McChrystal Group uses machine learning to drive client outcomes

Leveraging AWS, this leadership-development organization transformed a time-consuming and labor-intensive process using an automated natural language machine learning solution.

Our customer

McChrystal Group is a renowned advisory services and leadership development firm that helps organizations identify opportunities to improve their performance so they can operate optimally in today's complex environments.

The obstacles they faced

McChrystal Group needed to develop a machine learning-based natural language processing algorithm to analyze surveys faster and with greater accuracy.

How we helped

Amazon Web Services (AWS), Machine Learning, Data Analytics

What we achieved together

Onica, a Rackspace Technology company, was able to build a natural language machine learning solution on AWS that would automate the survey analysis process and expedite time to value for McChrystal's clients.

McChrystal Group

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Victor Bilgen
Partner, McChrystal Group
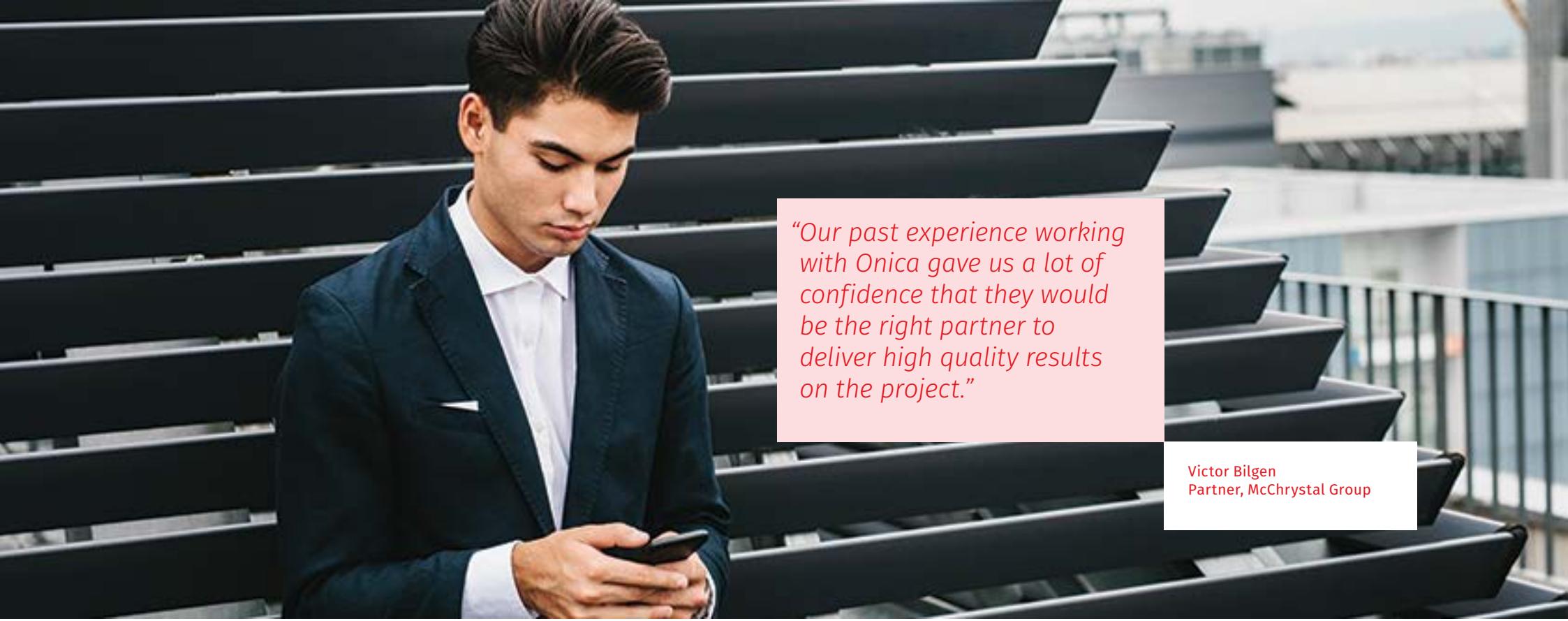
Augmenting survey processing with machine learning

McChrystal Group is a renowned advisory services and leadership development firm that helps organizations identify opportunities to improve their performance. Its process involves utilizing a networked approach to enable clients to operate optimally in today's complex environments.

