

Chapter 7

The Role and Impact of Federal Learning in Digital Healthcare: A Useful Survey

Rajasree R. S.

New Horizon College of Engineering, India

Gopika G. S.

Sathyabama Institute of Science and Technology, India

Sree Krishna M.

Sathyabama Institute of Science and Technology, India

Carlos Andrés Tavera Romero

Universidad Santiago de Cali, Colombia

ABSTRACT

During the COVID-19 pandemic, IoT and machine learning played a very important role in assisting doctors by remote patient monitoring. Machine learning and deep learning algorithms are used to process the data that are generated by IoT devices. However, there was major concern about the privacy of the patient data that is generated. The data that has been generated by the devices was sent to central servers which may cause data privacy issues. FL (federated learning), a type of machine learning, was created to address this problem. It provides a solution for data governance and privacy by processing the data rather than transferring the data to another location. The performance of FL models is better when compared to the models that are trained on datasets maintained centrally. In this work, certain insights are given on some of the challenges faced by the healthcare industry while employing digital healthcare techniques and how FL (federated learning) can improve the digital healthcare as well as how patient data can be preserved.

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INTRODUCTION

Machine learning is considered a science exposed and developed in the 1950s as a subset of artificial intelligence. The first steps in deep learning date back to the 1950s, and there have been no significant advances in this field. However, studies in this domain were revived, extended, and continued throughout the 1990s. It's a technology that'll keep progressing. This pattern is due to the difficulties of interpreting and analyzing the continuously rising data. Machine learning is predicated on accumulating more data to discover the best model-based approach knowledge among previously collected data. As a corollary, computer vision innovation will keep pace with the expanding volume of information. As a consequence, supervised learning work will proceed at the same time as the massive data grows. The objective of this research would be to help educate experts about machine learning as well as its tools, but has become progressively prevalent. The impact of machine learning, the procedures used in machine learning, its specific uses, and the main objective of this survey is to help educate scientists about machine learning and its apps that became popular recently.

Machine Learning and Artificial Intelligence are extensively used these days in different sectors like educational sector, business sector, sports, industry healthcare sector, e-commerce and many more. Health care sector demands quality treatment and health care services. The application of ML in healthcare sector increases day by day.

According to Deloitte, AI will enable major scientific breakthroughs and accelerate creation of new therapies and vaccines to fight against the diseases. AI-enabled digital therapeutics and personalized recommendations will empower consumers to prevent health issues from developing. AI-generated insights will influence diagnosis and treatment choices, leading to safer and more effective treatments. Additionally, intelligent manufacturing and supply chain solutions will ensure the right treatments and interventions are delivered at the exact moment needed by the patient.

Telemedicine

Telemedicine is a broad term that encompasses all of the aspects you and ones doctor can interact using advanced technologies while not even in the same room. During the Covid -19 pandemic, telemedicine has got a wide popularity where examination of the patients and consultation are performed through communication devices. Patients can consult the physician by using a mobile application or through a video conferencing and discuss about their health conditions. It is a boon to elderly patients who are unable to reach hospitals. Telemedicine can be classified into different categories

Interactive Telemedicine

In an interactive telemedicine, patients who seek medical attention are given immediate advice in video conferencing software's and phone calls. The software's that are used for interactive telemedicine must protect patient privacy. The patient protection policies are defined by The Health Insurance Portability and Accountability Act (HIPAA) was enacted to make health insurance more Health Insurance Portability and Accountability Act of 1996 (HIPAA) is a federal law that mandated the construction of global regulations to prevent important patient data from it being divulged without the prior consent of the customer.

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