Nutshell

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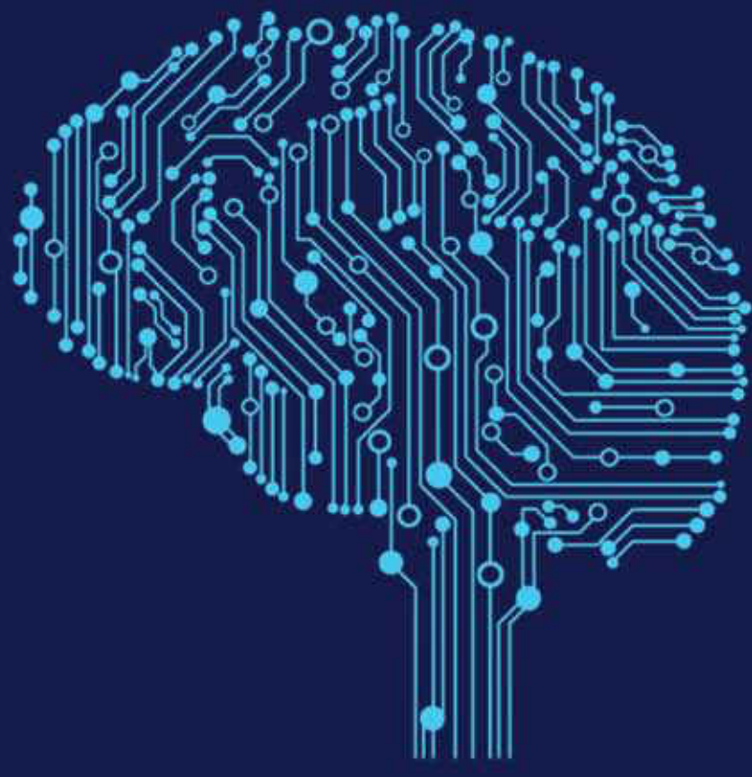

Understanding MACHINE LEARNING


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From the Chairman's desk

Dear Member,

One of the biggest challenges facing marketers today is the complex process of marrying the vast data on customers available today with personalizing messages to individual prospects, so that it strongly resonates with the recipient. 'Machine Learning', a discipline combining science, statistics and computer coding, that aims to make predictions based on patterns discovered in data to help customization, has therefore come as a boon to the marketers.

It is understood that by 2020 approximately 1.7 megabytes of new information will be created for every single person on the planet every second. Without machine learning, it is simply too difficult to manually compile and process the huge amounts of data coming from multiple sources (e.g., purchase behavior, website visit flow, mobile app usage and responses to previous campaigns).

This issue of Nutshell attempts to understand the complexities of Machine Learning and how it can be used effectively. We would love to hear from you. Do send-in your feedback to isa.ed@vsnl.net

Regards,

Sunil Kataria
Chairman

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Machine Learning

Machine learning is a discipline combining science, statistics and computer coding that aims to make predictions based on patterns discovered in data. As opposed to rule-based decision systems, which follow an explicit set of instructions known by the developers in advance, machine learning algorithms are designed to analyze data and discover patterns that people cannot find by themselves. In other words, machine learning leverages the massive power and objectivity of computers to see things in big data that slow and biased humans cannot – and then use those insights to determine how new data can be used to accurately predict results. Without machine learning, it is simply too difficult to compile and process the huge amounts of data coming from multiple sources.

What is Machine Learning?

Machine learning is a discipline combining science, statistics and computer coding that aims to make predictions based on patterns discovered in data. As opposed to rule-based decision systems, which follow an explicit set of instructions known by the developers in advance, machine learning algorithms are designed to analyze data and discover patterns that people cannot find by themselves. In other words, machine learning leverages the massive power and objectivity of computers to see things in big data that slow and biased humans cannot – and then use those insights to determine how new data can be used to accurately predict results.

A growing body of research indicates that machine learning is moving to the top of the

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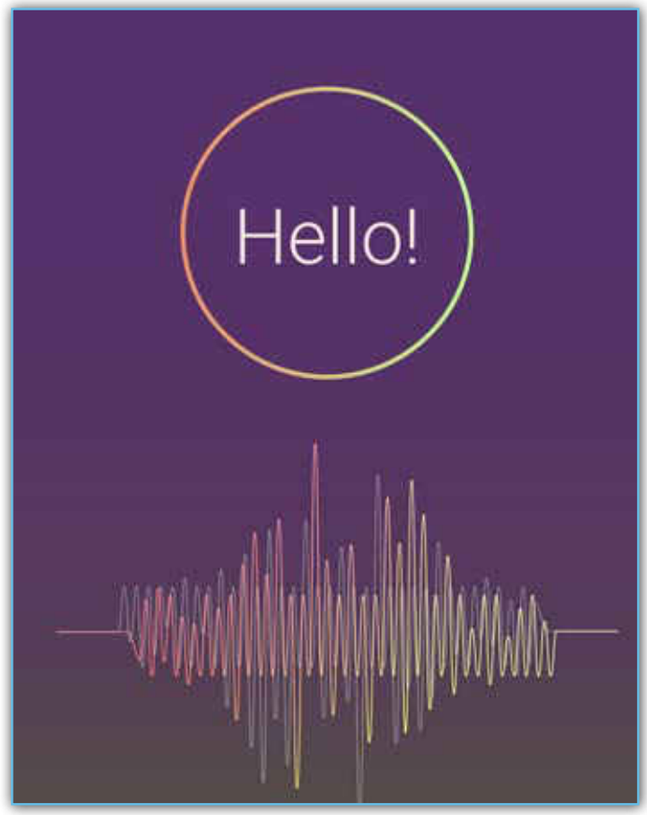
marketing agenda. A survey by Demandbase and Wakefield Research revealed that 80% of marketing executives believe that AI will revolutionise marketing over the next five years. But the same survey found that only 26% are confident in their understanding of AI technologies and its application to marketing.

