Journal of Computer Science & Computational Mathematics, *Volume 12, Issue 3, September 2022*
DOI: 10.20967/jcscm.2022.03.003

Role of Artificial Intelligence in e-Health ATM for Rural Health Care

Dhiraj Kumar[1], Usha Tiwari[1,2,*]

[1]Sharda University, School of Engineering & Technology
[2]Dept.of Electrical ,Electronics & Communication Engineering , Sharda University
[*]Corresponding author email: dhirajkumar1401@gmail.com

***Abstract*:** To introduce a easy access health facility at every where to reduce transportation in rural area we present a artificial intelligence based health atm with multiple diagnosis equipment at real time basis provide best service to diagnose with help of artificial intelligence the very early stage disease & early warnings to patients in this paper we will be discuss how the artificial intelligence help to patients, physicians and care taker for better outcome in less time and low cost. The use of AI has expanded quite withinside the every day operations and approaches of medical laboratories. Digital pathology permits taking pictures pathology facts together with complete slide images (WSI) and makes use of system studying to identify diffused styles and offer the pathologist with exact facts. The algorithms used make it feasible to mechanically study and interpret boom on plates, understand colony morphology, and serve different vital functions. The AI-primarily based totally medical laboratories of this proposed machine will check the diminutive extent of serum or blood from different samples in a unmarried day and offer correct solutions to all of the medical questions which can be tough for human beings. For the detection of colon, lung, and breast cancer, the CAD machine has been applied progressively, that's one of the best programs of AI. Thus, CAD has come to be a not unusual place and famous AI software in medical practice. AI has given a brand new method for the evaluation of whole human molecular data, in addition to genetics. AI has the capability to fathom and remedy severe demanding situation associated with scientific trials.

***Keywords*:** Artificial intelligence, smart healthcare, machine learning, deep learning, health ATM.

1. Introduction

In modern time as fast growing world we can not forgot the rural world or rural India so for rural health care we put a health atm setup with latest artificial intelligence technology with help of deep learning with concept of machine learning with guide a suitable line of treatment based on data study using big data. It is type of smart health care system which try to replace the old hospital system where lots of approvals needed to start the medical service depending on where healthcare takes place, smart healthcare can be divided into two major parts:

(i) Daily healthcare, (ii) clinical healthcare,
There are four Tier system of decision given below
Tier-1: Pervasive Health Decision Support
Tier-2: Pre-Laboratory Decision Support
Tier-3: Post-Laboratory Decision Support
Tier-4: Post-diagnostic Decision Support

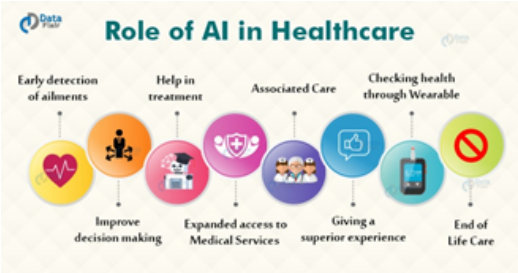

Figure 1. Role of AI in healthcare

In the healthcare market, Artificial intelligence (AI) changed into worth about $1441 million in 2016 [1], and through 2023, it's far expected that it'll attain approximately $22, seven hundred million. AI is concerned in records gathering, processing, and faultless prediction using algorithms which have undergone huge trying out to lessen the margin of error. The crucial AI technologies on this context encompass the herbal processing of languages, bodily robotic systems, and machine. mastering, in conjunction with deep mastering and neural networks. The number one intention of AI in healthcare is to observe the significant relationships among affected person effects and preventative remedy options. Different AI algorithms had been created for extraordinary applications. proposes the usage of goal reputation and photograph interpretation, shows the usage of a remote sensing photograph retrieval set of rules primarily based totally on an progressed Sobel operator, shows large-scale, high-dimensional data processing for pics of the human mind that allows you to set up a hierarchical model of hidden relational logic, detecting the criminals of destiny clever towns the usage of AI is defined in, video circulate primarily based totally on object detection is proposed in, and suggests the way to extract pics of cultivated land the usage of deep mastering. It makes use of deep mastering for photograph-primarily based totally fault diagnosis. A hash community set of rules primarily based totally on deep neural networks is proposed in to retrieve animal pics from a huge community of pics. proposes a transferring goal monitoring set of rules primarily based totally on block records. [2] AI has additionally been implemented in speed field of clever fitness service along with robot surgery. Drug improvement has been addressed, and so affected person tracking and personalized medication, as well as helping doctors make perfect decisions, finding re-

