiyan, A. M. (2023). Targeting the lipid kinase PIKfyve upregulates surface expression of MHC class I to augment cancer immunotherapy. Proceedings of the National Academy of Sciences, 120(49), e2314416120.
10. Borker, P., Bao, Y., Qiao, Y., Chinnaiyan, A., Choi, J. E., Zhang, Y., ... & Zou, W. (2024). Targeting the lipid kinase PIKfyve upregulates surface expression of MHC class I to augment cancer immunotherapy. Cancer Research, 84(6_Supplement), 7479-7479.
11. Choi, J. E., Qiao, Y., Kryczek, I., Yu, J., Gurkan, J., Bao, Y., ... & Chinnaiyan, A. M. (2024). PIKfyve, expressed by CD11c-positive cells, controls tumor immunity. Nature Communications, 15(1), 5487.
12. Gondal, M. N., Sultan, M. U., Arif, A., Rehman, A., Awan, H. A., Arshad, Z., ... & Chaudhary, S. U. (2021). TISON: a next-generation multi-scale modeling theatre for in silico systems oncology. BioRxiv, 2021-05.
13. Gondal, M. N., Butt, R. N., Shah, O. S., Sultan, M. U., Mustafa, G., & Nasir, Z. & Chaudhary, SU (2022). A Personalized Therapeutics Approach Using an In Silico. Combinatorial Approaches for Cancer Treatment: from Basic to Translational Research.
14. Gondal, M. N., Butt, R. N., Shah, O. S., Nasir, Z., Hussain, R., Khawar, H., ... & Chaudhary, S. U. (2020). In silico Drosophila Patient Model Reveals Optimal Combinatorial Therapies for Colorectal Cancer. bioRxiv, 2020-08.
15. Gondal, M. N. (2024). Assessing Bias in Gene Expression Omnibus (GEO) Datasets. bioRxiv, 2024-11.
16. Choi, J. E., Qiao, Y., Kryczek, I., Yu, J., Gurkan, J., Bao, Y., ... & Chinnaiyan, A. M. (2024). PIKfyve controls dendritic cell function and tumor immunity. bioRxiv.
17. Gondal, M. N., & Chaudhary, S. U. (2021). Navigating Multi-scale Cancer Systems Biology towards Model-driven Personalized Therapeutics. bioRxiv, 2021-05.
18. Gondal, M. N., & Farooqi, H. M. U. (2025). Single-Cell Transcriptomic Approaches for Decoding Non-Coding RNA Mechanisms in Colorectal Cancer. Non-Coding RNA, 11(2), 24.
19. Borker, P., Bao, Y., Qiao, Y., Chinnaiyan, A., Choi, J. E., Zhang, Y., ... & Zou, W.

(2024). Targeting the lipid kinase PIKfyve upregulates surface expression of MHC class I to augment cancer immunotherapy. Cancer Research, 84(6_Supplement), 7479-7479.

20. Butt, R. N., Amina, B., Sultan, M. U., Tanveer, Z. B., Hussain, R., Akbar, R., ... & Chaudhary, S. U. (2022). CanSeer: A Method for Development and Clinical Translation of Personalized Cancer Therapeutics. bioRxiv, 2022-06.
21. De La Hoz-M, J., Montes-Escobar, K., & Pérez-Or=z, V. (2024). Research Trends of Ar=ficial Intelligence in Lung Cancer: A Combined Approach of Analysis With Latent Dirichlet Alloca=on and HJ-Biplot Sta=s=cal Methods. *Pulmonary Medicine*, *2024*(1), 5911646.
22. Pan, X., & Xue, Y. (2023). Advancements of Ar=ficial Intelligence Techniques in the Realm About Library and Informa=on Subject—A Case Survey of Latent Dirichlet Alloca=on Method. *Ieee Access*, *11*, 132627-132640.
23. Sharma, C., Batra, I., Sharma, S., Malik, A., Hosen, A. S., & Ra, I. H. (2022). Predic=ng trends and research pacerns of smart ci=es: a semi-automa=c review using latent dirichlet alloca=on (LDA). *IEEE Access*, *10*, 121080-121095.
24. Mustakim, M., Wardoyo, R., Mustofa, K., Rahayu, G. R., & Rosyidah, I. (2021, November). Latent Dirichlet alloca=on for medical records topic modeling: systema=c literature review. In *2021 sixth interna3onal conference on informa3cs and compu3ng (ICIC)* (pp. 1-7). IEEE.