Improving Sales Account Coverage with Artificial Intelligence

Executive Overview
As businesses grow, meeting the needs of new markets, new customers, and new partners can be challenging. Sales and marketing organizations are constantly under pressure to increase their account coverage and rapidly respond to customers' changing needs, while maintaining or even reducing operational costs. Intel’s Sales and Marketing Group (SMG) faces similar challenges while growing in new markets and domains and evolving its existing business. To meet these challenges, Intel IT developed an artificial intelligence (AI) platform, Sales AI, that enables Intel to significantly scale its sales activity. Sales AI collects and interprets customer and ecosystem data, then translates it into meaningful and actionable insights. Sales Assist, which provides insights to account managers, is the first application based on the Sales AI platform. Sales Assist goals are:

• Enable account managers to find more opportunities and interact with customers more effectively
• Simplify the account management process and provide deeper insights, allowing account managers to cover more customers
• Recommend actions and discussion topics to account managers based on customer announcements and activities in their markets

In early 2017, Intel IT conducted a pilot of Sales Assist with 90 account managers. Sales Assist collected and analyzed data on approximately 1,000 customers. This included crawling approximately two million web pages and capturing more than 30,000 social media posts per day, resulting in valuable insights on approximately 1,000 customers.

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1 Intel’s Sales Assist application adheres to individual websites’ terms of use. The only data collected is what is permitted by the site owner under their terms of use agreement.
Background

Like many sales organizations, Intel's Sales and Marketing Group (SMG) continuously seeks to meet the needs of its customers, improve partnerships, and increase sales, while also reducing operational costs. Some of the challenges include:

- **Covering more accounts and partners.** Balancing operational cost reduction with expanding markets often means fewer resources to maximize the value of existing and also new accounts. Programs must scale to support a larger and more diverse partner base.
- **Efficient and more effective support.** Both existing and new customers want fast responses to their inquiries along with an account manager who can predict their needs, based on their business goals and specialty.
- **Penetrating new markets.** Account managers must understand the market opportunities, the value chain, and the market landscape. They must identify and engage new customers and partners.

Intel SMG needed an innovative approach to help our account managers be more efficient and increase the number of accounts they cover. To overcome these challenges, Intel IT collaborated with the SMG to develop Sales Assist, using an artificial intelligence (AI) platform to provide automated insights and recommendations to improve customer engagement and satisfaction.

The Sales AI Platform

Every sales activity should start with a deep understanding of the customer account. Account managers need the latest information on their accounts in order to provide the most relevant products, offers, and best possible customer service. To provide this level of support to more accounts, Intel IT and Intel Sales developed the Sales AI platform, which is based on these linear and iterative modules (see Figure 1 on the next page):

- **Sense.** The Sense module collects data about customers or partners to provide a deep understanding of their business, growth potential, and needs. It can collect data from millions of web pages per day, for hundreds of thousands of accounts. It can also collect behavioral information about customer engagement with Intel and social media information, totaling millions of data points.
- **Reason.** To clearly understand the relevant business process and improve the business outcome, the Reason module interprets the information, correlates different pieces, and creates actionable insights. The insights identify valuable events, such as investments or product launches, then score and rank those insights to filter out the non-relevant information.
- **Interact.** The Interact module recommends actions to account managers and can generate an automatic interaction for non-covered accounts.
- **Learn.** Machine-learning algorithms base their learning on historical sample data. For the algorithms to stay accurate over time, past account interactions, results, and input from account managers are required. The Learn module actively processes this input and feeds the algorithms to keep them accurate and up to date.
Sales Assist

Sales Assist is the first of several initiatives based on Intel's Sales AI platform. Sales Assist uses AI to provide real-time account insights from multiple data sources. Sales Assist streamlines coverage by using the Sense, Reason, Interact, and Learn modules to help provide account managers with the most important insights about their customer accounts:

- **Sense**: Gather information. The system collects a full digital representation of the account activities through big data technologies across diverse data sources, such as social media, company websites, and Intel account data.

- **Reason**: Identify valuable insights. The platform interprets the information collected by cross-referencing sources and turning the data into actionable insights that are statistically proven and ready for use by account managers.

- **Interact**: Provide actionable information. Account managers interact with Sales Assist through an easy-to-use interface that displays insights.

- **Learn**: Improve through feedback. Account managers provide feedback in the user interface, allowing the platform to measure success by identifying what information is valuable and continuously improving the AI models and processes.

Sales Assist uses the insights to generate an “assist” for the account manager. Assists include the account insight, as well as supporting information to provide context. Examples of assists include the following:

- The account launched a new product to the market.
- The account is involved in merger and acquisition activities.
- The account has viewed an Intel product web page that is not part of their usual product portfolio.
- The account is mentioned in the news.
- The account is hiring for a key position in the company.
- The account attended or is planning to attend a major conference

Collecting, Correlating, and Generating Insights

Businesses increasingly use multiple channels to connect with their customers and promote new products. While doing so, they leave a digital footprint that tells their business story. Identifying the plethora of data points about projects, goals, and organizational changes can help Intel account managers have more accurate and strategic discussions with the account. Sales Assist can help us recognize and correlate relevant information from social media and web activity, as well as within our own back office systems.

