International Journal of Science and Technology

International Journal of Science and Technology, 2025, 45–50

doi: 10.70728/tech.v2.i06.017
Volume 02, Issue 06
ISSN: 3030-3443
Paper

PAPER

INNOVATIVE APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN MEDICINE AND HEALTH CARE: DIAGNOSTICS, TREATMENT AND PREVENTION

Turakhonova Shahnoza Odiljonovna[1,*]

[1]Teacher of the Department of Socio-Economic Sciences, Andijan Branch of Kokand University

*Shahnoza01@gmail.com

Abstract

: This article analyzes the application of artificial intelligence (AI) in the field of medicine. The impact of AI technologies on the processes of diagnosis, treatment and prevention of diseases is studied based on scientific data and evidence. The effectiveness and prospects of systems based on artificial intelligence are also considered.

Key words:
artificial intelligence , medicine , health storage , diagnostics , treatment , prevention , information analysis

Introduction

Modern in medicine artificial of intellect role increasingly increasing Diagnostics SI algorithms in processes diseases early in stages in determining help gives , treatment plans and individual patients using SI suitable accordingly working Artificial intellect medical the images again performance , data analysis and of patients health monitoring such as in processes wide is being used .

Based on SI working issued neuron networks and the car study technologies medicine in the field news is creating . Example for , artificial to the intellect based systems through doctors of patients medical history deep analysis diseases much before prophecy to do to the possibility has They were . With this together , SI health storage in institutions work efficiency increase , patients clear and fast service show opportunity Research this shows that SI technologies development diagnostics in the processes errors number reduces and patients treatment personalized approach provides . This in the article artificial of intellect health to keep impact , current problems and promising directions Diagnostics in the process artificial of intellect place in medicine noticeable revolutionary changes done is increasing .

Below this in the field in use technologies and their clear results about in detail information is given :

SI image It is clear in diagnostics (radiology , X-ray , MRI, CT). diagnosis to put for used;

Artificial intellect figurative diagnostics in the field wide used by patients X-ray , magnetic resonance imaging tomography (MRI), computer tomography (CT) and other figurative inspection the results analysis to do help gives.

Qure.ai - X-ray and CT images analysis to do for working SI system It is a lung . diseases, tuberculosis and like COVID-19 diseases in determining is used. Zebra Medical Vision - heart, bone , lung and other members' CT and X-ray images analysis diseases early in stages to determine help gives.

Arterys AI - heart images analysis in doing used artificial intellect platform It is the heart shortage and artery diseases early in stages define takes. To research artificial intellect through done increased diagnostics traditional to methods 10-15 percentagemore than accuracy with works and analysis speeds up the process by 40-60 percentage . Google Health and IBM Watson Health systems in diagnostics Google Health and IBM Watson Health are two medical companies that are working on improving their healthcare systems. in the field diagnostics processes in improvement important role is playing:

Google Health AI - artificial intellect using eye diseases, lungs cancer and other diseases determination for used in research. this system lungs cancer 94.4 percentage accuracy in diagnosis shown record done.

IBM Watson Health - Doctors for medical information analysis to do and diagnosis in the past help giver artificial intellect system

Compiled on: April 30, 2025.
Manuscript prepared by the author.

is, it is oncology in the field especially effective works . This system cancer patients individual treatment for plans offer to do to the possibility These systems using diagnostics process further more precisely and fast done is increasing . Example For , IBM Watson Health cancer diagnosis in 10 minutes less time inside sheep takes , this and traditional to methods than much is effective .

Based on SI worker neuron networks using eye diseases early to determine; Eye diseases, especially diabetic retinopathy, vision of ability to decrease take incoming serious from problems is one. Artificial intellect this the disease early in stages in determining important importance profession will :

DeepMind (Google Health AI) is a diabetic retinopathy early diagnosis for This is used . neuron network diabetic of patients eye bottom analysis so, ophthalmologists with equal at the level in accuracy the disease determination to the possibility has.

