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# SMART HEALTH RECORDS

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### **Abstract:**

To manage the updated medical history and records of health care is a comprehensive process, and with the time being technology like Vision API, AutoML Google Cloud has done a remarkable role in data storage and retrieval. As we all know that the manual data process, paperwork, and similar kind of documentation have extensive processes that usually take huge time, and effort to complete the majority of the processes takes a lot of time and money to complete. So to reduce the time and efforts at a low cost now we have an excellent technique to cope up with all these issues named machine learning algorithms. Vector machines and ML-based OCR recognition techniques are deliberately collecting potency in Objects and different document classification methods such as Google's Cloud Vision API and MATLAB's machine learning-based handwriting recognition technology. Researchers of MIT are innovating new techniques with the help of Machine Learning which is the succeeding generation of astute, smart health records, by integrating ML-based tools from scratch to encourage with better analysis, diagnosis, superb treatment recommendations.

**KEYWORDS:** Clinic, Billing, e-prescription, Optical Character Recognition, HER, EMR, etc.

### **INTRODUCTION:**

The meaning of smart is organized, precise, efficient, measurable, analytical, prosecutable, and technology-driven in all manner. We have to use the statistics of a patient in real-time to store it on the cloud so that we can interpret the information through various mobile apps, smartphones, find out some few patterns, images recognition techniques, the previous record of the patient e.g X-ray reports, Ultrasound reports and going to evaluate these records through machine learning model/techniques with maximum accuracy by accommodating advance health services that have never been existed before. Technology is coming with conviction and zeal and the peoples are obtaining and grasping it with open-handed as it is a powerful and transformational technique to make millions of people's lives better and

healthy. The intention behind the technology is to gather real-time data using wearable gadgets like a smartwatch, smart glasses, bio-patch, smart hearing aids, etc. to track the improvement or any implication through the day to day monitoring and collect the real-time data at the centralized server and fetch these data through a mobile application at the time emergency.

This is the collective exercise between researchers, doctors, specialists, developers, and engineers to implement the machine learning algorithm by recognizing the patterns of previous images of organs and comparison it with a healthy one, so we can easily identify the ramifications with current health statistics of patients and start the treatments as earlier as possible.



Instead of managing a lot of documentation for a single patient is easier to have a single medical record: We are creating the huge decentralized records through jobs cards, patient's admission forms, procedure sheets, evaluation sheet, medication sheets, recovery sheets, etc as the day in and day out that are at present exists in almost every health care institution among health records of outpatient offices, ICUs, and treatments.

Physicians, health care experts, and medical professionals are spending a lot of time preparing the records of patients who have already been surrounded by chronic diseases or having such kind of history for a long time.

They use to create the documentation for a large number of patients as per day, week and month by making files or manual diagnosis through huge previous medical records, repeat the tests to check the health implications of patients.

### **Development of EHR standards for India**

Ministry of Health, Government of India proposed the EHR standards to recommend a system that is highly flexible in conserving and generating the health records of patients in the country in the long run by health care workers. So in the coming generation of the 21st-century government of India is focused on Electronic health records with the mission of digital India. The vision of this new era would be implemented in such a way that in the case of emergency a person can't need to take any documentation like the previous history of their health treatments, last visit summary reports, etc.

So with these standards, a person can go to any hospital having the best medical facilities, any physicians and specialists, or expert and start his treatments as earlier as possible without

wasting a lot of time as fully unified electronic records has already been there at the cloud and anyone can access it at the time of need through connecting devices like software and applications embedded laptops, tablets, etc.

Health Ministry had planned to suggest the EHRs standards for the country in 2013, Again it was revised in 2016 introducing the information technology, machine learning, big data analytics, sensors based live streaming of data by using the Internet of things, and other technologies to make health care system efficient and easy to access in the upcoming years throughout the country by hospitals, research, and development centers pertinent to health-care, various organizations, medical institutions and advised them to update the system with new technology and implement the system in such a way that it would be within reach of a common man at the time of urgency with full transparency.



Image source: <https://bis.gov.in/>

### **Traditional paper records vs smart health records**

Even in today's scenario, Hospitals are still using traditionally paper records to evaluate the files having the previous summary of their patients

A lot of documentation against the confidentiality of patient and the emphasis of being accessible to the records of patients delinquently the location from where they belong to take huge dominance to make the shift to EHRs.

An electronic health record (EHR) is an electronic adaptation of a patient's admission form to any health care institution. EHRs belong to live data that proceeds as real-time information on the cloud, these records produce the data by using data-analytics techniques which is easily accessible and steadily authorized.

