Report : Using combination of Sequence Processing and Image analysis for stratified healthcare and precision medicine

Introduction

There has been a remarkable paradigm shift in Personalized medicine from the 'One size fits all approach to personalized medicine, which involves personalizing therapies for people based on their genetic makeup has grown in popularity. The ability to quickly analyze numerous genes concurrently due to current genomic sequencing technology, however, is fundamentally altering how genetic testing may be utilized in clinical treatment. Researchers, clinicians, payers, policymakers, and patients will need to comprehend sequencing underlying concepts in order to decide how it may be utilized. For a long time, numerous medical imaging technologies have been crucial to healthcare. The X ray was invented by Wilhelm Rontgen in the late 19^{th} century and soon after that, it was employed in medicine.

Combination of Sequence processing and Image analysis for Healthcare and Precision medicine

The imaging of bodily components, typically internal organs is employed regularly nowadays to diagnose patients using a variety of technologies ad techniques. Furthermore, this technique is a powerful tool in stratified healthcare and precision medicine when combined. One such technique that can be used in combination is Sequence Processing and Analysis. Sequence analysis in bioinformatics refers to the processing of DNA, RNA or peptide sequences using a variety of analytical techniques in order to comprehend its structure and function. Sequence assembly, sequence alignment and searches among biological databases are among the methodologies employed . Due to the enormous quantity of information it generates as well as its complexity , diversity, and rapidity , Sequencing is a well-known example of a big data technique. Sequencing processing offers tremendous potential but policy challenges include how to maximise patient involvement and data confidentiality,establishing coverage policies to consider differentiation between research from clinical implications and account for bioinformatic costs and assessing the economic value of sequencing through sophisticated,economic models that account for variety of findings and downstream costs . Sequence analysis make use of an algorithm for comparing and exploring sequence similiarity.These analytical methods can aid precision medicine for example by providing a understanding in rare diseases and henceforth developing of targeted therapies .By combination of sequence processing to identify,predict disease and then implementing image analysis can help in identification and testing for disesase aims to provide better prevention and treatment.This combination of approaches can facilitate creating a rich complete feature by connecting image data with other patient information like genetic or lifestyle data resulting in certain diagnosis or course of therapy.

Example in healthcare

As an example for treating mental health and precision medicine using this combination approach, we have a much better chance of identifying what has made a person vulnerable to a mental health episode and how can we possibly predict that more easily ,step in sooner and prevent the full onslaught of these conditions using the combination of genetic studies,sequence processing with advanced brain imaging studies and with a much better and richer idea about environmental exposures ,lifetime exposures and can do it in a holistic manner

Challenges and Ethical considerations

With all successful considerations, however it is hard to envisage a future where all the medical photos are stored ,processed and altered without any digital participation. IT solutions are currently a common tool for handling this sort of data. If technologies are also employed to analyse this data, they may prove to be much more beneficial . Another challenge in this regard is identification of specific variant from large data for definite diagnosis .

Along with this some safety and ethical issues are concerning in this regard as these data can now be gathered, handled, and evaluated because to advancements in information technology and data size. The findings may offer insightful information on the medical and healthcare industries. As a result, medical and health data become a valuable resource with a variety of possible applications. However, society is concerned about the growing ability of data science to extract and reuse personal information. Although individual, clinical and health information affects everyone. Therefore, there is a public interest in using medical and health data responsibly. The general population is aware of the benefits and is ready to support scientific research to create better medical treatments and healthcare advancements. However, they are equally concerned with safeguarding people's privacy, including their identities. Considering that sensitive information is contained in medical and health records, privacy is actually of utmost importance. This brings up the dangers associated with the usage of personal data. There are a variety of dangers, including threats to cyber security or data abuse that might be harmful to people or organizations. Medical and health information must thus be kept confidential and safe. An individual's identity can be safeguarded by measures and data deidentification. Removing identifying information, substituting IDs with a special code, and combining data into bigger datasets are a few examples of how to do this. Different legal measures have been put in place to preserve privacy. First, all EU individuals are shielded from privacy and data breaches by the EU General Data Protection Regulation, or GDPR. Second, the Human Rights Act of the UK provides the right to privacy, unless there is an established, compelling public interest.

Conclusion

Data analysis in healthcare is a promising tool for stratified healthcare and precision medicine However, the use of data may not be ethically acceptable even if it complies with the law. As a result, efficient data usage governance is crucial. In order for society to reap the advantages with the fewest dangers, the law and ethical governance must change along with how data is used in the future.