



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

ARTIFICIAL INTELLIGENCE IN MEDICAL DIAGNOSTICS: APPLICATIONS, LIMITATIONS, AND GOVERNANCE

F. Arzikulov

L Fazilova

Tashkent State University

Relevance

Artificial intelligence (AI), and in particular machine learning methods trained on large clinical and imaging datasets, has moved over the past decade from an experimental research topic into a clinically deployed technology across multiple diagnostic specialties. Trained algorithms have demonstrated the ability to detect diabetic retinopathy from retinal photographs, identify suspicious lesions on dermatological images, flag likely malignant nodules on chest computed tomography, and detect arrhythmias from electrocardiogram signals, in several cases achieving diagnostic accuracy comparable to that of experienced specialist clinicians on standardised benchmark datasets [2–4]. These developments are driven by the convergence of three enabling factors: the increasing availability of large, digitised clinical datasets; substantial increases in computational power, particularly graphics processing units suited to training deep neural networks; and algorithmic advances in deep learning architectures specifically adapted to image and signal analysis.

Keywords: Artificial intelligence, machine learning, medical diagnostics, deep learning, clinical decision support, algorithmic bias

Introduction

The principal clinical applications of diagnostic AI can be grouped into three broad categories. Image-based diagnostic support applies convolutional neural



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

networks to radiological, pathological, dermatological, and ophthalmological images to detect, localise, and sometimes classify abnormalities. Signal-based diagnostic support applies similar techniques to physiological time-series data, such as electrocardiograms or continuous vital-sign monitoring streams, to detect patterns associated with specific pathological states. Risk-prediction and triage support uses structured clinical and laboratory data to estimate a patient's probability of a particular outcome, such as sepsis, deterioration, or hospital readmission, allowing clinical attention to be prioritised toward the patients at greatest need.

Despite these advances, AI-based diagnostic tools carry important limitations that constrain their safe clinical use. Algorithms trained on data from one population, imaging device, or clinical setting frequently show reduced performance when applied to a different population or equipment, a phenomenon known as distributional shift, which is of particular concern for the adoption of internationally developed AI tools in settings, such as those in Central Asia, that were underrepresented in the original training data. Many deep learning models function as effective but largely opaque “black boxes”, providing a prediction without a clinically interpretable explanation, which complicates clinician trust, accountability, and the identification of systematic errors. Algorithmic bias arising from unrepresentative training data can produce systematically worse performance for underrepresented patient subgroups, raising serious equity concerns. For all these reasons, the World Health Organization's guidance on AI in health explicitly emphasises the need for rigorous external validation, transparency, human oversight, and context-specific regulatory evaluation before clinical deployment, rather than relying solely on reported accuracy metrics from the original development dataset [1].



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

Conclusion

Artificial intelligence has demonstrated genuine and, in several diagnostic domains, clinically meaningful capability, but its safe and equitable integration into medical diagnostics requires more than technical accuracy: it requires rigorous external validation across the populations and equipment in which the tool will actually be used, mechanisms for clinical interpretability and oversight, and a governance framework that keeps the clinician, rather than the algorithm, as the final locus of diagnostic responsibility.

References

1. World Health Organization. (2021). Ethics and governance of artificial intelligence for health. Geneva: World Health Organization.
2. Topol, E.J. (2019). High-performance medicine: the convergence of human and artificial intelligence. *Nature Medicine*, 25, 44–56. <https://doi.org/10.1038/s41591-018-0300-7>
3. Gulshan, V., Peng, L., Coram, M., et al. (2016). Development and validation of a deep learning algorithm for detection of diabetic retinopathy in retinal fundus photographs. *JAMA*, 316(22), 2402–2410. <https://doi.org/10.1001/jama.2016.17216>
4. Esteva, A., Kuprel, B., Novoa, R.A., et al. (2017). Dermatologist-level classification of skin cancer with deep neural networks. *Nature*, 542, 115–118. <https://doi.org/10.1038/nature21056>
5. Мухамедова, Н. Х., & Собирова, М. Р. (2023). ОЦЕНКА МАРКЕРОВ ПОВРЕЖДЕНИЯ КЛУБОЧКОВ ПРИ МЕТАБОЛИЧЕСКОМ СИНДРОМЕ У ЖЕНЩИН В ПОСТМЕНОПАУЗАЛЬНОМ ПЕРИОДЕ.