Similarly, Forrester's study of 150 marketers found that 94% of marketers are excited by the possibilities of using machine learning to optimise their campaigns but are confused by how best to implement these strategies.

One of the key pieces of information is that by 2020 approximately 1.7 megabytes of new information will be created for every single person on the planet every second. This highlights the increasingly important role of data scientists and their specialist skills at separating true and relevant data from the noise.

How does Machine Learning help marketers?

Machine learning and pattern recognition can help marketers in a variety of ways. One of the biggest challenges facing marketers is how to personalize messaging to individual prospects and customers so that it most strongly resonates with the recipient. The results of successful, highly relevant marketing include increased customer loyalty, engagement, and spending.



Without machine learning, it is simply too difficult to compile and process the huge amounts of data coming from multiple sources (e.g., purchase behavior, website visit flow, mobile app usage and responses to previous campaigns) required to predict what marketing offers and incentives will be most effective for each individual customer. However, when all of this data is made available to computers programmed to perform data mining and machine learning, very accurate next-best-action predictions can be made.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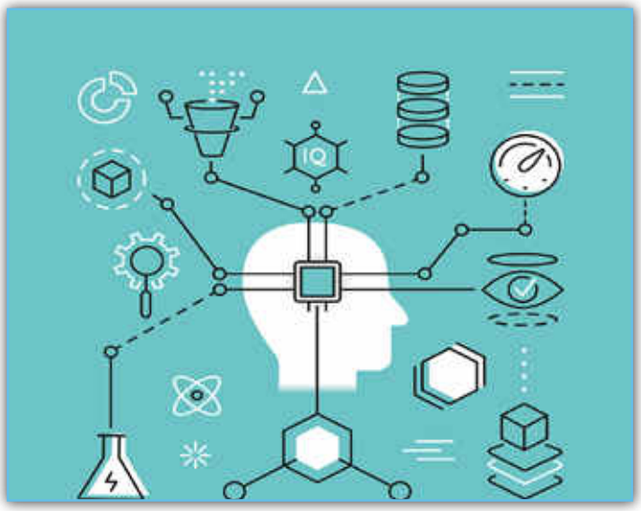
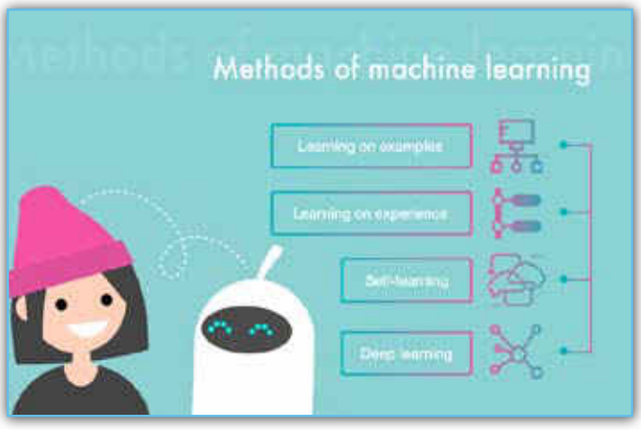
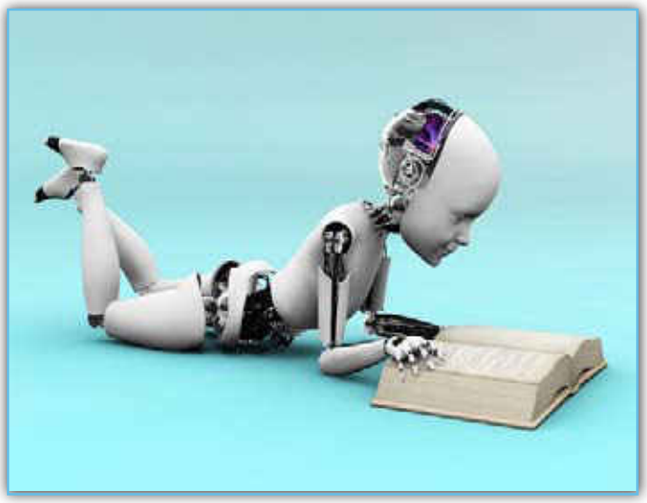
Other areas in which a machine learning application can help marketers include:

• **Customer segmentation**
Machine learning customer segmentation models are very effective at extracting small, homogeneous groups of customers with similar behaviors and preferences. Successful customer segmentation is a critical tool in every marketer's toolbox.



• **Customer churn prediction**
By discovering patterns in the data generated by many customers who churned in the past, churn prediction machine learning forecasting can accurately predict which current customers are at a high risk of churning. This allows marketers to engage in proactive churn prevention, an important way to increase revenues.





• **Customer lifetime value forecasting**
CRM machine learning systems are an excellent way to predict the customer lifetime value (LTV) of existing customers, both new and veteran. LTV is a valuable tool for segmenting customers, and for measuring the future value of a business and predicting growth.

Implementing Machine Learning in Marketing
Pattern recognition and machine learning software have come a long way since their early days in the 1960s. New algorithms and technologies are constantly emerging, suggesting new possibilities and applications. Despite this, most marketers are not using any form of machine learning in their day-to-day efforts because it remains a complex field, requiring the involvement of data scientists and developers. As a consequence, effective implementations of machine learning algorithms in marketing remain beyond the reach of many small- and medium-sized businesses.