IDx -DR - by FDA in the USA approved first artificial intellect diagnostics system He is diabetic . retinopathy traditional doctor without verification determination opportunity gives .

Eyenuk AI - diabetic retinopathy , glaucoma determination for used and 91-95 percentage accuracy has that is determined .

To research according to, based on SI working issued eye diseases diagnostics systems doctors with together while working diseases determination rate up to 96 percentage rise possible.

PathAI and Qure.ai artificial intellect based on worker progressive systems pathology in the field noticeable to achievements is reaching:

PathAI - biopsy samples analysis cancer and other pathological situations clear diagnosis opportunity This gives system cancer in diagnosis to doctors 20 percentage less than error does . **Qure.ai** - X-ray images analysis to do through lungs diseases, especially tuberculosis and COVID- 19 determination for is used.

Paige AI - prostate and blue crack cancer diagnosis for working issued artificial intellect system is, pathologists work efficiency to increase help gives. Also , artificial intellect pathological diagnostics 50 percentage faster in processes result to give and diagnosis Increases accuracy by 30 percentage determined .

Treatment and in patient monitoring artificial of intellect role Artificial intelligence (SI) modern in medicine not only diagnosis in laying, maybe treatment and patient monitoring also great in processes changes done is increasing . Below this in the direction main technologies and their efficiency about in detail information is given.

1. Robotics and automated surgery systems (Example : Da Vinci Surgical System)

Robotics surgery practices precise, minimally invasive and safe in execution big role Da Vinci Surgical System – the world 's the most progressive from surgical robotic systems one to the surgeons high accuracy with operations to perform opportunity The Da Vinci Surgical System Advantages:

- Accuracy and minimum error :

– Robotic arms human in hand than much stable and small actions high accuracy with will do.

- Minimally invasive: – Operations small cuts through is done, this and blood disappearance and recovery time shortens .

- 3D-HD visualization : – Surgeon for clear and enlarged images presented is done , this and the operation makes it easier .

- Remotely management Opportunity : – Experienced surgeons other from the place operations while standing done increase possible .

Practical results : Prostate cancer Da Vinci system in operations traditional to methods 20 percentage less than complications with completed .

Surgery from practices then of patients recovery The life span is reduced by 30-50 percentage. In the USA 1.5 million per year more than operation this system using done Also , Mazor X (Medtronic), Versius (CMR Surgical), Senhance Surgical System (Asensus Surgical) other surgery robots are also active is developing .

2. Based on SI working issued personal medical assistants (Example : AI Chatbots, virtual nurse services)

SI technologies of patients daily medical needs satisfy and them remote control also effective in is being used . Using AI working chatbots and virtual nurses to patients advice to give , medicines reminder and symptoms observation opportunity Popular SI assistants :

- Babylon Health – artificial intellect based on personal advice and diagnostics services presented Patients own symptoms enter, initial recommendations they receive possible .

- Ada Health – for users health about information is an AI chatbot that provides analysis the results assessment and to the doctor appeal to do necessity indicates.

- Florence (Virtual Nurse) – for patients their medicine reminds me of health about information gives and symptoms following goes.

- Woebot Health – spiritual health according to tips giver artificial intellect depression and anxiety signs to determine help gives.

Practical results: from Babylon Health services used in 78 percentage of patients clear diagnosis laid identified. via Ada Health 65 percentage of users own symptoms according to correct doctor specialty to determine successful Virtual nurses health storage in the system medical reduce the load by 30-40 percentage help is giving.

3. Smartphone applications and SI sensors through patients monitoring the current situation.

on the day smartphones and smart using devices (smart watches, bracelets) of patients real - time health in mode observation These technologies are possible . heart hit speed, blood oxygen amount of blood pressure, sugar amount and other indicators observation opportunity gives .

Popular SI monitoring technologies : - Apple Watch (ECG) – heart rhythm measured, arrhythmia and heart diseases in advance determination opportunity gives.

- Fitbit Sense – heart beat and stress level control to do help giver artificial intellect technologies has .