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Web Mining
Changes on customer websites can translate into valuable information for Intel's account managers. Websites change for various reasons, including new product launches or acquiring new domains, which are highly relevant and business-related. Sales Assist collects daily customer website information and creates a timeline representing the changes compared to the previous period. It then examines the business-related outputs from other sources, and if there are corresponding events, it generates an assist to alert the account manager so they can assess the relevance of the change.

Behavioral Information
One of the effective ways to indicate intent to buy a new product is by collecting customer activity on intel.com. For example, if a customer is searching intel.com for data center products or downloading product information, Sales Assist correlates that activity with information collected from other sources and sends an assist to the account manager.

Social Media
Social media has become a crucial data source for business information. Unlike traditional news sources, social media encompasses medium and small businesses with roughly the same coverage of large corporations. Intel IT collects data from Twitter*, which also provides official news directly from the companies themselves, as well as first-hand experiences, such as testimonials and reviews. Sales Assist analyzes tweets in the following ways:

- **Collection.** Tweets are collected from multiple types of Twitter accounts, including official company accounts, semi-official accounts used by company personnel, and non-official accounts that occasionally post about the company. Our automated process identifies account candidates and then cross-validates them with known company features, such as location, web addresses, industry, and personas. Using graph analytics, we expand our search of known data—or "seeds"—to less obvious accounts. With a broader understanding of the company's profile, we search Twitter for related, non-company tweets.

- **Structuring.** Free-form tweets present unique challenges because they break the rules of formal language, clean vocabulary, and syntax. We adapted each method, model, and dataset of the text-processing algorithm to accommodate these variations. For example, different details of a single business event may be reported in vastly different words across hundreds or thousands of tweets.

- **Grouping.** For each event, Intel IT grouped the variants into a single information item by measuring the similarity between tweets based on semantics, syntax, and statistical features, based on word-embedding and other methods.

- **Ranking.** Sales Assist ranks information by event, company, and history. Event-level ranking is based on properties such as the event's date, the location, the tweet's impact, and participants. Company-level ranking may be boosted by a correlating event, such as a product launch at the same time. History-level ranking uses historical events, such as a change in the number of events the company is attending in a specific timeframe.

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2 The Intel Sales Assist platform uses APIs provided by Twitter to collect data only from accounts the user has designated as public.
Sales Assist uses web-mining methodologies to collect and cross-reference information about products, brands, advertisements, verticals, and other business-related data. When customers advertised an Intel product, but had not recently purchased that product, an assist was generated. This scenario can indicate that the customer may need help in understanding Intel’s marketing strategy and requirements, and account managers can offer joint marketing activities to increase market penetration. It can also indicate that the customer is purchasing Intel products through non-authorized distributors, and the account manager can help correct this.

Changes in Customer Behavior
Sales Assist identifies purchasing trends and cycles to detect changes in purchasing habits by analyzing the customer’s purchasing history as well as its activity on intel.com. For example, a sudden and unexpected decrease in Intel purchases (compared to the company’s historical purchasing patterns in the market) is important for account managers. It can indicate that the customer is exiting a product line or market.

For each customer, Intel IT models purchasing behavior based on historical data to discover trends, seasonality, and cycles. Using time series modeling, we can predict the past three months of purchases and compare our prediction to the actual data. A change in purchase behavior is defined when the actual data is significantly lower than our prediction.

Market Penetration
Sales Assist tracks market penetration by measuring which customers advertise specific products on their websites. This provides account managers with a better understanding of which customers may be considered as early adopters of new products, giving them an opportunity to engage the customer earlier.

Crowdsourcing
To be certain that our AI models correctly correlated dramatically different sources, we also used crowdsourcing to enrich and validate data with critical and useful information, such as websites and addresses. Crowdsourcing helped to create labels and monitor the quality of data for our predictive models, especially involving social data. We created a template with detailed submission rules—or steps—then tested it for accuracy. Each submitted response from the crowd could be accepted or rejected, and each contributor could be blocked or rewarded automatically by a model we created. To gain quality results in high-scale, high-speed responses, we used a third-party crowd management platform that automated the process, including creating batches with required information for each task, uploading it to the crowdsourcing platform, managing the submissions, and providing final results to Sales Assist. The crowdsourcing management platform enabled Sales Assist to produce a validation set to measure and increase accuracy in assists based on unstructured data, such as tweets. Crowdsourcing provided a cost-effective solution to common data problems and produced high-quality results within hours.

