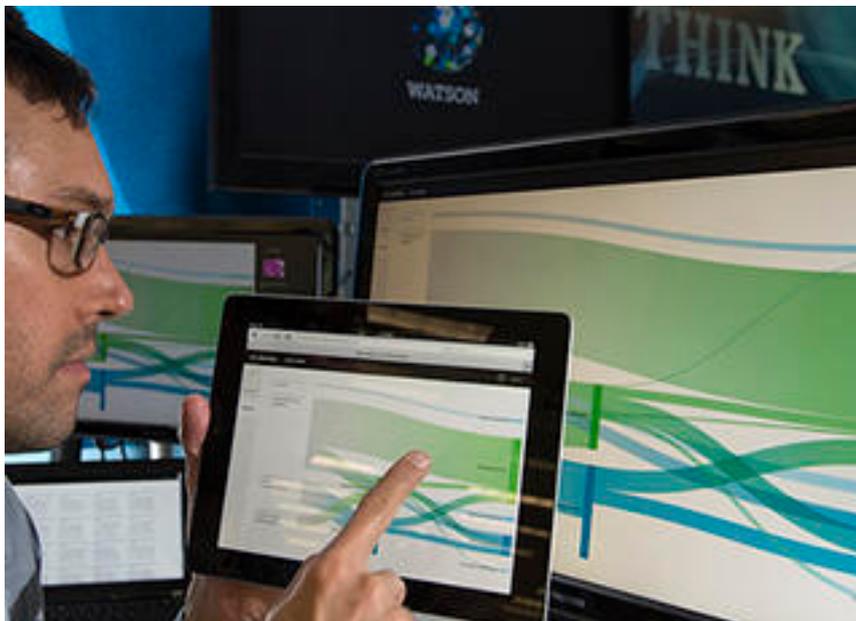


Two New Watson-related Cleveland Clinic Projects Unveiled

IBM Research



CLEVELAND, OH -- IBM

Research has unveiled two new Watson-related cognitive technologies that are expected to help physicians make more informed and accurate decisions faster and to cull new insights from electronic medical records (EMR).

The projects known as "WatsonPaths" and "Watson EMR Assistant" are the result of a year-long research [collaboration](#) [1] with faculty, physicians and students at [Cleveland Clinic Lerner College of Medicine of Case Western Reserve University](#) [2]. Both are key projects that will create technologies that can be leveraged by Watson to advance the technology in the domain of medicine.

With the [WatsonPaths](#) [3] project, IBM scientists have trained the system to interact with medical domain experts in a way that's more natural for them, enabling the user to more easily understand the structured and unstructured data sources the system consulted and the path it took in offering an option. The Watson EMR Assistant project aims to enable physicians to uncover key information from patients' medical records in order to help improve the quality and efficiency of care.

"On *Jeopardy!* it was not necessarily critical to know how Watson arrived at its answer. But doctors or domain experts in any field will want to understand what information sources Watson consulted, what logic it applied and what inferences it made in arriving at a recommendation," said Eric Brown, IBM Research Director of Watson Technologies. "Through our research collaboration with Cleveland Clinic, we've been able to significantly advance technologies that Watson can leverage to handle more and more complex problems in real time and partner with medical experts in a much more intuitive fashion. These are breakthrough technologies

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intended to assist future versions of Watson products."

"WatsonPaths is designed to augment the problem-based learning methods that Cleveland Clinic medical students employ in the classroom. The vision is for WatsonPaths to act as a useful guide for students to arrive at the most likely and least likely answers to real clinical problems, but in a classroom setting," said [J. Eric Jelovsek](#) [4], MD, MMEd, Director of the [Cleveland Clinic Multidisciplinary Simulation Center](#) [5]. "Of course, it is also easy to visualize how this type of technology could eventually be a tool for physicians to use in real-time clinical scenarios — a powerful guiding reference to consult when diagnosing and identifying the best treatment options."

Using WatsonPaths to support clinical reasoning

WatsonPaths explores a complex scenario and draws conclusions much like people do in real life. When presented with a medical case, WatsonPaths extracts statements based on the knowledge it has learned as a result of being trained by medical doctors and from medical literature.

WatsonPaths can use Watson's question-answering abilities to examine the scenario from many angles. The system works its way through chains of evidence — pulling from reference materials, clinical guidelines and medical journals in real-time — and draws inferences to support or refute a set of hypotheses. This ability to map medical evidence allows medical professionals to consider new factors that may help them to create additional differential diagnosis and treatment options.