However, specialized applications developed specifically to address marketing challenges – and to be very easy for marketers to use – are now available for smaller businesses with modest budgets. This is a game changer for

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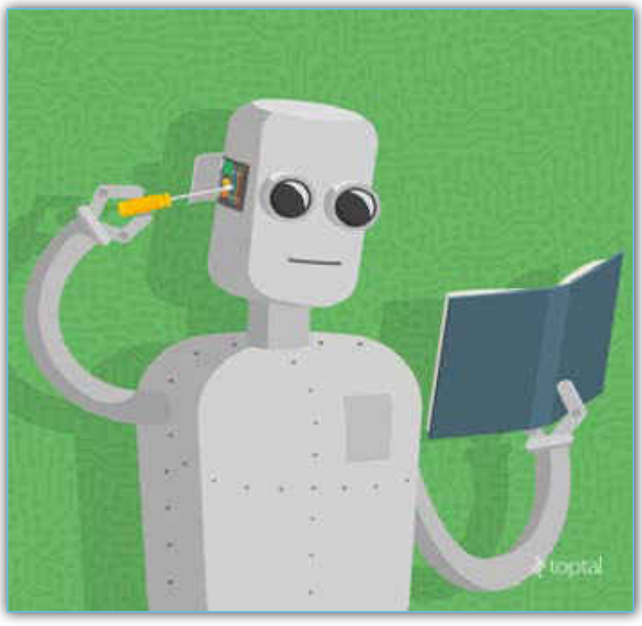
savvy marketers because machine learning can eliminate the guesswork involved in many of the most challenging – and valuable – aspects of data-driven marketing.

Towards Using Machine Learning In Your Marketing!

Optimove is the leading customer marketing automation system available today, and machine learning is a big reason why. Much of Optimove's power comes from the machine learning algorithms that contribute to its highly accurate customer modelling, customer segmentation, LTV predictions and next-best-action recommendations. The Web-based software is designed to deliver the advantages of advanced machine learning algorithms to marketers, without any need to understand data modelling, statistical analysis or algorithm development.

Machine learning techniques are being used to solve many diverse problems, and we stand to benefit as we move towards a world of hyper-converged data, channels, content, and context -- having the right conversation at the right time with the right person in the right way. For us marketers, ML is about finding



nuggets of "predictive" knowledge in the waves of structured and unstructured data.

The four major areas of the marketing big data ecosystem which we see being impacted by machine learning in 2017 are:

- Automated data visualization (including ML results) will become more rich, and user-friendly.
- Content analysis (textual, lexical, multimedia/rich) will be used to drive better marketing conversations.
- Incremental ML techniques will become more prevalent, leading to real-time, not just on-going and automated, changes in marketing execution.
- Learning from ML results will accelerate the growth and skills of marketing professionals.

For decades, marketers have dreamt of personalized experiences at scale. We've gotten close — dynamic emails, retargeted advertising, location-based push notifications — but the reality is that configuring and activating these programs on a 1:1 level still takes a lot of manual work.

Machine learning promises to change that, which has us on the cusp of the next great epoch in marketing. This technology will identify exactly how to understand consumer behavior and serve up relevant interactions to drive conversions, greater engagement and ultimately revenue. From entertainment to

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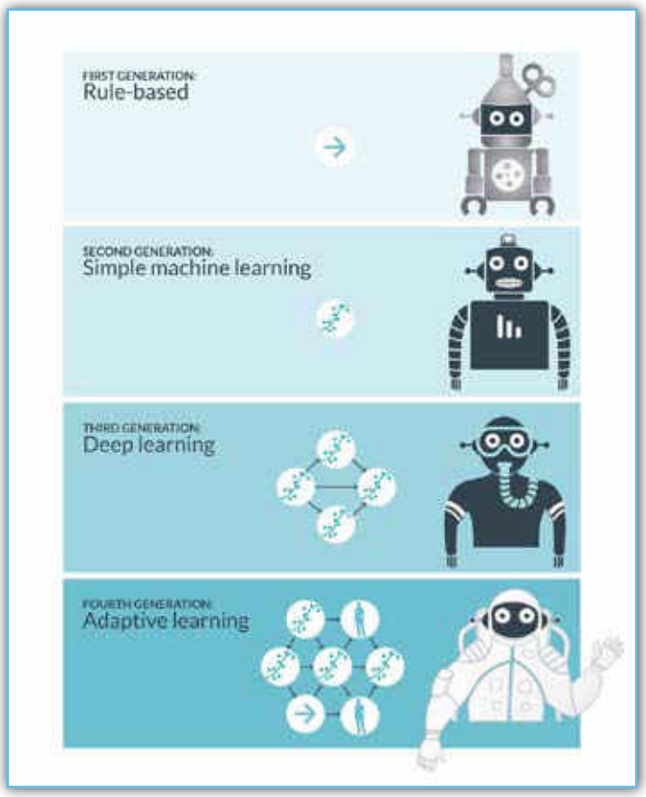
e-commerce and media to travel, machine learning algorithms are transforming customer experiences. We are on the brink of a world where our inboxes are filled with offers we actually want, our mobile wallets have coupons for nearby stores, and our connected fridge automatically orders more milk.