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

6. Нурметов, Х. Т., Маруфханов, Х. М., Талипов, Р. М., & Тухтаева, Н. Х. (2023). Клиникоэпидемиологические особенности анкилозирующего спондилартрита в условиях стационара.
7. Нурметова, Х. Т., Маруфханов, Х. М., Талипов, Р. М., & Тухтаева, Н. Х. (2023). Clinical and Epidemiological Features of Ankylosing Spondylarthritis in A Hospital Setting.
8. Kh, T. N., Sh, K. M., & Kurbanov, A. K. (2021). Assessment of the gastrointestinal tract in patients with rheumatoid arthritis. European Journal of Pharmaceutical and Medical Research, 2(5), 34-37.
9. Мухамедова, Н. Х., & Бауетдинова, Г. Д. (2023). ПОЧЕЧНЫЕ И ВНЕПОЧЕЧНЫЕ ЗАБОЛЕВАНИЯ. ИХ ЭТИОЛОГИЧЕСКИЕ И ЭПИДЕМИОЛОГИЧЕСКИЕ ПРОЯВЛЕНИЯ.
10. Мухамедова, Н. Х., & Собирова, М. Р. (2023). ОЦЕНКА МАРКЕРОВ ПОВРЕЖДЕНИЯ КЛУБОЧКОВ ПРИ МЕТАБОЛИЧЕСКОМ СИНДРОМЕ У ЖЕНЩИН В ПОСТМЕНОПАУЗАЛЬНОМ ПЕРИОДЕ.
11. Сабирова, М., & Мухамедова, Н. Х. (2024). АНТРОПОМЕТРИЧЕСКИЕ ПОКАЗАТЕЛИ ПРИ МЕТАБОЛИЧЕСКИХ НАРУШЕНИЯХ У ЖЕНЩИН ПОСТМЕНОПАУЗАЛЬНОМ ПЕРИОДЕ. Innovations in Science and Technologies, 1(1), 134-137.
12. Мухамедова, Н. Х. (2024). СУРУНКАЛИ БУЙРАК КАСАЛЛИГИ БИЛАН ОҒРИГАН НЕФРОСКЛЕРОЗ МАВЖУД БЕМОРАЛДАРДА ТОМИР ЭНДОТЕЛИЙСИ ҲОЛАТИНИ БАҲОЛАШ.
13. Бауетдинова, Г. Д., & Мухамедова, Н. Х. (2024). СУРУНКАЛИ БУЙРАК КАСАЛЛИКЛАРИ РИВОЖЛАНИШИДА ЭНДОТЕЛИАЛ ДИСФУНКЦИЯ АҲАМИЯТИ. Innovations in Science and Technologies, 1(1), 119-127.



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

14. Мирзаев, Х., Ризаев, Э., Мухамедова, Н., & Усманова, Ш. (2024). ОЦЕНКА МЕТАБОЛИЗМА КОСТНОЙ ТКАНИ ЗУБОЧЕЛЮСТНОЙ СИСТЕМЫ У БОЛЬНЫХ ЗАБОЛЕВАНИЕМ ТУБУЛОИНТЕРСТИЦИАЛЬНОЙ СИСТЕМЫ ПОЧЕК. *Innovations in Science and Technologies*, 1(2), 35-42.
15. Усманова, Ш., Мухамедова, Н., Давлатова, Д., Умерова, Ф., & Тошмурадова, М. (2024). ВЛИЯНИЕ ПАТОЛОГИИ ПОЧЕК НА СТОМАТОЛОГИЧЕСКУЮ ЗАБОЛЕВАЕМОСТЬ. *Innovations in Science and Technologies*, 1(2), 21-28.
16. Halimovna, M. N., Pulatovna, S. U., & Rikhsievna, S. M. (2021). ESPECIALLY CHANGES GOMOCYSTEINE IN WOMEN OF CHILDBEARING AGE WITH METABOLIC SYNDROME. *European science*, (1 (57)), 57-60.
17. Kh, M. N., & Shukurova, U. P. (2021). Modern Methods for Diagnosing Disorders of Kidney Function (Literature Review). *Central Asian Journal of Medical and Natural Science*, 2(4), 176-181.
18. Набиева, Д. А., & Мухамедова, Н. Х. (2017). Параллелизм множественных повреждений при неалкогольной жировой болезни печени у больных подагрой и псевдоподагрой. *Узбекистан тиббиет журнали*, (6), 83-87.
19. Мухамедова, Н. Х. (2015). К механизму дисфункции эндотелия при метаболическом синдроме у женщин репродуктивного и постменопаузального периода. *Молодой ученый*, 11(91), 683-7.
20. Фазилова, Л. А. Электронное обучение как возможность для повышения качества образования. *Pedagogika*” научно-теоретический и методический журнал, 321-323.