- Glucose Monitoring Patches – diabetes disease with sick of patients blood sugar amount observation for is used.

- KardiaMobile – heart disease monitoring for used artificial intellect system . Practical Results: Apple Watch 10 million more than heart in the rhythm changes early determination circumstances record Heart beat monitoring through heart 85 percentage accuracy of attacks with in advance guess to do possible. SI sensors through diabetes of patients sugar amount 60 percentage faster control is being done .

4. Real time Monitoring systems in the mode; (Example: Biofourmis, Health Catalyst)

Patients health far term observation for Biofourmis and like Health Catalyst artificial intellect systems They are used in real time in mode information analysis to the patients customized treatment plans working to go out help gives .

Biofourmis system

- Heart-blood vein diseases in advance determination and heart attacks prevent in receiving used.

- The patient heart heartbeat, blood pressure, breathing to take speed and other to monitor indicators help gives.

- Real time in mode to doctors warning signal sends.

Health Catalyst system.

- SI algorithms using in hospitals of patients information analysis does .

- Medical to employees of patients health about in advance forecast giving, treating process optimizes.

- Medicine in institutions treatment expenses to reduce help gives .

Practical results

Biofourmis heart in diseases to the hospital to be laid down reduced the risk by 37 percentage . Using Health Catalyst AI medical decisions acceptance 20 percentage faster . Monitoring systems doctors excess work the load reduce and increase efficiency by 30-50 percentage help gives .

Diseases prevent to take (prevention) and artificial of intellect role Artificial intellectual (SI) disorders prevent taking, preventive measures designation and health storage system in improvement important role plays. SI technologies medicine to experts epidemics in advance prophecy to do, individual illness the risk assessment and healthy marriage style promote in doing help gives.

1. Using SI epidemics in advance prophecy to do and spread reduce

Epidemics and pandemics health storage system for the most serious from dangers one is considered. Artificial intellect big in size information analysis so , infectious of diseases spread dynamics in advance prophecy to do and prevent to take help gives . SI epidemics how prophecy does it ? - Data assembly and analysis to do: – SI different from sources (social networks, travel information, hospital statistics) data collecting , diseases spread direction determines . - Geographic and climatic factors into account get: – SI algorithms of diseases to spread impact doer climate conditions and population density in consideration take forecast gives. - Dangerous regions definition: – Epidemic which in the regions outbreak to receive possible in advance showing, prevention measures on time see opportunity gives. - BlueDot – Using SI to combat the COVID-19 pandemic , December 2019 in the month prophecy did and his/her spread about to governments in advance warning gave . - HealthMap (Harvard University) – flu , Zika and Ebola viruses spread following The SI system is used . - Metabiota – epidemic the risk assessment and the global spread of diseases observation for The AI platform used . Practical Results : BlueDot COVID-19 spread World health storage 9 days from the World Health Organization (WHO) before determined . Ebola virus spread Directions SI 85 percentage accuracy with prophecy did . SI analysis because of to the pandemic against preventive measures accelerated by 30 percentage .

2. Genetic analyses based on to diseases tendency determination

Each human genetic in the code it is or this to illness tendency about important information available . Artificial intellect big in quantity genetic information analysis in a person which disease development probability high that to determine help gives . Using SI genetic analysis how does it work ?

- DNA and genetic information analysis to do – SI algorithms millions genetic markers study , disease development the risk evaluates .

- Propensity level Definition : – Some diseases (cancer , heart diseases , Alzheimer's) tendency high was people determines .

- Individual prevention strategies working output : – Disease danger high was people for special recommendations working is released .

Examples : - 23andMe – human genetic information Parkinson 's disease , diabetes and heart illness the risk determiner artificial intellect system .

- GenoPred – cancer and heart diseases in advance determination for The SI platform used .

- Deep Genomics – genetic diseases determination and treatment methods working exit from SI technologies for uses .