While helping businesses with organizational development and process improvement, McChrystal Group utilizes surveys to get input from various stakeholders. These surveys include multiple-choice questions as well as open-ended questions that are designed to identify underlying issues. For some of their larger client accounts, as many as 20,000 responses can be received during a single survey.

Buried in data

The previous survey review process relied heavily on manual processes that were both time consuming and labor intensive. McChrystal Group was looking to develop an automated natural language processing solution that would save considerable time and have the ability to identify key topics that were cropping up in the answers to open-ended questions.

Having previously worked with Onica, a Rackspace Technology company, to leverage AWS for an infrastructure move and data flow modernization project, McChrystal Group was well aware of the advanced capabilities of the AWS cloud. It also had a very clear idea of the solution it was looking for, but chose to bring in an external partner instead of developing it in-house in order to meet tight timelines. McChrystal Group decided to work with Onica as a result of our proven expertise and extensive experience developing machine learning solutions for customers across multiple industries.

The solution

McChrystal Group had considered several off-the-shelf language analysis tools for its workflow, however, it did not find one that met its specific needs. Having significant experience and expertise in machine learning and natural language processing, Onica was able to suggest tools that would provide the visualizations that could best serve their use case.

Onica worked closely with McChrystal Group to first understand what the highest value output from the machine learning data processing would be in order to ensure the proposed solution produces

the results they were looking for. With this information, Onica was then able to select the right tools and machine learning models to ensure the delivery of high value data derived from processing responses to open ended questions.

The solution designed by the Onica team uses Amazon Athena, AWS Glue, Amazon S3, Amazon SageMaker, and Amazon Translate. As some of McChrystal Group's clients respond to the surveys in different languages, Amazon Translate is used to first translate all responses into English before processing. The solution is also using Latent Dirichlet Allocation (LDA), an open source topic modeling algorithm generally used for large documents. Onica optimized the LDA implementation to the customer's specific use case, improving its processing of shorter text passages.

One of the biggest challenges that the team encountered while developing the solution was the varying sizes of the text responses. Responses to the same question might elicit a lengthy answer from one person, and a shorter one from another. The team had to make calculated decisions on how to select words or n-grams (multiple words or phrases) and the number of topics, based on the amount of text variations and lengths.

Another challenge while working with a variety of large and small client accounts is that the sources and amount of data may vary significantly. Onica used an iterative approach in getting feedback from the customer to ensure that the different modelling approaches that were being tested and deployed would achieve the best visualization result.

The effectiveness of visualizations also vary depending on the person viewing them. This is because a detailed, intricate visualization may be ideal for a trained specialist, but too complex for someone not familiar with big