lated medical data or information from different textbooks and journals, storing patient data on the Cloud for easy access, and so on. The purpose of this paper is to provide an architecture for an AI-based smart healthcare system where patients will get complete support throughout the course of their lives. This AI-primarily based totally aid will come from all departments, including Emergency Medical Service (EMS), nursing, doctors, radiologists, clinical laboratories, pharmacy, and so on. Researchers can also be capable of use patients' statistics and AI-primarily based totally decision-making for in addition improvement in the fitness care device. This proposed device will even give an explanation for the way to install the latest trends in AI to automate the complete healthcare device, which is exceptional in current research.

2. Structure

Our research methodology includes both parts qualitative & quantitively because in previous research some parts of our research has exist in some university on very small scale as our topic has a research on application & further development of health atm to maximize the use of computer science with medical electronics finding out new easy way to diagnosis of various diseases by end application of Artificial intelligence by using its different software tools these are following:- Neutral Network, Machine Learning, Data science & analysis, Tensor flow & python programming. Health atm is touch screen kiosk hardware designed for managing health related information which also allows to measure health information & manage clinically. Methodology used following method:-

1. This is a data driven technology is used for AI based health ATM to successfully implement the method in system.
2. The research methodology also depends on old data processing & past Medical records.
3. Most of the data acquisition based on sensor output & prediction finalization is clinical trails.

3. Working Principle

As we our project based on artificial intelligence application in health care we review so many journal & literature review paper but we are unable to find exact application does not match with our project & research work.

3.1 Search Execution:

1. First of all a exploration was performed using the selected search string and then the obtained results were sorted by relevance.
2. Then from each topic, the full citation, abstract of the paper and the full text were retrieved.
3. Finally the topics matching the inclusion criteria were examined further. In case the abstract of the article/paper did not challenge the exclusion criteria, it was fully read. If the paper/article was still conforming to the study selection conditions, it was selected.

We have concentrate on around 25 paper in which definite match the word computerized reasoning in medical services programmed framework how we can further develop the information base of wellbeing record and simple to conclude the illnesses on premise of information there are two fundamental boundary which will dissect the information one is unbiased organization and another is Artificial knowledge works on the existences of patients, specialists and clinic heads by performing errands that are typically finished by people, yet quicker than expected and for a portion of the expense.

One of the world's most noteworthy development enterprises, the AI area was esteemed at about $590 million of every 2014 and is projected to come to a $140 billion by 2025. Man-made reasoning, otherwise called Machine Intelligence, alludes to machine-showed insight, which is disconnected to the information showed by people known as regular knowledge. Man-made intelligence examination, which is a part of PC science has been portrayed as the investigation of any electronic gadget breaking down climate and making a move expands its possibilities accomplishing its planned goals. As a rule, word “Fake Intelligence" is utilized when a PC imitates “mental" undertakings like other human personalities, e.g., “Learning" and “solve related problem of issues." The job of AIs is frequently challenged as PCs are continuously productive, as errands created to include "thinking" are frequently eliminated because of an effect known as the "Computer based intelligence impact." first of all, in Artificial Intelligence, optical person acknowledgment is normally discarded, as it has turned into a typical spot innovation. Man-made consciousness has as it is an always evolving innovation. These days, virtually all organizations depend on Artificial Intelligence, and there is consistently a popularity for Data Analysts, Computer Scientists, Research Scientists, and so on.