Aside from changing the entire customer experience, machine learning has significantly advanced (and will continue to shape) the entire field of marketing. In the past 20+ years, the field has shifted from a story-driven approach to a technology-driven one, with marketers expected to bring analytical, data-driven skills to the craft. While many

-- including Elon Musk -- worry of an "AI apocalypse" or a future in which machines will create a risk for unemployment, there are immediate machine learning opportunities for businesses -- and, crucially, marketers -- right now. Marketers have the chance to redefine their role in setting the technology vision in the company, but we first must separate what is hype from what AI and machine learning is actually meaningful for marketers.



Here are four case examples:

Predicting User Churn To Drive Greater Engagement

While the volume of data captured increases from every new channel or input, the analysis still needs a human touch. With insight into these analytics, marketers can identify how a certain segment of the market typically behaves or predict future patterns. But analyzing this for millions of customers across a dozen (or more) touch points is more than any marketing team can handle. Digital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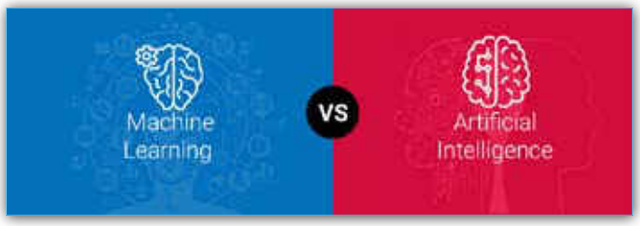
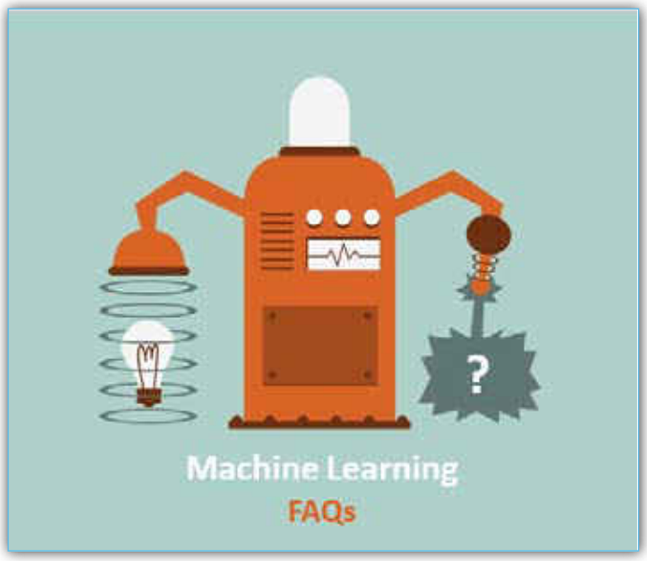


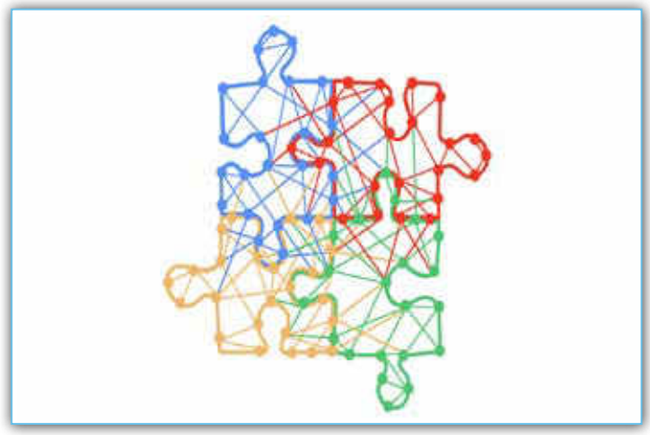
growth company Urban Airship, for example, has developed a machine learning algorithm that analyzes mobile customer behavior to help app publishers identify the most loyal users and predict those that are likely to churn. Armed with this insight, marketers can take action across digital channels to deepen customer engagement or invest more in retaining specific customer segments.

Incorporating Bots For Improved Customer Experiences

Marketers are frequently turning to bots, integrated with popular messaging apps such as Facebook Messenger or Kik, to automatically answer questions about package delivery status or other post-purchase requests, reducing the time spent trying to track down answers to FAQs. Post-purchase experience platform Narvar has built a Facebook Messenger bot, for example, that shoe company DSW uses as a shopping assistant. After customers make a purchase, DSW shares personalized shipping information and makes it easy for customers



to track their package. Facebook is looking to extend these capabilities even further with its recent launch of Chat Extensions, which will enable the use of Messenger bots in group chats. With bots from Spotify, SnapTravel, and other available integrations at their fingertips, groups can collaborate on a playlist or even book travel together -- powerful tools that might soon tip bots into mainstream adoption.



Scaling Personalized Content

Brand marketers have long relied on stock images, staged photo shoots or extensively produced ads. Today's customers are sceptical, and increasingly turning to one another for product recommendations. With a social content marketing platform, marketers can tap into the nearly two billion posts shared on social media every day to find real examples of customers using their products. Travel, automotive, and CPG brands are starting to use software to find, categorize, and publish real photos of its customers and products to better personalize their marketing campaigns. Machine learning technology can learn what content performs best -- one person images or group images, for example -- and prioritize those results.

Demonstrating Marketing ROI

In addition to having the skills necessary to put the technology into practice, marketers

must also have the ability to understand and communicate the ROI of each new tool used. This is where AI can help. Brands and sports teams are turning to GumGum for its computer vision technology in order to determine the value of their investments in sports. Each logo exposure on TV and social media is captured and analyzed, resulting in a more comprehensive and accurate media valuation of their sponsorships.