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

21. Фазилова, Л. (2025). ТАЛАБАЛАРНИНГ АКТГА ОИД КОМПЕТЕНТЛИГИНИ РИВОЖЛАНТИРИШ. Academic research in educational sciences, (Conference 1), 96-101.
22. Фазилова, Л. А. (2018). Стоматологияни урганишда мобил иловаларни урни. Stomatologiya Научно-практический журнал, (2), 71.
23. Фазилова, Л. А. (2018). The role of mobile applications in learning dentistry.
24. Каюмова, М. (2025). Цифровые технологии в клинической практике: перспективы и вызовы. Academic research in educational sciences, (Conference 1), 165-168.
25. Фазилова, Л. А. (2025). Масофавий таълимни ташкил этишда онлайн маърузалардан фойдаланишнинг назарий-методологик ахдмияти. Замонавий тиббий олий таълим: муаммолар, хорижий тажриба, истикболлар" мавзусидаги VII укувуслублик анжуман туплами.-УДК, 004-37.
26. Nurmatova, F. B., Xuan, R., & Fazilova, L. A. (2024). The advantages of implementing digital technology in education. Innovations in Science and Technologies, 1(3), 192-195.
27. Abduganieva, S., Fazilova, L., Nurmatova, F., & Khodjaeva, D. (2023). Computer-human interaction: Web technologies in education. PROBLEMS IN THE TEXTILE AND LIGHT INDUSTRY IN THE CONTEXT OF INTEGRATION OF SCIENCE AND INDUSTRY AND WAYS TO SOLVE THEM:(PTLICISIWS-2022), 2789(1), 050005.
28. Фазилова, Л. А., & Абдуганиева, Ш. Х. (2018). Компьютерные технологии в высшем медицинском образовании. Stomatologiya, (4), 59-61.
29. Никонорова, М. Л., Нурматова, Ф. Б., Абдуганиевна, Ш. Х., & Фазилова, Л. А. (2022). Методический кейс как инновационная образовательная



Global Conference on Medical and Health Sciences

Hosted Online from Madrid, Spain

Date: 14th October, 2026

Website: <https://econferencia.com>

-
- технология. Scientific approach to the modern education system, 1(10), 115-119.
30. Иргашева, С. У., Гуламмахмудова, Д. В., Алиева, М. М., & РУз, Р. М. СРАВНИТЕЛЬНАЯ ОЦЕНКА КЛИНИЧЕСКИХ ПОКАЗАТЕЛЕЙ РАЗЛИЧНЫХ ФОРМ ПОЛИКИСТОЗА ЯИЧНИКОВ. МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ УЗБЕКИСТАН РЕСПУБЛИКАНСКИЙ СПЕЦИАЛИЗИРОВАННЫЙ НАУЧНО-ПРАКТИЧЕСКИЙ МЕДИЦИНСКИЙ ЦЕНТР АКУШЕРСТВА И ГИНЕКОЛОГИИ АССОЦИАЦИЯ ВРАЧЕЙ ЧАСТНОЙ ПРАКТИКИ УЗБЕКИСТАНА КЛИНИКА «МАНЛИҮО-SHIFO» & V «МАНЛИҮО-SHIFO» & V, 59.
 31. Эргашева, Н. Н., & Юнусов, М. З. У. (2022). Синдром дефицита внимания и гиперактивности или СДВГ. Медицинский взгляд на проблему. Oriental renaissance: Innovative, educational, natural and social sciences, 2(2), 818-825.