

# The introduction of cognitive technology at Crédit Mutuel

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## **Abstract:**

Even as the digital transition is changing the behavior patterns of its shareholding customers, as its account advisors need everyday assistance in order to provide better services to customers, and as the first cognitive computing solutions based on IBM's Watson technology are emerging, the Crédit Mutuel, a mutualist bank in France, is working with IBM to develop the first AI applications in the French language. This project, which started in mid-2015, has come up with three initial solutions (an e-mail analyzer and two virtual assistants) that were deployed during the first semester of 2017 in the 2800 branch offices of the Crédit Mutuel and the CIC. The 20,000 account advisors who follow up on relations with customers will use these tools. After explaining the process of developing these AI solutions in the bank, attention is turned toward the initial training and continuous learning necessary for using this technology, and toward AI's (current) limits and coming uses. Seven lessons have been learned...

Underlying the program implemented at Crédit Mutuel are the recent, "cognitive" solutions in information technology that are capable, for example, of learning and of automatically processing natural language.

In May 2015, IBM, with which we have worked for 55 years, proposed working together on a French version of the Watson system, which its laboratories had just released. Out of all the use cases from around the world presented by IBM, we were convinced by those in the medical field (in particular oncology). The system indicates to the doctor the possible treatments, each with an index of confidence. The doctor then makes a decision based on his knowledge of the patient. This example helped us imagine what this technology could bring to our account advisors in relations with our customer-shareholders.<sup>1</sup>

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<sup>1</sup> This article has been translated from French by Noal Mellott (Omaha Beach, France). Translator's note: Crédit Mutuel (now merged with CIC) is a mutualist bank whose shares are owned by account-holders. The article regularly refers to the bank's customer-shareholders, a phrase shortened in the translation to "customers".

At the end of June, we set off on this adventure, thus becoming the first firm in France to implement IBM Watson. The program advanced fast. By the last quarter of the year, we had formed a multidisciplinary team of members from our banking offices, computer service, etc., along with colleagues from IBM (France, Ireland and the United States). The first step was to clearly understand this technology, as well as its current limits and performance, and to identify potential use cases. Three cases (explained hereafter) had been selected by the end of 2015. This work showed that our plans for using Watson were going to facilitate the jobs of our account advisors and improve customer services. With the backing of IBM for this program, we reached a definitive agreement on 29 December 2015. The first solutions developed in 2016 were rolled out during the first semester 2017 in 2800 branch offices of Crédit Mutuel and CIC (CMC-CIC).

This initial experience laid a solid, durable technological base that opened new prospects for analyzing queries formulated in natural language. In 2017, decisions were made for similar projects in other fields of the banking business.

## **A program at the right time**

Digital technology is changing the behavior patterns of our customers:

- Contacts with customers are more and more often long-distance.
- Customers are increasingly connected, informed and autonomous.
- Customers are still attached to close relationships with their account-advisors and banking office.
- Customers need, more than ever, personalized advice and assistance.

Given, on the one hand, the increasing number of “products” in our catalog that must be understood (banking activities, insurance policies, real estate transactions, telephony, security at home, in cars...) and, on the other hand, the increasing volume of information to be handled, our account-advisors need everyday assistance if they are to maintain the quality of customer services. In this context, our ambition is to more effectively help our 20,000 account-advisors in their jobs and to place technology at the service of human relations on behalf of our customers.

Without a doubt, the account-advisor figures at the center of this innovation (to which customers do not have direct access). This reflects our decision to maintain an operational brick-and-mortar network of banking offices and to place account-advisors at the core of relations with customers, including long-distance relations. We must provide account-advisors with the tools for being more responsive to queries coming through several channels of communication. AI tools should free time so that account-advisors can devote more time to providing advice and to activities with a higher added value that call for human interventions.

This technology does not replace employees but assists them. There is no change in relations: the account-advisor is the only decision-maker for all actions; and he/she remains the intermediary to whom customers address questions.

## **The e-mail analyzer**

The first use case was the invention of an e-mail analyzer. Our account-advisors receive more than 300,000 e-mail messages per day from customers. They have to reply to them and perform the requested tasks under conditions that require being more responsive.

The e-mail analyzer is integrated in our messaging service:

- It improves the handling of incoming e-mail from customers by identifying “intentions” via a list of the most frequent queries: make an appointment, conduct a transfer operation, stop payments on a credit/debit card, etc.
- It detects urgent e-mail either through the intention (matters that are urgent by definition) or the customer’s vocabulary. It thus serves as a tool for assigning tasks a priority.
- The bar of analysis integrated in the messaging service proposes a direct link to our business application software as a function of the intention detected and helps perform the tasks related to the customer’s query. If, for example, the e-mail clearly requests making a transfer, the bar will open the right application and fill in certain fields with the requisite information. The account-advisor remains in control of the decision to validate the operation.
- The e-mail analyzer also proposes to account-advisors a personalized excerpt from our library of standardized responses. Employees used to have to open a specific application and search for the right model in a long list. The e-mail analyzer has automated all this, even the customer’s name can be automatically filled in because the sender’s e-mail address is directly linked to our customer data base.

The intention is to help account-advisors handle ordinary operations that do not involve large amounts of money and to free time so that they can concentrate on their core activity of providing advice and offering services to customers.

## **Virtual assistants**

When searching for information, our account-advisors can consult an in-house corpus of 52,000 documents. Each year, they conduct millions of searches in this data base. They used to do this with a search engine that used key words; and the search took a good while if they did not know the right key words. For example, to find the answer to the question “May my son drive my car?”, the right key words were “occasional driver”.

A virtual assistant was developed for searches (initially for property insurance). Adapted to the ordinary vocabulary of account-advisors, the assistant opens a conversation if it needs more parameters for handling a question and coming up with a single response. The advisor can continue the conversation with the support platform when the question is more complicated.