This wave of technologies leveraging machine learning is putting more power into the hands of the marketing professionals and enabling a new era of personalization, sophistication and scale. While these evolving technologies are just starting to make their mark on the world, the effect on marketing is undeniable. Over the next few years it will become even more apparent how machine learning can make marketing even more robust, changing the way brands interact with consumers and fulfilling the promise of a more authentic customer experience.

Given the rate of Artificial Intelligence dollars flowing into R&D — more than $30 billion a year — it's safe to say we'll be looking at a proliferation of AI-based tools in the very near future.

It's entirely possible that we'll see this same volume of AI tech with applications in marketing in the near future as well, but many CMOs are not for it… not yet, anyway. Recent studies by both the McKinsey Global Institute and MIT/Boston Consulting Group reported that only about 20 percent of companies have implemented AI technology in a meaningful way.

The potential of AI in marketing is still largely abstract, but that's okay. You don't need to have it all figured out in the next quarter.

Here are some AI opportunities and some steps you can take today to get in position for the AI proliferation of tomorrow:

1. Prepare your data and the processes/ practices around it

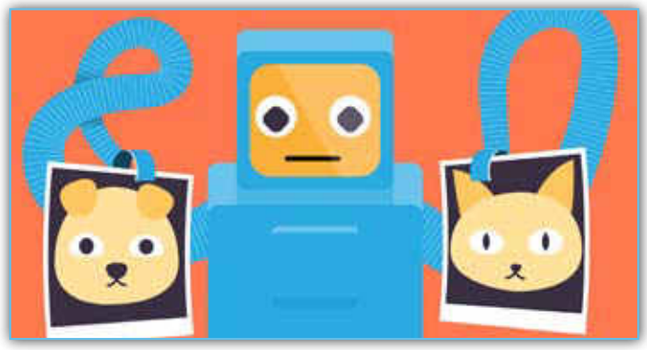
Fake news has become so ubiquitous that Facebook has had to take steps to combat it,

and even private businesses are developing opportunities around the filtering out of false information.

Gartner recently predicted that by 2022, "most people in mature economies will consume more false information than true information." The research firm also warned that while AI is proving to be effective in creating new information, it's equally effective at distorting data, which results in false information.

Brands are going to have their work cut out for them. As they increasingly function as publishers and curate content to share, fact-checking and data cleaning will become more important — and resource-consuming. AI has the potential to assist in the automation of these tasks, but hybrid marketers skilled in interpreting and cleaning your data will be key.

Whatever the specific marketing application, your AI tools will need clean, optimized inputs, as well as experts in place to make sense of the output.

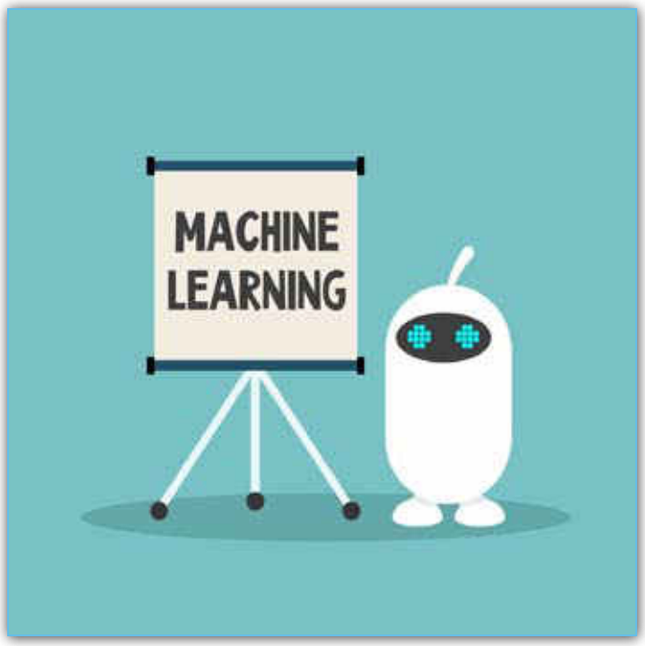


2. Prepare your people

Your AI applications will only be as good as the people who drive them. Gartner also predicted that in 2020, AI will become a "positive net job motivator," creating 2.3 million jobs while doing away with only 1.8 million jobs. If this comes to fruition (and all indicators say it will), all of the anxiety over machines taking over will have been for naught.

Even so, the types of jobs that will be available — and the skills and competencies required to succeed in those positions — are changing rapidly. As ad tech and martech converge and AI is increasingly thrown into the mix, the demand for specialists will decrease. Brands will be looking for people able to perform across multiple disciplines — those who are able and willing to acquire working knowledge of many platforms and disciplines.

"Because the technology is so powerful, there's a large demand for talent that understands how to apply it," Scott Penberthy, director of applied AI for Google Cloud, recently told Fast Company. Major tech brands are investing heavily in new AI positions. Amazon is in for $228 million, Google has invested $130 million in new AI jobs, and Microsoft is in the mix with $75 million, according to research firm Paysa.



