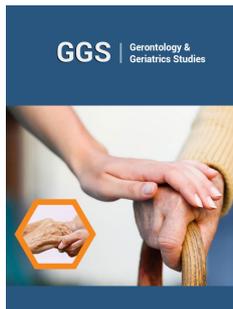


How AI is Keeping Blood Donation in Check

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Executive Summary

Machine learning and artificial intelligence are changing the way of living and have made their impacts on many areas like mental health, food deliveries, crypto currency and industries also evident in our day to day lives. Artificial Intelligence is and will change the way blood is donated, evaluating the quality, quantity and selection of blood for donation to patients. Although there are still doubts, advantages, disadvantages and concerns by doctors and experts questioning on the functionality and the effectiveness of Artificial Intelligence helping to keep the process of blood donation in check, but there have been slow and sprouting progressions in various laboratories across the globe who have been near success of bringing in the use of this technology with access and scalability which may or may not prove to be the future of blood donation (Figure 1).



Figure 1: N. Irene.

Keywords: Blood donation; Patient; Accidents; Plasma; Diseases

Introduction

The importance of blood donation is crucial and of high risk as many times people or victims in need of blood do not receive it on time risking their life, also sometimes resulting in fatality. These patients come from severe accidents, patients suffering from diseases like malaria and dengue or someone who is in need of an emergency blood donation of their specific type of blood type. There are also some extreme health conditions like Leukaemia and cancer where the patient sometimes experiences sudden blood loss and requires urgent supply of blood and quite often do not receive it, or do so but not in time. Only around 5% people belonging to the eligible donor population can donate blood (Katsaliaki, 2008). Almost about 118.4 million blood donations are collected worldwide [1]. 40% of these are collected in high-income countries, home to 16% of the world's population (WHO, 2020). Blood Donation may be of either the entire blood, or of specific elements directly (apheresis). Blood banks usually participate within the assortment method similarly because of the procedures

that follow it. Potential donors are evaluated for anything that may create their blood unsafe to use. Machine learning and artificial intelligence could modify the means in which donated blood is evaluated for quality and selected for transfusion to patients with ease and perfection compared to the manual work done by the doctors and nurses. Excitingly, blood is not a characteristic product and cannot be owned. After donation the blood encompasses of a period of time wherein it commonly splits into platelets, red blood cells, white blood cells and plasma, which takes roughly about forty-two days. Each of them has their own storage necessities and a shelf life. For example, platelets should be held on to around 22 degrees, whereas the red blood cells should be kept at around 4 degree centigrade. Moreover, the platelets will be held on for mostly 5 days, red blood cells up to 42 days and plasma up to one year. Solely around only 5% of the eligible donor population is actually donating blood. This low proportion highlights the danger humans are facing today as blood and blood products are forecasted to increase year by year [2].

Revamping the Disorganized System

The Indian blood donation scenario faces immense problems like acute shortage of blood supply, wastage of blood, transmission of harmful infections, relying on manual methods are bringing risk to both health and care. The Indian health system is at the verge of a digital transformation as Artificial Intelligence is very rapidly disrupting the manual labour and are bidding for accessibility, efficiency and scalability. While the private sector industries are the first one to take a step towards transformation with innovative interventions, the Indian government too has started taking a proactive role in building a foundation that help this digital health ecosystem to thrive on. Together they are making these emerging technologies possible and available, changing the way health care is delivered, data is harnessed for decision-making, making these processes automated and enhanced to provide better and faster care to the people of India [3].

Decoding Precision

Researchers from the University of Alberta have collaborated with scientists and various academic institutions in five countries while finding and researching into Artificial Intelligence (AI) that can be used to bring in efficiency to analyse the Red Blood Cells (RBC's). According to the World Health Organization (WHO), about 118.5 million donations are collected around the year, bring in the problem of accessibility between high- and low-income nations, making accurate assessment of blood storage even more important (WHO, 2020).

Efficiency and Safety

The researchers found that big data/Information and Artificial information applications will help facilitate and make sure that blood is kept safe from contamination after collection from the donor which is applied in the most optimal manner to the patients. As contamination, faulty cross-matching, inadequate testing and transmissible diseases are the key challenges in donating blood

from the donor the patient, a transparent digital footprint can help reduce physical/manual errors that can allow the specimen identification and tracking to be precise and appropriate. Computer vision for reading bar codes and spotting infections in the blood collected will be having all applications being explored but are far from the proof-of-concept phase. Discovering a robotics surveillance automated computer that will do a better job than any human effort could and will be able to pick up subtle differences in a way that humans cannot. The computing technology will not just show that the red blood cells do not just go from shape to another but will also elaborate on the gradual progression of the shapes and quality in samples from the blood products, being able to classify them accordingly with precision. This level of enhancement will also help prevent many infectious diseases spread through the manual process of blood donation. The AI powered technology will be able to distinguish and discriminate subpopulations of cells inside identical blood types that may facilitate health professionals spot potential health problems quicker and find out the dangerous factors of bound merchandise aiming to a particular patient expeditiously and fast. This will further be elevated by combining effective donor engagement with Artificial Intelligence (AI) powered inventory management to endlessly monitor blood and cause automated notifications once an exact element falls below the minimum level can considerably scale back wasteful assortment and promote optimizing of inventories [4]. These tools will be trained for exaggerated practicality like stocking informed universal blood varieties within the face of associated natural disasters.

In Terms of Patients

Keeping the important section of patients in mind, live huntsmen in AI engineered applications ought to be offered for the donor and therefore the patient to whom the service is to be provided will keep a track concerning their blood supply which can embrace it's method. Data and background concerning the donor moreover will keep the blood within the laboratory in check. These applications would be directly connected to the data passed on by the synthetic intelligence United Nations (UN) agency is providing. The precise information concerning the blood's condition presently and in progress can make sure that the blood given by the donor is safe and not wasted or misused as in many cases mishandling takes place. It will additionally facilitate keeping the patient or the doctor on track concerning the condition and level of the blood for donation.

Conclusion

Leveraging Artificial intelligence for clinical support, especially the blood donation sector where a lot of manual efforts are taken place, early alerting, precise data management, automated check and prevention of transmissible diseases is one in all the foremost promising areas of development for this revolutionary approach to knowledge analysis [5]. By powering a replacement generation of tools and systems that create the doctor's additional attentive to nuances, additional economical once deliverable care, probably to

induce sooner than developing issues, AI can begin a replacement era of clinical quality and exciting breakthroughs in patient as well as doctor's health and safety. One main pain purpose refers to the dearth of sympathy and also moral quandary which will occur between the AI and the patients, whereas this can be true for these days, it is naive to assume that this way of technology can stay dormant and cannot progress to any further extent. Hence, it is essential to market remote health care facilities/technologies and to own permanent solutions in situ to avoid wasting lives so as to cut back any unneeded burden or risk on each health care staff and patients alike.

Call to Action

It is recommended that every industry and both government as well as private sectors should get together and include and invest

in Artificial intelligence to alter the future of health industry across. This step will not only change the health facilities but moreover will built safety and security for both the doctors as well as the patients.

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