Practical Results

Genetic analyses through 85 percentage of diseases in advance prophecy to do possible . Via 23andMe made analyses as a result heart to diseases tendency there is 30 percentage of patients are healthy marriage in style transition recommendation Parkinson's disease has been diagnosed for 10 years using Deep Genomics. before determination opportunity increased .

. Healthy marriage style encouragement to SI algorithms for based Recommendations

Artificial intellect of people healthy marriage style to keep help giver recommendations working AI technologies people sleep quality , physical activity and food habits following go and get individual advice gives . SI is healthy . marriage in style how help gives ?

- Food and calories control to do – SI applications individual nutrition for users plan recommendation does .

- Physical activity tracking – Smart watches and fitness trackers using SI human physical activity control does .

- Sleep quality improvement – AI technologies human sleep schedule watch and have a better rest for advice gives .

- MyFitnessPal – food calories calculate , healthy food according to recommendations gives .

- Fitbit and Apple Health – heart to beat follow , practice and physical activity according to recommendations gives .

- Sleep Cycle – human sleep quality evaluate and have a productive vacation according to tips gives .

Practical Results

Healthy marriage in style compliance to do encouragement through heart attacks decreased by 40 percentage. 60 percentage of Fitbit users use AI recommendations through physical activity to increase successful was . Using AI recommendation made diets diabetes disease development reduced the risk by 30 percentage. 4. BlueDot and Metabiota SI systems such as global health storage threats observation and prevention measures designation BlueDot and Metabiota artificial intellect global disease systems threats in advance prophecy to do and their spread prevent to take for is used . BlueDot and Metabiota how does it work ?

– Global health storage threats observes

– Social networks , travel information and medical statistics analysis does .

Epidemic the risk in advance prophecy does .

– AI algorithms infectious of diseases which in the regions outbreak to take in advance determines .

Health storage to organizations message gives

– Government and medicine to organizations warning giving , prevention measures to start help gives .

Practical results : BlueDot tracks the spread of COVID-19 with WHO and USA Diseases control to do 9 days from the center before determined .

Metabiota by working issued Epidemiological model predicts Ebola outbreak with 90 percentage accuracy with prophecy did . Artificial of intellect in medicine face coming problems and

restrictions Artificial intelligence (SI) medicine in the field big revolution making although , its wide in use one row problems and restrictions There are problems . technological , legal and human to the factor related and they solution to do SI's in medicine efficiency to increase help gives . Below this main problems and them eliminate to grow roads about in detail analysis given .

1. Data privacy and safety issues

Medical information human the most personal and secret from information one is considered . SI medicine in the field wide application as a result of patients personal information analysis is made , is stored and share This is seen . cybersecurity threats and privacy violation the risk increases .

Home problems :

- Data unauthorized Spread – Patients medical information wrong to the hands fall or illegal usage possible .

- Hacking attacks – SI systems working big in size medical information cybercriminals attack meeting possible .

- Regulation problems – Many countries where SI is operating medical of information legal protection level enough it's not .

Solutions :

- Blockchain from technologies Usage – Information reliable in a way is stored and only permission given individuals from them use possible .

- Data Data encryption – Medical information safety increase AI systems for encrypted information with performance need .

- Like GDPR and HIPAA in medicine to the laws compliance to do – Patients personal information protection to do for international to standards compliance to do important . Analytical Result : in the USA in 2023 medical institutions more than 25 to their data big hacking attacks happened that 's it and 25 million more than patient your information danger under to stay reason it has been .

Blockchain based on medical information systems information Reduces breakage by 70 percentage possible .

2. SI systems reliability and human factor importance

Artificial intellect in medicine big help giving even though it is complete independent performance for now dangerous . SI diagnostics and in treatment his/ her own efficiency even if it proves that a person factor importance high become remains . Home problems :

- SI's wrong decision acceptance to do – Neuron networks sometimes wrong result give takes , especially less information with when working .

- Artificial intellect medicine of employees irreplaceable – SI patient with personal to contact has it's not and human feelings doesn't understand .