3. Tailor your content to capitalize on the voice search opportunity

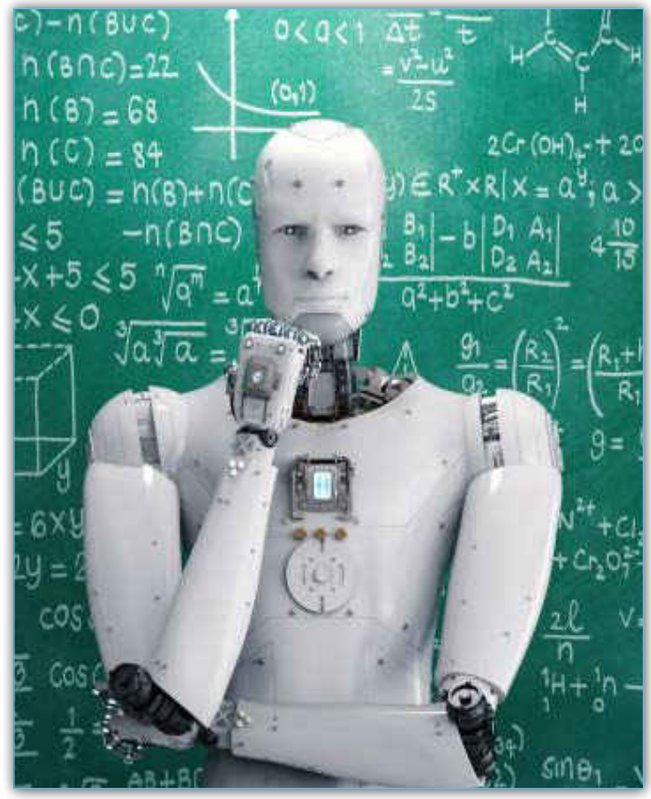
This is not a trend, and it's something you can implement now to make your future AI applications even more successful.

Between 20 and 25 percent of queries on the Google mobile app and Android devices are already voice searches. Gartner found that voice-based search queries are the fastest-growing mobile search type and expects that by 2021, early adopter brands that redesign their websites to support visual and voice search will grow their digital commerce revenue by 30 percent.

4. Boost your content performance with AI

How can you prepare your content for AI? Your language strategy goes beyond voice search; prepare for AI technology like chatbots as well. Natural language is becoming the standard as AI tools become smarter and learn to adapt to the natural speech patterns of each audience.

This is why the application of the SMART (Specific, Measurable, Achievable, Realistic and Timely) framework is advocated constantly for new technology decisions. Marketers need to get infinitely intentional in planning, creating and promoting content. You'll need to understand the entire customer journey, start to finish, and which content formats, platforms, channels and device targeting will get your content in front of the right customer at the right point, at just the right moment.



This is perhaps where AI will have the greatest utility in marketing — in learning user behaviors and needs at a level so granular that each consumer has a completely custom, personalized experience.

5. Examine your potential IoT and AI use cases

Tristan Greene over at The Next Web took a bold stand (and may well be right on) with his AI prediction: "Showing up in 2018 without an AI chip in your flagship device is going to get your product dismissed by the general public."

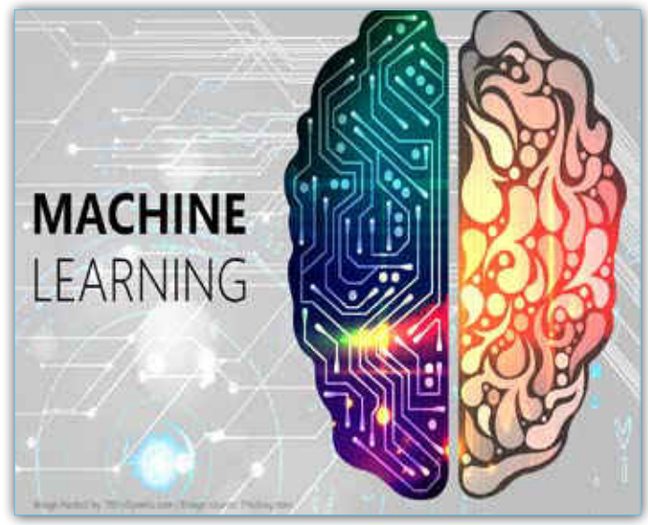
You're probably not manufacturing phones, but the majority of your consumers will soon be armed with AI-enabled devices.

Start with that assumption and begin projecting out from there. AI is going to have use cases inside your business, but it is also going to be the new normal for the consumers you're trying to reach. Begin documenting the problems you believe AI may be able to help you solve — both internally and for your consumers — and examine each use case.

Smart Insights provides some great examples of use cases by breaking down AI into three components: Machine Learning Techniques, Applied Propensity Models and AI Applications.

Artificial intelligence in e-commerce

The explosion of AI in e-commerce has allowed online retail giants to explore advanced technologies. As firms in the e-commerce industry continue to expand and cater to a growing number of customers, the need for an automated system to streamline their operations has become one of their top investment priorities.

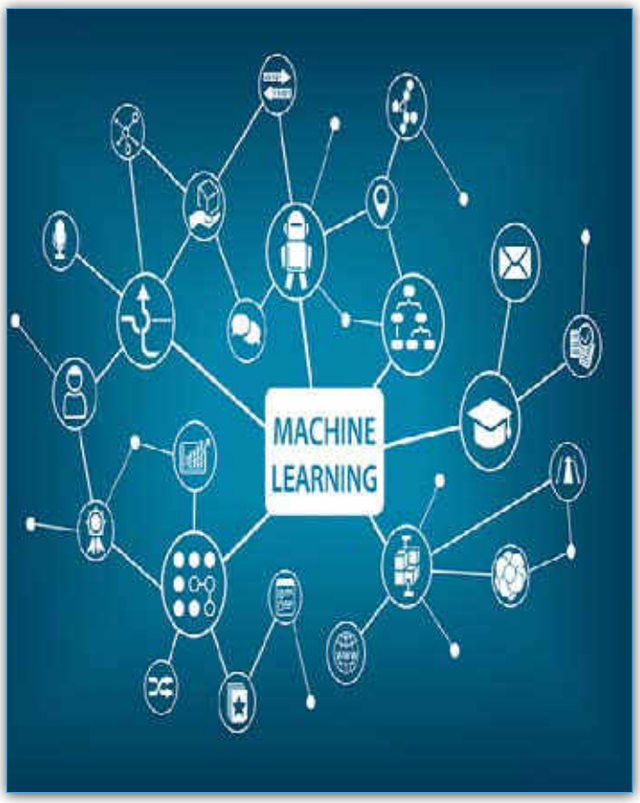


Ocado reportedly planned to spend £175 million ($232 million) for its robotics and automation system this year, Amazon committed $5 billion in its tech investments in India alone, and Alibaba is looking into pouring $15 billion into research and development spending over the next three years. Forrester Research predicts that AI-related investments will grow by about 300 percent in 2017, with businesses becoming more competitive by 2020 and gaining $1.2 trillion per year.