At the point when the expression [3] 'man-made consciousness' was first begat in 1956 by PC researchers, assumptions for the improvement of machines with human-like clever thinking and conduct were high, however the field was in for a huge delay. In the a long time to come, the term alluded to a great extent to mainstream society. More terrible, the general disappointment of calculations that endeavored to imitate human thinking at the higher, [4] emblematic level gave the field an awful name and prompted a drawn out freeze in subsidizing.

3.2 System setup & Result

We have started the project by study numerus of research paper in electronic health system in remote by gaining [5] the knowledge it is find that main component for beginning the project is hardware module that means sensors like heart sensor, ecg sensor, led weight sensor, blood pressure machine, glucometer, height sensor and height sensor all are combined with the microcontroller to fetch the data from the source . Now we have collected the data from 100 of patients and [6]

Table 1. Sensor data

Sensor (Unit)	Resolution (bits/sample)	Sampling rate (Hz)	Transmission rate (bits/s)
Heart rate	15	3-9	90
Blood pressure	15	0.001-99	1599
Oxygen saturation	9	0.001-2	15
Temperature	9	0.001-1	8
Blood sugar	15	0.001-100	1500
Accelerometer	13	2-500	4500
ECG	12	101-999	11900
EEG	12	10-100	13000

started the apply the algorithm to find out probability of heart disease and then go for clinical laboratories to complies the data from our research point of view how much accuracy we get from these hardware and change in hardware according to requirement.

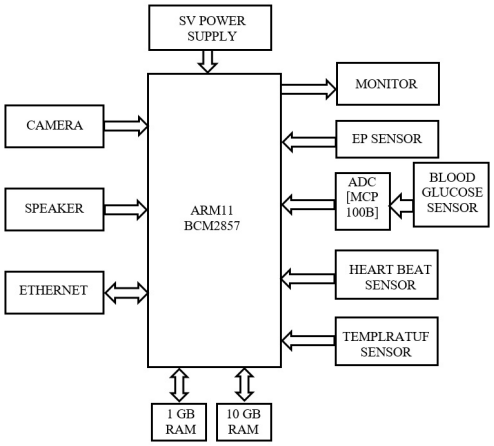

Figure 2. Block Diagram of Proposed System

3.3 Implementation of technology on real level

Technology uses for developing artificial intelligence based health care system

1. IBM WATSON
2. OPEN Mhelth care
3. Google cloud ML Learning
4. Tenser flow with Python

We have collecting data how we use machine learning is helpful to interfacing artificial intelligence in smart health care system the study shows the actual work scenario & its components. Stress detection & [7] Alleviation system can be programed as following system at programing level.A review study of algorithm for stress measurement Algorithm 1 Stress alleviation protocol

Given: therapy Set, set of the stress alleviation techniques.
1: therapy ← null, k ← 0, flag ← 0
2: for i = 1, ..., length(therapy Set)
3: therapy ← therapy Set(i)
4: Delay (30sec.)
5: Compute selected N feature values
6: Compute k, number of features showing stress relief
7: if k ≥ N/2
8: Delay (30sec.)
9: Compute selected N feature values
10: Compute k
11: if k ≥ N/2
12: flag ← 1
13: return
14: end
15: end

The system is contains of hardware & software both has vital role in this type of health care system the [8] artificial intelligence also needs hardware for design the system the main hardware is following. a)Blood pressure machine digital b) heart sensor c) Loadcell d) glucometer c) Touch display e) Webcam f)microphone g) Microcontroller h) spo2 sensor i)stethoscope j) Temperature sensor.

