

Big Data in Healthcare (P2)

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ABSTRACT

In this paper, I'll be describing the role of big data in healthcare, the application areas and how to be secure when using this data.

Keywords

Big Data; Big Data in Health Care; Application of Big Data in Health Care; Security of Big Data in Health Care

1. INTRODUCTION

Healthcare is a fragile industry. The symptoms of diseases and side effects vary from person to person, a new disease is evolving every single day, experience of specialists are limited by regions and there are several other points that effect to diagnose. A person comes across with different microbes, viruses or other cause of diseases, organ failures, false nutrition, lack of exercise, environmental causes and all of these have effect on people's health. Different kinds of vaccines, diet plans, medicine and processed/raw food is circulating in our bodies since we were born. Some of us had surgeries, broken bones, artificial suppliers, pacemakers attached. Billions of people live on earth, and every single one of them shows slightly different reaction to these health conditions. And every other healthcare companies produce different kind of health suppliers. Some of them are still in use, most of them are recalled or outdated. That brings us the huge amount of big data in healthcare.

2. WHAT IS THE ROLE OF BIG DATA IN HEALTH?

To process the enormous amount of data in healthcare sector, several kinds of technology have to be used. For example, the fact of "Antibiotic-Resistant diseases" cause both expenses and missing work-days in labor. Until the near past, antibiotics were the first door to knock when a microbial or virus caused disease. But especially in the last decade, the threat of antibiotic resistance started to be taken

seriously and CDC released a report about Antibiotic Resistance Threats in the United States in 2013 [3]. According to this report,

- Severe infections or illnesses caused by bacteria are showing increasing resistance to the drugs used for treatment.
- Antibiotic resistance can have harmful impact on high-risk groups, such as chronic illnesses, or cancer.
- Every year in USA, more than 2 million people are sickened with antibiotic-resistant infections, with at least 23,000 dying as a result [3].

But until this realization, antibiotics were the number one prescribed medicine whenever a patient went to doctor. Today, an important percentage of world started to prescribe antibiotics only when needed, but not all the countries have this understanding yet.

Antibiotic resistance is a good example of getting to use Big Data in health. Specialists and researchers collated millions of data from all around the world from people who use antibiotics, and they realized that bacteria or viruses also evolving themselves against antibiotics and gathered more resistance. Redundant use of medicine only helped to the cause of diseases, not to the people.

Only in the last 10 years, the expenses in healthcare in USA increased 5% every year, and the common sense is that can't be sustained. The biggest point of achieve at this moment is using Big Data techniques for analysing the collated health data from citizens, and making use of them into new treatments [4]. This will cut down the expenses and increase the quality of the healthcare.

Especially when we estimate the size of data which is gathered from all around the world, it's wise to supply these medical records to facilities for research as long as the security risks for sharing this data are eliminated.

3. DIFFERENT AREAS IN HEALTHCARE WHERE BIG DATA IS USED

Big Data is not only collated from reported incidents, it has been also gathered from monitoring. All the personal electronic devices used for healthcare, started to use internet nowadays and that allows us to connect all the devices, collate results and monitor personal health from different angles. Not only sick people use these devices in our decade, it has become very common with mobile phones or wearable devices, almost every single one of them have built-in health monitor applications.

Continuous monitoring will improve healthcare with bet-

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ter predictive modelling. This might be termed the 3M strategy for population health: Monitor—Measure—Manage. To manage populations to decrease cost and increase quality, it is necessary to measure populations to determine health status. To measure population health deeply, it is necessary to monitor individuals on a continuous basis [5]. By these devices you can do the following;

- Step counts are continuously measured by pedometer function
- Heart rate, body temperature, blood oxygen, stress rate etc. can be measured on demand
- Daily exercises can be measured and recorded
- Diet and daily nutrition can be recorded
- Many of the applications comes with daily programs and recommendations

Fitbit is one of the most popular activity tracker and it has reported by many users that they gained significant benefits from this tool [2]. That's quite amazing, because a personal tracker is making people responsible only to themselves, and it's all about self-discipline. These kind of tracker or monitoring applications is building a self-control mechanism and makes people more responsible to their own bodies. Accomplishing for this result can be done in small steps:

- 1) Log daily
- 2) Reflect quarterly
- 3) Plan yearly
- 4) Identify pattern of mistakes that seem to occur [2]

Of course, these steps can be increased or decreased, but the important achievement is getting benefits.

These personal devices may not be suitable for seriously ill people, and more precise devices should be used for tracking. Old fashioned blood pressure meters (sphygmomanometer), blood sugar meters (saccharimeter), personal measuring devices are also improved and integrated to each other. That allows people to track all levels from one center, collate the levels and compare with each other, track drug use, prescriptions and diagnoses to create one source for the patient's medical life.

That brings us to an important result, if every patient or person tracks their personal data like this, there'll be one huge pile of data created with all kinds of symptoms, causes, diagnoses and treatments. And imagine all these different factors create one virtual assistance for quick diagnosing? All the medical costs and time will be eliminated? That'd be unbelievable, yet quite in near future [4].

4. HOW TO KEEP SECURE THE BIG DATA IN HEALTHCARE?

Like every big achievements have consequences, sharing all these personal data comes with security issues. Of course, this is personal data and should stay personal, especially doctor-patient confidentiality has to be kept. According to Mathieu Gorge, CEO of Vigitrust, actual value of patient's data has to be considered all times [1]. The key steps for big data security in healthcare which are defined by Gorge:

- When you have access to health records, it's important to have a data classification policy.

- You need to use encryption to maintain confidentiality.

- You need to have a full disaster recovery plan for business continuity.

- You need to maintain connection security.

- It's important to have the enough data, not much, not less to avoid any irrelevancies [1].

As long as you keep your data secure, using big data in healthcare will be a huge step and will help millions of people. For the greater good, people need to be understanding the importance of these great improvements.

5. CONCLUSION

Every industry using technology and internet is collating terabytes of data for decades. This is also applicable for healthcare, and all the great value of this data is realised in last years with Big Data approach. With a full programmed security, all the data collected from hospitals, pharmacies, personal healthcare devices and activity trackers create the future of medical industry, and it's very important to make use of this huge source, this will cut down a significant part of health expense, redundant prescriptions and help people to have a better life with self-discipline and control.

6. REFERENCES

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