Healthcare and Natural Language Processing (NLP)

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Use of NLP Tools in Healthcare

Healthcare providers have long used natural language processing (NLP) tools, such as voice recognition, to facilitate electronic medical record (EMR) tasks. These tools can help doctors to meet documentation requirements through dictation, often in front of patients, with the added benefits of reducing manual documentation completion requirements, assurance for patients that what is being dictated is accurate, and the ability to place greater attention of the patient due to the inherent efficiencies of the approach.

NLP tools are also used by health systems to conduct a range of other tasks, including the tracking of patients using diagnosis or procedure codes, which are mostly created for billing purposes.[1] Machine learning and NLP tools have further shown potential for detecting complex patients who may benefit from enhanced care coordination.[2]

Healthcare providers have been more hesitant to utilize machine learning and NLP tools as part of their clinical workflows to identify possible diagnoses in patients. Artificial intelligence (AI) certainly offers a short cut to the interpretation of clinical data. But it is not without some pitfalls. For example, recent studies showing racial bias perpetuated by the use of this technology also contributes to providers hesitancy to adopt the technology.[3]

Expanding the use of NLP to Identify Disease

Despite some pitfalls, the use of NLP for diagnoses is likely to increase. To this end, managed care provider, Kaiser Permanente, recently completed a study involving the use of natural language processing (NLP) technology by clinicians. The study, conducted by Matthew Solomon, MD, a cardiologist at The Permanente Medical Group and a physician researcher at the Kaiser Permanente Division of Research in Oakland, California, identified more than 50,000 patients with previously undiagnosed cases of aortic stenosis, a common heart disease.[4] Solomon explained:

"Without accurate and systematic case identification, population management and research on valvular heart conditions and many other complex conditions isn't possible. We set out to tackle this problem by developing natural language processing algorithms that make it possible to teach a computer how to do this for us."[5]

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[1] McNemar, Erin. "Identifying Disease with Natural Language Processing Technology". Health IT Analytics. September 27, 2021. Accessed on September 29, 2021. Available at: https://healthitanalytics.com/news/identifying-disease-with-natural-language-processing-technology

[2] Kent, Jessica. "4 Natural Language Processing Use Cases for Healthcare Orgs". Health IT Analytics. July 25, 2018. Accessed on September 29, 2021. Available at: https://healthitanalytics.com/news/4-natural-language-processing-use-cases-for-healthcare-orgs

[3] Heath, Sara. "Predictive Analytics Algorithm Displays Bias, Drives Inequity". Health IT Analytics. October 28, 2019. Accessed on September 29, 2021. Available at: https://healthitanalytics.com/news/predictive-analytics-algorithm-displays-bias-drives-inequity

[4] McNemar. *op. cit.*

[5] *Ibid.*

For what would otherwise be a daunting task, likely to have taken years, researchers were able to identify the nearly 54,000 patients within minutes. The NLP, trained by researchers, was able to sort through over a million electronic medical records (EMR) and echocardiogram reports to identify certain abbreviations, works, and phrases associated with aortic stenosis.[6]

Whatever biases or other issues have detracted from the use of certain NLP and artificial intelligence approaches in healthcare, providers can be confident to invest in these new technologies. Results like the recent Kaiser study show that these technologies have the potential to improve diagnostic abilities and, therefore, patient outcomes. As Solomon noted, "[t]hese AI techniques will be able to assist doctors and other providers to care for their patients in ways that were not previously possible".[7]

[6] *Ibid.*
[7] *Ibid.*