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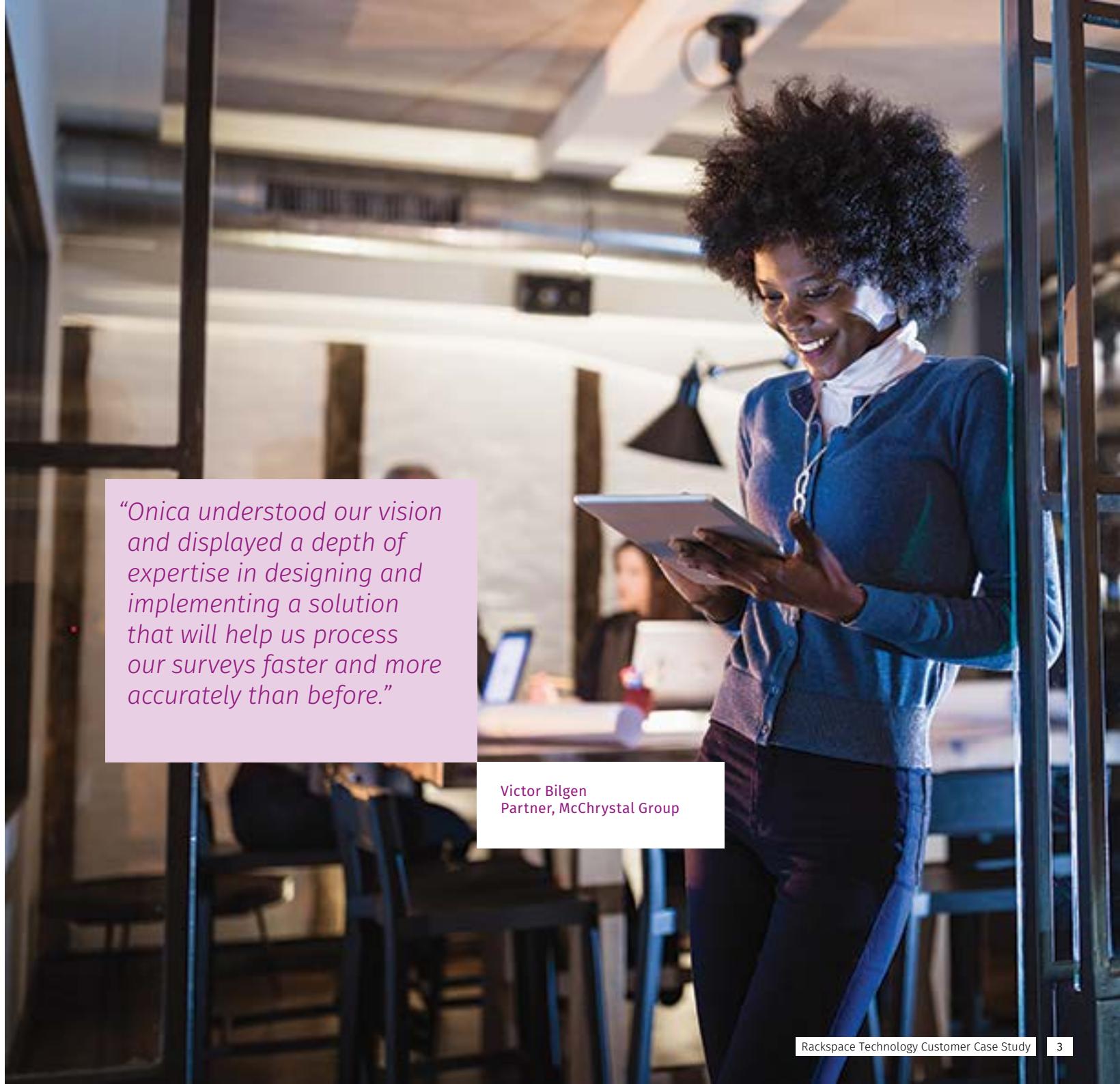
data. Onica optimized the visualizations for McChrystal Group's users and analysts based on their feedback.

Maximizing speed, accuracy and comprehension with machine learning

One of the key benefits of automated language analysis is faster identification of latent topics in the survey responses across large datasets. By automating the analysis using natural language machine learning, results are now available in minutes, as opposed to what previously might have taken days for teams of analysts to dig into. This also frees up the analysts' time to focus on other important tasks. Analysts are now able to work with the visualization results, rather than spending days creating the visualization.

Other advantages of a machine learning solution are that it can detect subtle, hidden and abstract topics that might be missed by human analysts, and it's also more comprehensive and consistent in the processing of the data. This enables McChrystal Group to provide their clients with more accurate and effective solutions to any issues that are identified.

Once deployed, Onica's natural language machine learning solution enables a quick visualization of survey results and rapidly identifies the underlying themes that might be coming through in the responses. It provides a classification model for the types of business challenges McChrystal Group's clients may face, such as indications of corporate communications issues, process issues, merger issues and so on. The solution adds texture to the analysis and ensures a standard process focused solely on the extraction of relevant data, including subtle topics, enabling McChrystal Group to provide

its clients with the intricate guidance they require to manage any issues identified.

The solution is also designed to be scalable, with the ability to process data of varying sizes from both small and larger clients. In fact, the scalability is so advanced that it could process all of the data from all of McChrystal Group's client accounts at once, and it's capable of processing data from some of the largest organizations in the world. In addition, the solution requires minimal management while providing high availability, redundancy and scalability enabled on AWS. The only management required is for the visualizations, or output for each individual client account.

Onica's automated machine learning natural language processing solution on AWS will enable this leading advisory and leadership development company to replace a time-intensive manual process that consumed considerable resources with an automated process that is significantly faster, more consistent and replicable. Beyond increasing the speed at which survey results can be processed and data extracted, this solution increases the accuracy of the data, enabling McChrystal Group to provide more holistic and effective solutions to its clients.

"Our past experience working with Onica gave us a lot of confidence that they would be the right partner to deliver high quality results on the project," said Victor Bilgen, Partner and Head of McChrystal Analytics. "Onica understood our vision and displayed a depth of expertise in designing and implementing a solution that will help us process our surveys faster and more accurately than before."