4. Limitation

It should be noted that many AI technologies are still in the exploration stage, and various limitations must still be resolved. [9] First, the real-world clinical applications of AI are still lack of. The outstanding performance of medical AI in experimental stage with using specific dataset with high-quality cannot represent its real-world performance . The quality, performance, safety, and reliability of AI systems must be guaranteed by establishing a set of standards and validated with rigorous clinical trials. Second, relevant laws, regulations, ethical guidelines and accountability should be formulated; for example, laws regulating information security and privacy must be established to ensure that patients' medical data are protected

5. Conclusion

We and in the last stag of conclusion of our project AI based e-health ATM which is advance stage of health atm to diagnosis of diseases in more effective way & analyze future diseases on basis of data collect from patients & stop by prevention methods, medication, surgery As we take about the future scope of our project looks a tremendous opportunity for Artificial intelligent in field of medical & diagnosis we are hope to that in future we are able to provide these services in our cities in near by future & expand on large level. [10] PCMS framework is planned particularly for rustic individuals to counsel experts specialists from a distance and get legitimate answers for their concerns on time. To accomplish this, we have prototyped a framework by coordinating the current straightforward applications where one patient with one sensor application for pulse estimation can convey to a far off trained professional. We have utilized existing freeware applications to limit the expense (cost is nearly nothing). As the framework is working with a specific sensor, we can infer that it will function admirably with coordinated sensors too. Additionally as the framework is working with not

many different modules incorporated together, we can presume that the framework will function admirably if numerous modules are coordinated together. The ongoing Proof of idea has tended to moving imperative boundaries of an individual from 'sensor to tab' through one HR Monitor application and afterward from 'tab to tab' through one PCMS entryway. Here, the future work could include various kinds of sensors information aggregated and putting away to cloud naturally (without manual mediation).

Acknowledgement

I would like to thanks all technical staff member of Sharda University for guiding me so nicely and give important improvements inputs during writing the paper.

References

[1] A. Minaie, A. Sanati-Mehrizy, P. Sanati-Mehrizy, and R. Sanati-Mehrizy, "Application of wireless sensor networks in health care system," in *2013 ASEE Annual Conference & Exposition*, 2013, pp. 23–200.

[2] S. Verma and N. Gupta, "Microcontroller-based wireless heart rate telemonitor for home care," *IOSR J Eng (IOSRJEN)*, vol. 2, no. 7, pp. 25–31, 2012.

[3] C. N. Scanaill, B. Ahearne, and G. M. Lyons, "Long-term telemonitoring of mobility trends of elderly people using sms messaging," *IEEE Transactions on Information Technology in Biomedicine*, vol. 10, no. 2, pp. 412–413, 2006.

[4] N. P. Jain, P. N. Jain, and T. P. Agarkar, "An embedded, gsm based, multiparameter, realtime patient monitoring system and control—an implementation for icu patients," in *2012 World Congress on Information and Communication Technologies*. IEEE, 2012, pp. 987–992.

[5] B. Sudarshan, R. Hegde, and B. Satyanarayana, "Design and development of fall detector using fall acceleration," *International Journal of Research in Engineering and Technology*, vol. 2, no. 9, 2013.

[6] K. S. P. V. S. Kumar Kandukuri A. Amala Jency R, Anita, "Android based women safety application with blood pressure, heart beat monitoring and location tracking, emergency support system," *IJSRD - International Journal for Scientific Research & Development*, vol. 3, no. 01, 2015.

[7] S. Majumder, T. Mondal, and M. J. Deen, "Wearable sensors for remote health monitoring," *Sensors*, vol. 17, no. 1, p. 130, 2017.

[8] V. Ramesh, M. Sankaramahalingam, M. D. Bharathy, and R. Aksha, "Remote temperature monitoring and control using iot," in *2017 International Conference on Computing Methodologies and Communication (ICCMC)*. IEEE, 2017, pp. 1059–1063.

[9] P. Pandian, K. Mohanavelu, K. Safeer, T. Kotresh, D. Shakunthala, P. Gopal, and V. Padaki, "Smart vest: Wearable multi-parameter remote physiological monitoring system," *Medical engineering & physics*, vol. 30, no. 4, pp. 466–477, 2008.

[10] L. Gatzoulis and I. Iakovidis, "Wearable and portable ehealth systems," *IEEE Engineering in Medicine and Biology Magazine*, vol. 26, no. 5, pp. 51–56, 2007.