A second virtual assistant was developed to handle problems related to savings products.

## **Initial training...**

At the start, the technology in the Watson offer had no data, apart from those for using the French language. So, it was necessary to make a dictionary of a thousand concepts described by approximately 4000 “language motifs”, each related to an “intention”. This work of annotation has to be worth the effort. With more than 300,000 e-mail messages received per day, it was worthwhile for us; but this solution does not fit all contexts.

For the e-mail analyzer, our business process experts started by annotating a sample of ten thousand incoming messages (that had been made anonymous) in order to identify the intention and degree of urgency so as to detect recurrences. They then focused on the most frequent recurrences in order to start training the machine.

For the virtual assistants, we first gathered from our 20,000 account-advisors thousands of the most frequently asked questions in given fields of business. We then had our business process experts classify the questions by intention and by business activity, before setting the parameters of dialogs and identifying, in our base of documents, the appropriate paragraphs with an answer. In 40% of the cases, we had to improve the contents of documents so as to make them more “accessible” to account-advisors, who are nonspecialists. This called for a significant investment of time and resources, but the multiplier effect offered by the system in relation to our 20,000 account-advisors made the investment worthwhile.

## **...and continuous learning**

Our account-advisors can provide feedback, positive or negative, about the responses provided by these AI tools. Our business process experts analyze this feedback to improve the tools.

These improvements are not automated. The reason for this is not a technical limitation in the machine's learning capacity; it is a decision we made. Take the example of the concept of urgency. Each account-advisor has an idea about what is urgent. Were the system to learn directly from the feedback data base, it would not be capable of converging toward a single response. The intervention of human experts is necessary to precisely define the concept of urgency depending on cases. Some firms have conducted self-learning experiments with machines, but the results have not met expectations — in some cases, cybernauts trained the system to respond in an unseemly way.

For the virtual assistants, the corpus of documents that serves as input is constantly evolving as a function of the intentions, questions or new tools available. This necessitates a horizontal organization with input from experts in various business processes, who have to be coordinated so as to preserve the system's coherency. We are working to finalize this methodology. This is what is actually at stake in these preliminary projects, which have to advance so that the following projects be conducted more effectively.

## **Limits**

We should not be blind to this technology's (current) limits.

The e-mail analyzer has no knowledge of an e-mail's context or "implicit" information. It does not detect all the ambiguities and subtleties of language (*e.g.*, irony or threats). In one out of five cases, the same message analyzed by two of our business process experts — in the same conditions as the analyzer — was interpreted differently. If humans cannot have a perfect understanding of a message, AI will not either. This places an upper limit on what is possible. In a field as open and complex as the handling of customer queries in banks, developing a fully automated solution does not, at present, seem to be imaginable.

The virtual assistants provide satisfactory responses about two-thirds of the time. This rate of success is much higher than that of the previously used search engine. Furthermore, it is gradually rising thanks to feedback from account-advisors. In effect, the users are essential for making a technological solution work better. The virtual assistants will never respond correctly to 100% of queries, not even to those that seem simple. This limit is inherent in the process of learning by example.

## **New use cases**

Using what we have learned from this experiment and relying on the methodology and infrastructure set up in 2016, new use cases are being developed, in particular virtual assistants for three other business activities: consumer credit, health insurance and personal insurance (disability, death...).

To accelerate the input from cognitive technology to our business processes, we have set up an in-house team (Cognitive Factory) of approximately sixty employees to: identify new use cases; accelerate the operation of new cognitive projects; and further improve customer services at CM-CIC.

## **The lessons learned**

We have drawn seven major lessons during these first two years:

- 1) The machine learning phase demanded several months of work from our business process experts in order to identify the most frequent questions and prepare the responses to be provided to account-advisors. This effort is ongoing: it continues after the rollout of the first solutions and must ceaselessly improve and update responses. The machine does not learn by itself. Furthermore, new business activities are constantly being created in the firm around these solutions.
- 2) The system's performance is up to par. The rate of user satisfaction is more than 80%. In 60% of the cases, account-advisors find the right responses to customer queries faster when they use the virtual assistants (in comparison with the previous search engine).
- 3) It is better to steer clear of the phrase "artificial intelligence", since it arouses unwarranted anxiety and exaggerated expectations. This technology relies, in fact, on a machine learning by example so that it can mechanically reproduce an action. It signals an advance, since computer scientists are not able to write programs that can do as much. But the machine still does not "understand". Lacking the capacity for reasoning and creativity, it simply reproduces a set of predefined examples.
- 4) We must reassure. Virtual assistants only answer simple, recurrent questions with responses drawn from our in-house data base of documents. Anything having to do with creativity, empathy, the understanding of a given situation, or simply commonsense, is still an exclusively human activity.
- 5) The adoption of cognitive solutions is, at present, a partial response to the challenges of digital technology in business. This adoption is systematically an organizational feat: it is crucial for firms to be forward-looking, to innovate in the way of doing work and move toward more collaborative practices, to identify futures needs in skills and qualifications, and to foster the development of new business activities in order to fully profit from this technology.

- 6) A followup is necessary. The challenge is to follow up on employees to prepare them for the change through training programs and, too, information about the right practices and reflexes for fighting against habits. This takes time, but it is the key to success so that our 20,000 account-advisors increasingly put these new solutions to use.
- 7) For the success of a project of this sort, it is indispensable to have the support of (and involvement by) management at the highest level. This was the case for Crédit Mutuel and IBM.

## **Conclusion**

The fields of application of cognitive technology to functional business activities and to information systems is vast. We must always be capable of imagining our activities in the short, middle and long terms so as to seize opportunities. One thing for sure: this new technology has to fall into line with other technological innovations at the service of human beings.