But current technology is far from perfect. In the case of Ocado, it failed to impress analysts during their visit to the company's Andover

facility. According to a Telegraph interview with George Mensah of Shore Capital:

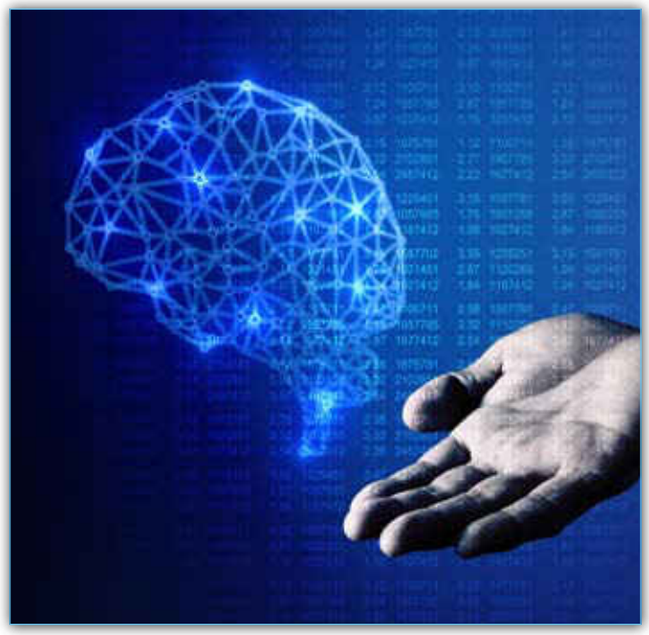
The slightest error in terms of the movement of the robot will cause them all to pause, so there were periods where there were long pauses.



The consensus was that the technology still had obvious glitches that needed a lot of fixing, which stands in contrast to the flawless operation Ocado shows on its marketing video.

The most popular AI applications from the selected e-commerce companies using AI in their marketing operations include:

- Chatbots to improve customer service.
- Image and voice recognition for faster search results.
- Recommendation engines with advanced algorithms for more accurate product recommendations.



How AI is implemented in e-commerce companies can be seen below:

Amazon

Before Ocado had its robots stuffing orange plastic bins and running them on winding conveyor belts, Amazon was looking to get ahead of its competitors by forming Amazon Robotics after purchasing Kiva Systems in 2012. The subsidiary is continuing to develop robotic technology using machine learning, object recognition and computer vision in Amazon's fulfilment centres.

– Product recommendations

If Amazon's latest earnings are any indication, product recommendations powered by AI also have been successful. The company reported a third-quarter sales increase of 34 percent to $43.7 billion. The recommendation system is integrated into every aspect of the purchasing process. (The company, however, prefers not to disclose how effective its system is.)

But a team of University of Toronto professors notes in a Harvard Business Review article that Amazon's system still doesn't deliver 100% accuracy in its predictions. They wrote:

Amazon's AI does a reasonable job, considering the millions of items on offer. However, they are far from perfect. In our case, the AI accurately predicts what we want to buy about 5 percent of the time. In other words, we actually purchase about one out of every 20 items it recommends.

That said, the team went on to predict that given additional data (such as that provided by Amazon's purchase of Whole Foods), the company could eventually become so accurate that it could someday turn a profit by shipping people items it predicts they will need.

– Battling fake reviews

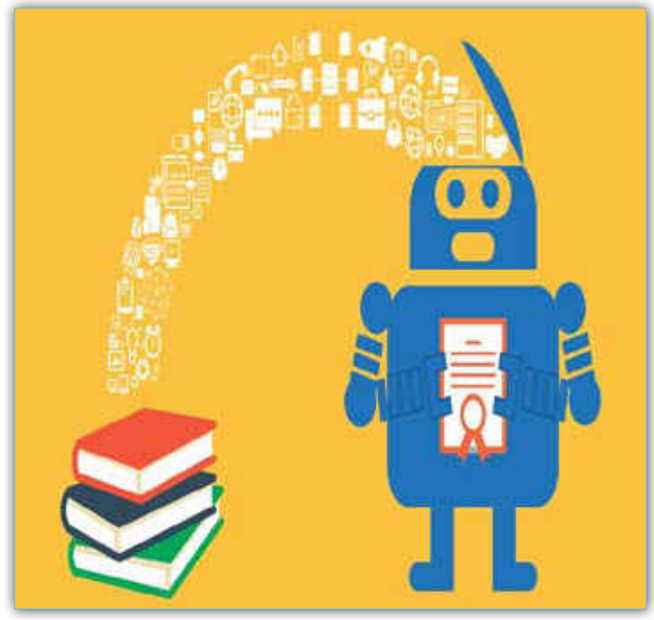
Amazon's well-known product reviews can help in marketing, but some companies have found a way to generate fake feedback to boost their product's ratings on the site. Sensing the growing number of inauthentic reviews on its website, Amazon filed a lawsuit in 2015 against companies that have paid for positive feedback, a scheme known as "crowdturfing." Some have also paid for negative reviews to be posted against their competitors. To combat the proliferation of fake reviews, Amazon released a machine-learning algorithm to better filter authentic online feedback.