Intel’s Sales AI Platform
Artificial intelligence (AI) is a journey, and Intel’s Sales AI platform is a conceptual model designed to imitate a salesperson’s standard process while taking advantage of enormous computing power and data. AI technology uses algorithms that can make intelligent decisions, which have historically been made by humans. These AI algorithms are equipped with a machine-learning mechanism that helps them improve over time. AI algorithms already surpass a human’s ability to process unlimited amounts of data, discover hidden patterns, and act on those findings. New, emerging technologies, such as Deep Learning and Natural Language Processing, improve the capability of AI algorithms to understand content and imitate human reasoning. AI technology is developing rapidly and performs best when used alongside humans who guide the algorithms and help them acquire contextual knowledge.

Intel’s Sales AI platform is a multi-year project designed to support multiple initiatives for different types of sales coverage, such as in the field, online sales, and autonomous coverage. We created a dedicated taskforce comprised of experts from both IT and Intel’s Sales and Marketing Group (SMG) to analyze and design thinking techniques for AI. We drew on experience from other AI projects in the design and manufacturing domains. The team used the latest research, technology, and methodologies in industry and academia to develop a conceptual model.
Solution Architecture

The Sales Assist capability uses Apache Hadoop* for tasks such as web crawling, data processing, data indexing, and search. We chose Cloudera Distribution of Hadoop* (CDH), an enterprise-level distribution, for its built-in security and high-availability. CDH includes Apache Hadoop and several other components of the Apache Hadoop ecosystem. All of the components were tested by Cloudera for stability and integration. For example, Sales Assist uses the component Apache Solr®, which provides the model with access to large-scale indexing and search capabilities with simplified deployment and maintenance.

The Sales Assist machine-learning model cross references the data, analyzes it for valuable insights, and sends relevant assists to account managers through the Sales Assist application (see Figure 2). Because the model requires high-performance compute, we selected servers based on the Intel® Xeon® processor family and Intel® Xeon® processor Scalable family.

Pilot

In early 2017, we conducted a pilot of Sales Assist in the Europe, Middle East, and Africa (EMEA) region. Approximately 90 online account managers participated in the pilot, who received assists and provided feedback on how valuable the information was.

Generating Assists

Assists are designed to help account managers understand and follow up on opportunities, which vary based on the type of information analyzed. In our pilot, we tested 16 assist-generated activities, including mergers and acquisitions, investments, new customer engagements, conference attendance, important new hires, changes in partnerships, new product launches, and new products purchased from Intel.
In the pilot, a user interface provided account managers with an overview of the customer, type of assist, and details about the data collected (see Figure 3).

The first row of Figure 3 shows the account manager an assist that Company A “Viewed Intel product.” In this case, the Details column highlights that the customer did not purchase this product in the past. The account manager can view the product pages that the customer visited (see Figure 4). These details provide the account manager with the right information, at the right time, to begin a conversation with the customer. The account manager can also rate the value of the information by marking it positive or negative, using a thumbs-up or thumbs-down icon.

Figure 3. Sales Assist provides relevant customer activity to the account manager with details that provide additional information.

Figure 4. With the “Details” for a “Viewed Intel product” assist, the account manager can see the specific pages the customer visited on intel.com and Sales Assist highlights that the customer has not previously purchased the product.
Sales Assist also generates graphs and charts to help account managers visually identify customer purchasing activity. This helps make relevant information easy to access and use. For example, trends in purchasing history can be reviewed more efficiently by viewing the information in a graph (see Figure 5).

Results

After the pilot, we evolved the system to a fully automated, self-maintained production system. Today, approximately 80 percent of the assists that are presented to account managers are utilized. This usage is relatively equal to the usage in the pilot phase. However, the value rating of the assists went up significantly, from 76 percent in the pilot to 87 percent during the first quarter of production, as the account managers learned how to use the information in their daily processes. We completed a subsequent pilot in our North American region, and we are deploying Sales Assist worldwide in 2018.

Next Steps

We have several enhancements planned for future versions of Sales Assist, including presenting a recommended action along with the assist. For example, if the assist indicates that a customer viewed an intel.com product page, the recommended action might be to send the customer a link to the relevant product brief or a promotional offer from the customer’s distributor.
We are also evaluating other capabilities that can initiate autonomous actions. For example, when a potential customer views an intel.com product page, but the company currently does not have an assigned account manager, Sales Assist could automatically send a customized offer to the potential customer and direct the company to a local distributor. In this case, an account manager does not need to be involved, allowing our sales group to reach and support new customers that we previously could not cover with human resources. We believe this will provide immense value to our company, our partners, and the customers we serve.

Conclusion

Intel SMG continuously looks for innovative ways to expand in new markets and enhance coverage of its globally dispersed customers and partners without significantly expanding its salesforce. Intel IT is helping SMG achieve its goals with Sales Assist, the first of several initiatives built on our Sales AI platform, to collect and analyze data from a variety of sources. Sales AI is transforming the way Intel conducts sales activity by using AI to enhance and support the sales teams.

For more information on Intel IT best practices, visit intel.com/IT.

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