As medical experts interact with WatsonPaths, the system will use machine-learning to improve and scale the ingestion of medical information. WatsonPaths incorporates feedback from the physician who can drill down into the medical text to decide if certain chains of evidence are more important, provide additional insights and information, and weigh which paths of inferences the physician determines lead to the strongest conclusions. Through this collaboration loop, WatsonPaths compares its actions with that of the medical expert so the system can get "smarter."

WatsonPaths, when ready, will be available to Cleveland Clinic faculty and students as part of their problem-based learning curriculum and in clinical lab simulations. With an emphasis on critical thinking and problem solving, WatsonPaths will be able to help medical students learn how to quickly navigate the latest medical information and will display critical reasoning pathways from initial clinical observations all the way to possible diagnoses and treatment options.

Unlocking the promise of electronic medical records with Watson EMR Assistant

IBM and Cleveland Clinic are using Watson EMR Assistant to explore how to navigate and process electronic medical records to unlock hidden insights within the data, with the goal of helping physicians make more informed and accurate decisions about patient care.

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Historically, the potential of EMRs has not been realized due to the discrepancies of how the data is recorded, collected and organized across healthcare systems and organizations. The massive amount of health data within EMRs alone presents tremendous value in transforming clinical decision making, but can also be difficult to absorb. For example, analyzing a single patient's EMR can be the equivalent of going through up to 100 MB of structured and unstructured data, in the form of plain text that can span a lifetime of clinical notes, lab results and medication history.

Watson's natural language expertise allows it to process an EMR with a deep semantic understanding of the content and can help medical practitioners quickly and efficiently sift through the massive amounts of complex and disparate data and better make sense of it all. With this research project, Watson's robust pipeline of natural language processing and machine learning technologies is being applied to begin analyzing whole EMRs with the goal of surfacing information and relationships within the data in a visualization tool that may be useful to a medical practitioner.

Working with de-identified EMR data provided by Cleveland Clinic and with direction from Cleveland Clinic physicians, the goal of the Watson EMR Assistant research project is to develop technologies that will be able to collate key details in the past medical history and present to the physician a problem list of clinical concerns that may require care and treatment, highlight key lab results and medications that correlate with the problem list, and classify important events throughout the patient's care presented within a chronological timeline.

To learn about how WatsonPaths came to be and how it fits into IBM's vision of the era of cognitive computing, read a blog post by IBM researcher Michael Barborak on the A Smarter Planet blog, <http://asmarterplanet.com/blog/2013/10/the-future-of-watson-computers-that-interact-naturally-with-people.html> [3].

About Cleveland Clinic

Cleveland Clinic is a nonprofit multispecialty academic medical center that integrates clinical and hospital care with research and education. Located in Cleveland, OH, it was founded in 1921 by four renowned physicians with a vision of providing outstanding patient care based upon the principles of cooperation, compassion and innovation. Cleveland Clinic has pioneered many medical breakthroughs, including coronary artery bypass surgery and the first face transplant in the United States. *U.S. News & World Report* consistently names Cleveland Clinic as one of the nation's best hospitals in its annual "America's Best Hospitals" survey. More than 3,000 full-time salaried physicians and researchers and 11,000 nurses represent 120 medical specialties and subspecialties. The Cleveland Clinic health system includes a main campus near downtown Cleveland, more than 75 Northern Ohio outpatient locations, including 16 full-service Family Health Centers, Cleveland Clinic Florida, the Lou Ruvo Center for Brain Health in Las Vegas, Cleveland Clinic Canada, and, currently under construction, Cleveland Clinic Abu Dhabi. In 2012, there were 5.1 million outpatient visits throughout the Cleveland Clinic health system and 157,000 hospital admissions. Patients came for treatment from every state and from more than 130 countries.

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Links:

- [1] <http://www.research.ibm.com/cognitive-computing/watson/watsonpaths.shtml>
- [2] <http://portals.clevelandclinic.org/cclcm/Home/tabid/4257/Default.aspx>
- [3] <http://asmarterplanet.com/blog/2013/10/the-future-of-watson-computers-that-interact-naturally-with-people.html>
- [4] <http://simcenter.clevelandclinic.org/About-Us/Team.aspx>
- [5] <http://simcenter.clevelandclinic.org/>