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Perspective

Advancement of Big Data in the Field of Healthcare

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DESCRIPTION

The term "big data" is not new, but the definition of it is continually evolving. Various attempts to define big data boil down to a collection of data items whose size, speed, kind, and/or complexity need the development, adoption, and invention of new hardware and software processes in order to store, analyzed, and visualize the data successfully. Healthcare is a great example of how the three *vs.* of data, velocity (the rate at which data is generated), variety, and volume, are all inherent characteristics of the data it generates. This information is dispersed among a variety of healthcare systems, insurers, researchers, government agencies, and other organisations. Furthermore, each of these data repositories is compartmentalized and hence unable to provide a platform for global data transparency.

Big data analytics in medicine is explored in three categories. These three domains are not meant to be full representations of big data analytics in medicine; rather, they are meant to provide an overview of broad, popular fields of research where big data analytics concepts are currently being used.

Medical photographs are a valuable source of information that is commonly utilized for diagnosis, therapy evaluation, and planning. CT, MRI, X-ray, molecular imaging, ultrasound, photoacoustic imaging, fluoroscopy, Positron Emission Tomography-Computed Tomography (PET-CT), and mammography are some of the imaging techniques that are well-established in clinical contexts. Medical picture data can be a few gigabytes per study (e.g., histology images) to hundreds of megabytes per research (e.g., a thin-slice CT examination with up to 2500 scans each trial). If such data is to be kept for a long time, it will necessitate a huge storage capacity. If any decision-assisting automation is to be performed using the data, it also necessitates fast and precise algorithms.

Medical signals, like medical images, present volume and velocity challenges, particularly during continuous, high-resolution capture and storage from a plethora of monitors connected to each patient. Physiological signals, on the other hand, pose spatiotemporal complexity in addition to data size difficulties. The interpretation of physiological information is typically more meaningful when combined with situational context awareness, which must be incorporated into the construction of continuous monitoring and predictive systems to ensure their effectiveness and reliability.

With the advancement of high-throughput sequencing technology, the cost of sequencing the human genome (which contains 30,000 to 35,000 genes) is fast lowering. Analysis of genome-scale data for creating meaningful suggestions in a timely manner is a significant problem for the area of computational biology, with implications for current public health policies and care delivery. In a clinical context, the cost and time it takes to make advice are critical. Finally, showing recommendations into practise remains a major difficulty for this discipline. Exploration, discovery, and clinical translation of such high-density data necessitate fresh big data techniques and analytics.

CONCLUSION

Big data analytics, which makes use of a plethora of heterogeneous, structured, and unstructured data sources, will play a critical role in the future of healthcare. A variety of analytics are already being used to aid in the decision-making and performance of healthcare workers and patients. Medical image analysis, physiological signal processing, and genetic data processing were the three areas of interest here. The exponential growth in the volume of medical images compels computer scientists to devise novel ways to process such a massive amount of data in a manageable amount of time.

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