Medical staff like nurses, practitioners, trainers using Electronic Health Records have seen the large attrition rate in papers work, patient's admission form, job cards, or other documentation by more than 40%. Electronic health records are one of the most impeccable approaches to get specific information on patients rapidly. Becoming paperless boosts our business. As we all know in today's cut-throat competition time is very crucial for all of us

and this has been proved that in various industries especially the health care industry Electronic health records has become the buzzword for us as it helps us reduce out a lot of time and efforts by using electronic gadgets, smartphones, etc.



### **Introduction of machine learning in health care**

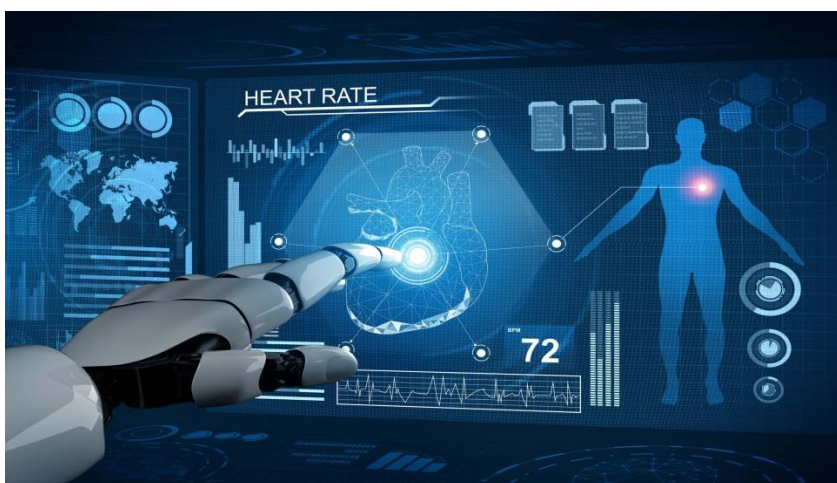
Machine learning aggrandizes manual tasks without the intervention of humans. Electronic Health Records (EHR) are unregulated and enigmatic and opposing computerization so we can be muddled in fetching the information by taking the pricey time. Machine-learning algorithms can forecast the data which is adjustable or fit according to patient's health specifications is majorly on top priorities so we can enlist the further steps to take appropriate actions as earlier as possible to save human lives and enhance the life expectancy of patients at the time of emergency.

AI with machine learning algorithms work with Generative Adversarial Networks (GANs) and anticipate the more precise shapes of molecules with high accuracy. Statistics using R language to predict the chart for the remarkable representation of data so we can easily understand the graphs which gradually showing the improvement measures of any individual to boost the capability and provide easy access.

Image recognition techniques, using Machine learning classifying pathology e.g: to find out tumors in health care modules by showing the images of different patterns showing in the human body so physicians can easily detect the body of having tumors with a healthy body which is showing a different image. Another pathway that is materializing is by using wearables with connecting devices like a smartwatch, Fitbit, etc. With the use of these wearables, we can store the real-time information of an individual and with the machine learning model, we can conclude the data as a result e.g: deterioration or wreckage. Wearables productively taking the data while walking, running, jogging as it is collecting data in through live streaming module so when this data has reached to the particular danger

point, it can inform to a person or an individual to take appropriate actions before a worse fallout to expose e.g, a stroke risk, heartbeat enhancement, excess sweating, etc.

Machine learning algorithms stimulating research in the field of healthcare with huge enthusiasm. Biologist, computer scientists, IT professionals, Physicians, and faculties of applied science all are working together and practicing day and night in a collaborative environment to come up with all related technologies and to end up with some creative solutions like outbreak prediction, personalized medicines, they often use the machine learning models to diagnose and identify the disease before happen. With the help of natural language processing, professionals related to this field can handle a lot of administrative tasks.



