TODAY'S CLINICAL LAB

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Applying AI to Handwriting May Offset Critical Lab Staffing Shortages

Accuracy of handwriting recognition technology has improved

May 09, 2024 LEE SPRINGER, PHD

A decades-long staffing retention problem has burdened the clinical laboratory profession and health care facilities across the US. However, artificial intelligence (AI) may be able to alleviate some of this burden with an evolving technique that helps accurately recognize handwriting on lab requisitions.

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As anyone reading this can appreciate, the lab profession faces various challenges from a **56 percent reduction in graduates from qualified laboratory science programs** compared to 20 years ago. On the flip side, there will be an **estimated 24,000 openings for clinical laboratory technologists** each year through 2032.

Such staffing issues create an impact on many laboratories' operational capacities across the US, which ultimately impacts the nation's health care system. More importantly, they have a substantial influence on quality and error rates.

Pre-analytical stage is rife with potential errors

This problem can be evident in the pre-analytical stage of testing, in which phlebotomists are a key part of the laboratory team. The pre-analytical stage is crucial to ensuring providers place the proper test orders, the lab gathers billing information, and clinicians track patient identification to produce optimal patient outcomes.

Errors in this process, such as missed or improper test orders due to transcription error, can delay diagnosis, care, and treatment. Prior studies have shown that **65 percent of laboratory errors occur in the pre-analytical ordering and processing phase** of clinical diagnostic testing. With staffing shortages and a continuing rise in diagnostic testing volumes, labs not only have a staffing crisis, but perhaps will have a quality crisis on the horizon as well.

Much of the impact in the pre-analytical phase stems from the volume of paper orders processed, which for both outpatient and outreach testing can be a considerable portion of daily patient orders. Paper orders take up precious time and result in the largest portion of clerical or transcription errors made.

Optical character recognition offers improvements

However, new capabilities are emerging in optical character recognition utilizing AI, including **fuzzy logic,** which simulates human reasoning as it dissects imprecise data. These advancements have made it possible to rapidly scan documents, such as handwritten requisitions and health insurance information, to create an instant e-order for transmission to a laboratory information system or electronic medical record in under a minute.

Untrained AI has demonstrated a 91.08 percent accuracy rate in recognizing handwriting on laboratory requisitions and insurance documentation. Even better, when data scientists map trained formats and document formats, accuracy can reach up to 98.4 percent; when augmented with human verification, accuracy can reach 99.9 percent to 100 percent, according to research that LabSavvy plans to present during a session at the Association for Diagnostics & Laboratory Medicine's annual meeting in July.

The performance of this technology, particularly with handwriting, shows its value in error

reduction, in time savings in order processing, and in reducing staff burden for manual entry of paper-based orders.

The use of AI-augmented req ordering not only improves accuracy and reduces staffing burdens, but it can also reduce operational costs for laboratories as well.

While AI isn't a silver bullet for the laboratory profession's staffing woes, it does have the potential to be a valuable tool to ease some burden for labs.