However, current developments in technology may just bolster the fake reviews business. Now, instead of companies paying people to post positive reviews, they may tap AI to do it for them. A team of researchers from the University of Chicago used a neural network to prove that it can write phony positive reviews that are indistinguishable from human-written reviews, as judged by the humans who verified the content. Their research has since been featured by multiple news outlets to raise awareness of the misuse of AI.

– Style recommendations

The fashion industry is where Amazon is planning to use AI to improve its marketing reach. In April 2017, it launched Echo Look, a hands-free camera assistant and personal stylist which uses a combination of human advice and machine learning. Users can command Alexa, Amazon's cloud-based voice service assistant, to take a photo or video of their outfit to be posted on social media. It also can compare outfits using Style Check's data analytics.

The Wall Street Journal's Geoffrey A. Fowler put the technology to the test by inviting stylists and then comparing their taste versus Alexa's.



He was surprised that Alexa was mostly on point, although not always.

Amazon continues to invest in AI for a variety of reasons. As CEO Jeff Bezos wrote in his annual shareholder letter, "Machine learning drives our algorithms for demand forecasting, product search ranking, product and deals recommendations, merchandising placements, fraud detection, translations, and much more."

Rajeev Rastogi, the company's Machine Learning lead, told the Economic Times, "We are applying AI to a number of problems such as speech recognition, natural language understanding, question answering, dialog systems, product recommendations, product search, forecasting future product demand, among others."

Amazon Web Services, the company's cloud-computing platform subsidiary, has developed these plans in the form of deep-learning tools such as Amazon Lex (a chatbot service for building conversation interfaces), Amazon Polly (a cloud service that turns text into speech) and Amazon Rekognition (a deep-learning image analysis technology). Amazon also has teamed up with Microsoft to develop Gluon, a user-friendly interface for developers working on training algorithms and neural network models.

Alibaba

Alibaba, one of China's e-commerce behemoths, has been investing in technology to improve its services, especially in marketing.

– Product recommendation

Its own software, E-commerce Brain, powers the company's product-recommendation technology. It builds predictive models using real-time online data on content consumption, buying behavior and other data from the entire Alibaba ecosystem such as Alipay, AutoNavi, Youku and UCWeb.

The company's AI also aids sellers by helping them create product-buyer matches on personalized virtual storefronts to improve the chances of selling their products. The recommendations are based on buyers' purchase history, background and location, among others. Alibaba claims that through this technology, they recorded a reported 20 percent increase in conversion rate during their 24-hour online shopping event in 2016.

The company also launched Dian Xiaomi (or store assistant), another AI-powered text-only chatbot, earlier this year to help merchants customize and manage their virtual storefronts, especially during rush hours when they are short of human staff to entertain buyer inquiries and problems.

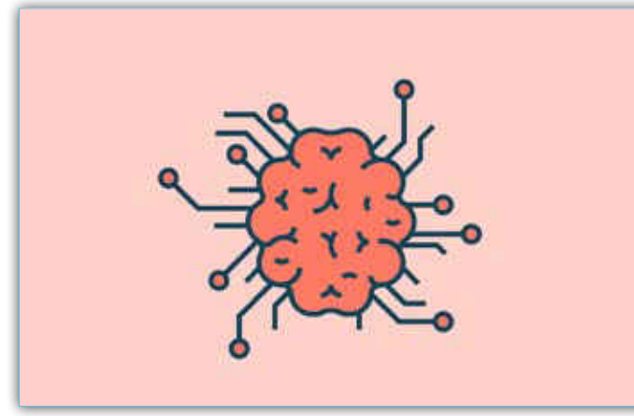
– Smart supply chain

In addition, the company is exploring the development of a smart supply chain in China through its Ali Smart Supply Chain (ASSC) platform, which predicts volatile buyer trends so sellers can focus on improving their product, inventory and delivery operations. Supply chain design can spur innovation and improved production, along with improving infrastructure through smart cities. After developing a smart transportation system for Hangzhou in eastern China, Alibaba has now turned to building an AI hub in Macau over a four-year period, bringing advanced technology to transportation, health care and governance.

In 2015, Alibaba claimed to have pioneered China's first AI platform when it launched DT PAI. The cloud offering allows companies to use tons of data and analyze which target market suits their products well. During its development phase, the company was planning to use image recognition by letting users take a photo of an item and allowing the platform to direct them to a specific page on the website where they could purchase it.

– Chatbots

In an interview with MIT Technology Review, Felix Liu, Alibaba's head of Customer Experience Business Group, explained that AI has helped the company by obtaining massive customer data, discovering key issues and improving the company's inquiry management channels. In one instance, Liu cited how their chatbot was able to detect abnormal levels of order status inquiries and took only 30 minutes to provide a solution to their affected customers. As Liu put it, "AI currently helps 100 percent of our customers with inquiries, and resolves 50 percent of them completely."



In October 2017, CTO Jeff Zhang announced during their computing conference that the company will be investing $15 billion in research and development over the next three years, much more than the investments they made from 2014 to 2017. They will build seven research laboratories, dubbed the Academy for Discovery, Adventure, Momentum and Outlook, spread across different continents. Researchers will work on projects dealing with AI, machine learning, natural language processing and data intelligence, to name a few.

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