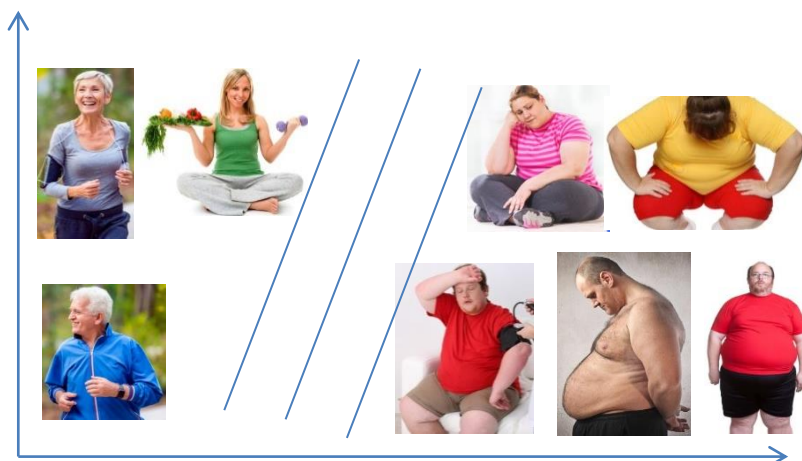
Source: <https://www.solulab.com/>

## Introduction to vector machine techniques

Machine learning (ML) has become the buzzword in almost every industry and it has been acknowledged as an essential part of AI, also a data analysis technique that computerizes the declarative structure. Algorithms used by machine learning are captivating with all big IT giants in an industry collaborating with all major sectors e.g., banking, transport, healthcare, etc.

Support vector machines are one of the classification techniques that distribute pieces of information varying with patterns matching with supervised learning technique with hyperplanes provided by the machine learning technology. So SVM is well known as the ML technique for classification. SVM is a selective classifier. It generates the result as an outcome of the hyperplane, which organizes new datasets with examples that accept the technique of hyperplane is called support vectors.

In the region of two-dimensional (2D), this technique is a straight line dividing into two sectors wherein each sector temporal on one side by taking two unique data sets or pieces of information showing with bullets or dots. This graphic representation proposes a confirmative interpretation as shown in the figure. as various images showing the differentiation of sickly vs healthy persons.



	<i>Fasting</i>	<i>Just After Eating</i>	<i>3 Hours after eating</i>
<i>Normal</i>	<i>80 – 100</i>	<i>170 – 200</i>	<i>120 – 140</i>
<i>Pre-Diabetic</i>	<i>101 – 125</i>	<i>190 – 230</i>	<i>140 – 160</i>
<i>Diabetic</i>	<i>126 +</i>	<i>220 – 300</i>	<i>200 +</i>

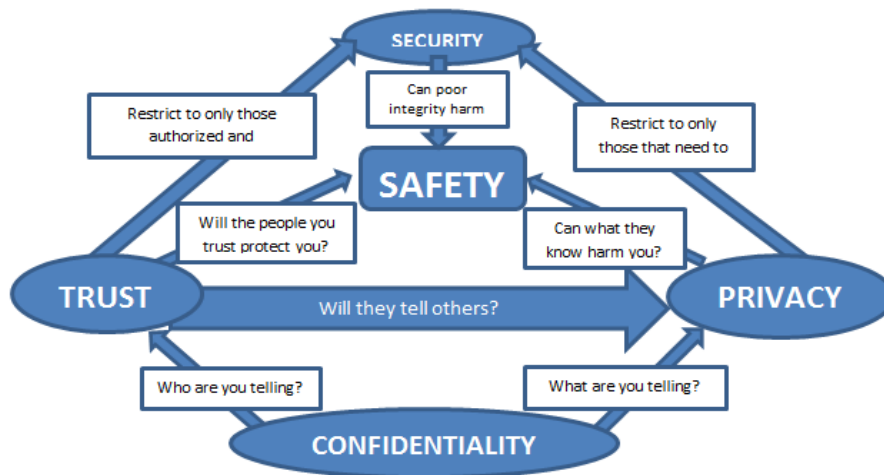
Table showing the various data set to analyses the data with the Machine Learning model.

### Privacy and security in smart health records

With the invention of technology, the government of India has initiated a tremendous attempt to revolutionize traditional health records integrates with information technology (IT). Electronic health records can produce huge profits and welfare by fixing responsibility and cutting costs. However, by computing and streamlining health records at the cloud. EHR systems have now become most vulnerable as having the most vital information now not only in the hand of medicals, doctors, or physicians, instead of all data now is on the cloud server, so this is now within the reach of hackers, crackers, and cybercriminals. Due to these ever-threatening privacy hacks for the critical health records.

A new branch has emerged named cybersecurity because for the policymakers this is the extreme affair for medical science in the era of the digital world. So many journals, articles, papers have been issued on cyberbullying and security and privacy concerns in health care. A lot of research is still going on in recent times to amend the privacy, security in EHR systems.

Uncompromising security and privacy safeguards are now essential for the everlasting accomplishments of EHR systems. If the trust and belief of patients have evacuated that EHR systems are apprehensive, most probably they are not going to use it and feel hesitant so not a single piece of information should be available to unofficial peoples. If a hacker is trying to access the record of any individual or trying to penetrate the medical history of any patient, then security is imposed.



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