Press release

Artificial intelligence, a disruptive tool for players in healthcare

From decision support to the identification of new therapeutic targets, artificial intelligence[i] (AI) is rapidly expanding in the field of health. Alcimed, a consulting and new market development consulting company, highlights the current potential of AI in healthcare and questions its future prospects.

Paris, April 3, 2017 – Every day medicine faces new challenges: new diseases, new therapeutic solutions, cost reductions, rapid decision-making and the processing of massive amounts of data. In this context, AI has a major role to play, particularly in the detection of weak signals and the decision-making processes. Its capacity to collect and analyze patient data, together with its ability to evaluate the various scenarios and then extract the optimal result, are real assets for healthcare professionals, researchers, industrialists, regulatory authorities and, above all, patients. On top of this multitude of medical applications, AI can potentially change patient management in the long term. In addition to the great interest it creates among pharmaceutical companies, the technology could also encourage the emergence of new players and reshape the health market.

Artificial intelligence already anchored in the healthcare sector

First of all, AI is a powerful decision-making tool, **both in terms of diagnosis and therapeutic recommendation**. With this in mind, IBM, in collaboration with the Memorial Sloan Kettering Cancer Center in New York, was able to train its AI Watson system in oncology. Applied in a referral center in India, Watson was able to give 90% of therapeutic recommendations in line with those of doctors in 638 cases of breast cancer[ii]. In addition, Professors Hauser and Bennett of Indiana University have succeeded in developing an AI system which provides a 50% more reliable diagnosis[iii] at half the cost of a doctor for a population of patients suspected of major depression, 65 to 70% of whom also suffer from chronic diseases (diabetes, hypertension, cardiovascular disease).

AI also finds its place in research. It reduces the costs and time of research processes. Berg Health's AI platform analyzes various biological data (protein and lipid profiles, genetics, transcriptomics, etc.) to identify biomarkers for specific diseases, and then suggests new therapeutic targets for the development of new drugs. Similarly, the Watson Discovery Advisor application, used within the framework of a partnership between IBM, J&J, Baylor College of Medicine and the New York Genome Center, identified six proteins that influence the p53 protein, which is linked to many cancers, by analyzing 70,000 scientific articles. The same analysis performed by a scientist could have taken more than 30 years[iv].

The ability of AI to **process weak signals and make initial diagnoses can also have several direct applications for patients.** For example, the BewellConnect application of the Visiomed group, connected to medical devices (glucometer, blood pressure monitor, ECG, etc.), establishes a pre-diagnosis in real time and advises the patient on the procedure to follow according to their vital constants. The AiCure application, on the other hand, aims to increase patient compliance and adherence to treatment by confirming, via the camera on their smartphone and using facial recognition, that the patient has taken their medication correctly. Finally, also related to facial recognition, a study published in the *Journal of Pediatrics*[v] showed that AI could assess the pain of children who underwent an operation for appendicitis as accurately as the assessment scales used so far.

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[i] *The term "Artificial Intelligence" (AI) refers to a collection of theories and scientific methods of giving computer programs characteristics similar to human cognitive processes: understanding, perception of the environment, analysis of complex data, etc. The aim is to induce the development of reasoning and learning skills.*

[ii] *SABCS 2016: IBM Watson for Oncology Platform Shows High Degree of Concordance With Physician Recommendations*, ASCO post, 2016

[iii] *Artificial intelligence framework for simulating clinical decision-making: a Markov decision process approach*, Bennett CC, Hauser K, 2013

[iv] *IBM Watson Ushers in a New Era of Data-Driven Discoveries*, IBM.com

[v] *Automated Assessment of Children's Postoperative Pain Using Computer Vision*, K.Sikka, 2015

Finally, since the **collection and processing of large-scale epidemiological data is a public health concern**, AI is of increasing interest to health authorities. It is then a question of surveillance and anticipation, and it is with this objective in mind that the US Food and Drug Administration (called FDA) launched the *"Sentinel Initiative"*[vi], a project based on a proactive side effect surveillance system, collecting data from nearly 125 million patients.

A field that opens up perspectives on patient care and market organization

Although the issue has been raised, **AI is not expected to replace doctors in the short or medium term, but rather to be a tool to assist them in their practice**. Preserving the human patient-physician relationship is still essential in the care of patients. Moreover, the responsibility for both diagnosis and therapeutic decision is entirely borne by the doctor and the inability to guarantee a zero risk of a false analysis of AI today does not allow us to foresee a future without a doctor in the coming years.

Secondly, because it **draws its strength from the analysis of patient data, AI offers the perspective of an open and accessible environment**, which differs from the current situation. It is reasonable to believe that successful developments, providing added value in patient care, can lead to a movement towards even more openness and access to our personal data.

Finally, AI is driving the health market to evolve with the arrival of new players whose expertise is no longer in drug development and production, but in mastering the technological tools needed to develop AI. Titans like Google, Amazon, Microsoft or Apple are now positioning themselves in health. DeepMind, a start-up acquired by Google and initially specialized in deep learning, works mainly on health-related projects through the DeepMind Health division. There are also joint ventures between laboratories and "big techs" such as Onduo, created by the merger between Sanofi and Google.

"Artificial intelligence will have a strong impact on the healthcare market," insists Lambert Lacoste, Project Manager at Alcimed. *"On the other hand, the question today is how the market will evolve. Will the skills in artificial intelligence be integrated within the laboratories, or will they remain in the hands of specialized players?"*

ABOUT ALCIMED – www.alcimed.com

Founded in 1993, ALCIMED is an innovation and new business consulting firm specialized in life sciences (healthcare, biotech, agri-food), chemicals, energy as well as in aeronautics, space, defense and public policy. Today ALCIMED works with major industrial groups, ETIs and SMEs, investment funds and institutional players. ALCIMED relies on a team of 180 highly-skilled individuals to help its clients in the exploration and development of their unchartered territories: New Technologies, Market Innovation, High-Growth Geographies, and Strategic Foresight. ALCIMED is headquartered in Paris and has offices in Lyon and Toulouse in France, as well as in Germany, Belgium, Switzerland, the United-States and Singapore.

Alcimed is a member of CroissancePlus and the ACI (Association des Conseils en Innovation).

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[vi] www.fda.gov