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USING DATA SCIENCE TO BETTER STRUCTURE MEDICAL RECORDS WHEN SECONDS COUNT

The growth of electronic health records is exponentially increasing the amount of information about patients available to their physicians. To better serve patients, the team at the MedStar Institute for Innovation (MI2)—which serves as a catalyst for innovation across the entire MedStar Health organization—sought a scientific solution to this technology challenge in collaboration with the data science team at Booz Allen Hamilton. Together, they applied health and data science expertise and natural language processing to clinical data and have created a solution to this vexing problem.

THE CHALLENGE

When a patient has a symptom, what are the key facts in his or her entire medical record that enable a physician to improve that patient's outcome? Since medical records can now encompass more than 20 years of unstructured and semi-structured data, including free text dictations and clinic notes, it is difficult to know what few top facts will make a difference in the patient's care.

MI2's Kevin Maloy, an emergency department physician, explains the challenges of the project this way: "When I see patients in the emergency department (ED), they often tell me, 'Why are you asking me so many questions, everything is in the computer.' And while we do have a lot of information on them, key facts can often be buried in their record. The modern electronic health record is organized somewhat like a chronological journal without an index in the back. If someone is in the ED today because they have a headache, the crucial fact in their history may be on page 20. But if they are there because of their belly pain, the relevant information might be on page 121. Currently, there is no way to know which page to turn to."

THE APPROACH

To bring a technology solution to this emergency care challenge, Booz Allen coupled its deep data science background and natural language processing (NLP) experience with the subject matter experts at MI2. As Booz Allen worked on code and set up the API, MedStar clinician experts evaluated and added extra resources to help the algorithm learn the types of information that would be most relevant to a user.

Together, the teams developed a technology called Dictation Lens, which automates the assessment of relevant facts in a patient's complete medical history. With this technology in place, clinicians can quickly find the relevant signal in the noise in moments of urgent care.

Data scientist Ernest Sohn has worked in health analytics for nearly 10 years. He says the Dictation Lens technology "looks at all different types of unstructured data, and then based on what the patient came in for, it uses NLP and machine learning to pull in the most relevant information so the clinician can make the most informed decision about what care to provide."

"It's all about getting relevant key terms," Maloy adds. "One previous diagnosis or procedure may be relevant to one symptom, while it may not be important if the patient has another. This system takes the symptoms presented and finds relevant information in free text, displaying it to the clinician in a user-friendly fashion."

"Dictation Lens totally changes how you think about patients," says Maloy. "When I work with the people at Booz Allen, I'm astounded by the complexity in making this situation actually work."

"Emergency room doctors use Booz Allen's data science solution to make quicker, more accurate patient diagnoses."

THE SOLUTION

With MI2 expertise—and a decade's worth of patient data—Booz Allen data scientists were able to unlock a solution in an area of great need. Their partnership resulted in a MedStar pilot program for Dictation Lens technology.

Emergency clinicians at MedStar Health are using Dictation Lens and creating even more opportunities in the health space for Booz Allen's data scientists, who are now further equipped to continue innovating.

THE FUTURE

Dictation Lens is only "the beginning of a suite of tools that become part of the medical care team," says Sohn. "These tools can meet problems from the front lines and from clinicians themselves."

In the health analytics space, Booz Allen and MedStar have innovated by marrying subject matter expertise with unparalleled data science skills. In doing so, they've brought unique analytics and technology solutions to emergency care that is enabling physicians to make quicker, more accurate diagnoses when seconds count

UNLOCK THE POTENTIAL OF AI

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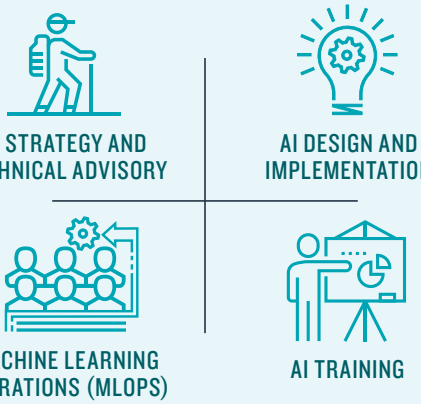

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