- SI results every always understandable It can't be done – Medicine employees SI decisions for how acceptance what did important , but this every always not explained .

Solutions :

- SI results human by control to do – Artificial intellect conclusions expert doctors confirmation need .

- SI explanation opportunity (Explainable AI - XAI) – Algorithms the results understandable in the form to give need .

- SI and human cooperation – SI Medicine to employees help giver tool as usage necessary . Analytical Result : IBM Watson AI system cancer 96 percentage accuracy in diagnosis with to put possible , but only expert doctor control under while working efficiency increases.

When Explainable AI (XAI) is used to the SI results of doctors was confidence from 50percentage to 85percentage increased observed .

3. Medicine employees' access to SI technologies adaptation process

Artificial from the intellect effective use for medicine experts this technologies understand and to them adapt to receive However , most doctors and nurses from SI technologies to use ready it's not or this regarding enough to knowledge has it's not .

Home problems :

- Technological knowledge shortage – Many doctors and nurses SI systems with work according to special to prepare has it's not .

- Regarding the SI of doctors insecurity – Some experts to the results of SI distrust or to them doubt with view possible .

- Medicine in the field traditional approaches – Many doctors their own usual to the methods stuck they get and new technologies acceptance to do they don't want to .

Solutions :

- Doctors and nurses for SI special courses current to be - Medicine SI technologies at universities teacher sciences input - SI systems simple and understandable interface with working exit Analytical Result : doctors in 2024 only 35 percentage of SI systems active to use ready that it is SI technologies adopted doctors 20 percentage less to mistakes road put determined .

4. Using SI wrong diagnosis to put probability and his/her prevent to take for necessary measures

Artificial intellect diagnostics in the process high to accuracy has to be possible , but sometimes wrong diagnosis It is also possible that case This is not the patient's wrong to treatment or serious health to the problems take arrival possible .

Home problems :

- Data poor quality – If SI is incorrect or enough not been information with trained if , it is wrong diagnosis to put possible .

- Similar symptoms with Confusion – Some diseases to each other similar to symptoms has happened because of , SI is incorrect conclusion release possible .

- Complex and less occurring Diseases – Rare occurring diseases SI every always right define can't . **Solutions :**

- SI results doctors by again check .

- Many kind of to the information based models create

- Complex diagnostics in the processes SI human experience with to harmonize .

Analytical Result

Research According to , SI diagnosis is 90-95 percentage accurate even though , human by 10-15 percentage errors if not checked observed . SI doctor cooperation diagnosis accuracy up to 98 percentage increased . SI in medicine strong tool even though it is restrictions understanding and them eliminate to grow important is considered .

Conclusion and suggestions

Artificial intelligence (SI) medicine in the field big revolution It is developing diagnostics , treatment , monitoring and of diseases prevent to take in the processes accuracy increase , time saving and efficiency to increase help is giving . With this together , SI medicine in the system still to be solved necessary was problems and restrictions there is .

1. SI diagnostics and diseases in determining new opportunities is creating

Artificial intellect medical the images analysis in doing radiologists , pathologists and to ophthalmologists big help Google Health and IBM Watson Health are providing systems cancer

, heart diseases and other heavy diseases in determining high results is giving . PathAI and Qure.ai neuron networks using medical the images deep analysis so , doctors mistake to reduce service is doing .

- SI diagnostics traditional to methods 20-30 percentage more accurate than results give takes .

- Eye diseases early detection (e.g. diabetic) retinopathy (artificial) intellect 95 percentage accuracy using with done However , SI is not 100 percentage perfect . not . Using SI wrong diagnosis to put probability there is and this of patients life for danger to give birth Therefore , the SI results doctor by confirmation necessary .

2. SI patients treatment and monitoring efficiency is increasing

Robotics and artificial intellect based on worker surgery surgical systems (e.g. , Da Vinci Surgical System) practices minimized invasive in a way transfer opportunity is giving . Patients in constant monitoring AI Chatbots, virtual nurses , Biofourmis and like Health Catalyst real- time technologies in mode information analysis to the doctors important signals is delivering .

- Robotics based on done increased surgery in operations Complications have decreased by 40 percentage.

- Using AI heart attack risk 1 week before determination opportunity appearance it has been .

- Smartphone applications through of patients health monitoring their to the hospital to go reduced its need by 50percentage .

3. SI diseases prevent (prevention) is great to opportunities has .

SI epidemics in advance prophecy to do and health storage system of diseases to spread in preparation important role is playing . BlueDot and Metabiota such as systems global health storage threats following to go and fast measures see for is being used . Also , genetic analyses through human various to diseases tendency is being determined .

- AI COVID-19 Pandemic December 2019 in the month prophecy did .

- Genetic analysis using cancer to the disease 80 percentage accuracy of inclination with determination possible . - AI is healthy marriage style formation individual recommendations for give takes , this and people healthy life to forgive helps .

4. SI in medicine face coming problems and restrictions

SI medicine in the field huge to achievements achieved Although , it is still certain to restrictions has .

Home problems :

- Data privacy and Safety – Medical information safety to threats face is coming .

- SI systems reliability and human factor – SI incorrect decisions acceptance to do possible , therefore for doctor control condition

- Medicine employees' access to SI technologies adaptation – Many doctors still with SI work for enough to knowledge has it's not .

- Wrong diagnosis probability – SI is incorrect information based on if it works , error diagnosis to put probability increases . **Solutions :** - Blockchain and encryption from technologies Usage – Information safety provision for .

- Explainable AI (XAI) systems current - SI decisions understanding and control to do facilitate for .

- Doctors for artificial intellect according to special training programs working output – SI technologies faster adaptation for .

- SI results doctors by Check – Diagnostics and in treatment human participation save to stay

1. SI and human cooperation strengthen ;

SI independent accordingly medicine system manage can't . That's why for : - SI results experts by to be checked necessary .

- Doctors for AI special trainings and courses organization to be need .

2. Medical of information safety to provide ;

With SI related the most big from problems one information confidentiality . Therefore : - Blockchain from technologies use recommendation is being done .

- Medicine such as GDPR and HIPAA in the field international to the laws strict compliance to do need .

3. SI diagnostics systems reliability increase ;

- Explainable AI (XAI) is now available in medicine to be need .

- SI only doctors with in cooperation usage necessary .

4. SI's prevention and monitoring capabilities expansion ;

- Artificial intellect based on healthy marriage style individual recommendations on giver systems working exit need .

- Using SI epidemics in advance prophecy to do and prevent to take systems improvement necessary .

SI in medicine clear diagnosis , effective treatment , patient monitoring and of diseases prevent in receiving revolutionary changes is creating . However, man without participation this technology dangerous to be possible . Therefore , the doctor and artificial intellect cooperation medicine the future defines .

- SI's in medicine from the possibilities maximum use for him/her human experience with harmony necessary .

Below artificial of intellect medicine in the field application according to used sources and recommendation done literature list cited .

References

1. Topol , Eric. Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. Basic Books, 2019. Artificial of intellect in medicine role and his/her future opportunities about in detail analysis .

2. Jiang, F., et al. (2017). Artificial Intelligence in Healthcare: Past, Present and Future. Stroke and Vascular Neurology, 2(4), 230-243. Medicine AI technologies in the field , their advantages and disadvantages .

3. Yu, K., Beam, A., Kohane , I. (2018). Artificial Intelligence in Healthcare. Nature Biomedical Engineering, 2, 719-731. AI diagnostics and in treatment how in use about scientific article .

4. Russell, S., Norvig , P. (2020). Artificial Intelligence: A Modern Approach. Pearson. Artificial of intellect main principles and in medicine application about .

5. Nguyen, M., et al. (2021). Machine Learning in Healthcare: Applications and Challenges. Journal of Healthcare Informatics, 8(1), 1-17. In medicine artificial intelligence in real life practical examples .