



# A Marketer's Guide to AI and Machine Learning



## Introduction

Advances in artificial intelligence (AI) are creating exciting opportunities for marketers – CMOs are looking to artificial intelligence to increase efficiency and make their marketing campaigns more effective and their customers' experiences more personalized and fulfilling. In fact, according to Forrester Research, 86% of marketers think AI will make marketing teams more efficient.'

While brands are enthusiastic about the doors that AI will open, there is also a lot of confusion, hype, and apprehension about the technology. There is no doubt that AI has the power to change various aspects of our daily lives both as marketers and as consumers. Already, AI has had an impact on a wide range of business applications from campaign production to inventory management to customer data analysis, but as we will discuss, these changes have historically come at a slow pace with some bursts of advances in between. Due to the hype and investment in AI, we are currently in a burst.

This whitepaper will outline what marketers need to know about AI and its sub-category, machine learning. We'll focus less on the hype and more on the practical applications and useful knowledge for marketers who are looking for inspiring ways to implement artificial intelligence (AI) and machine learning.

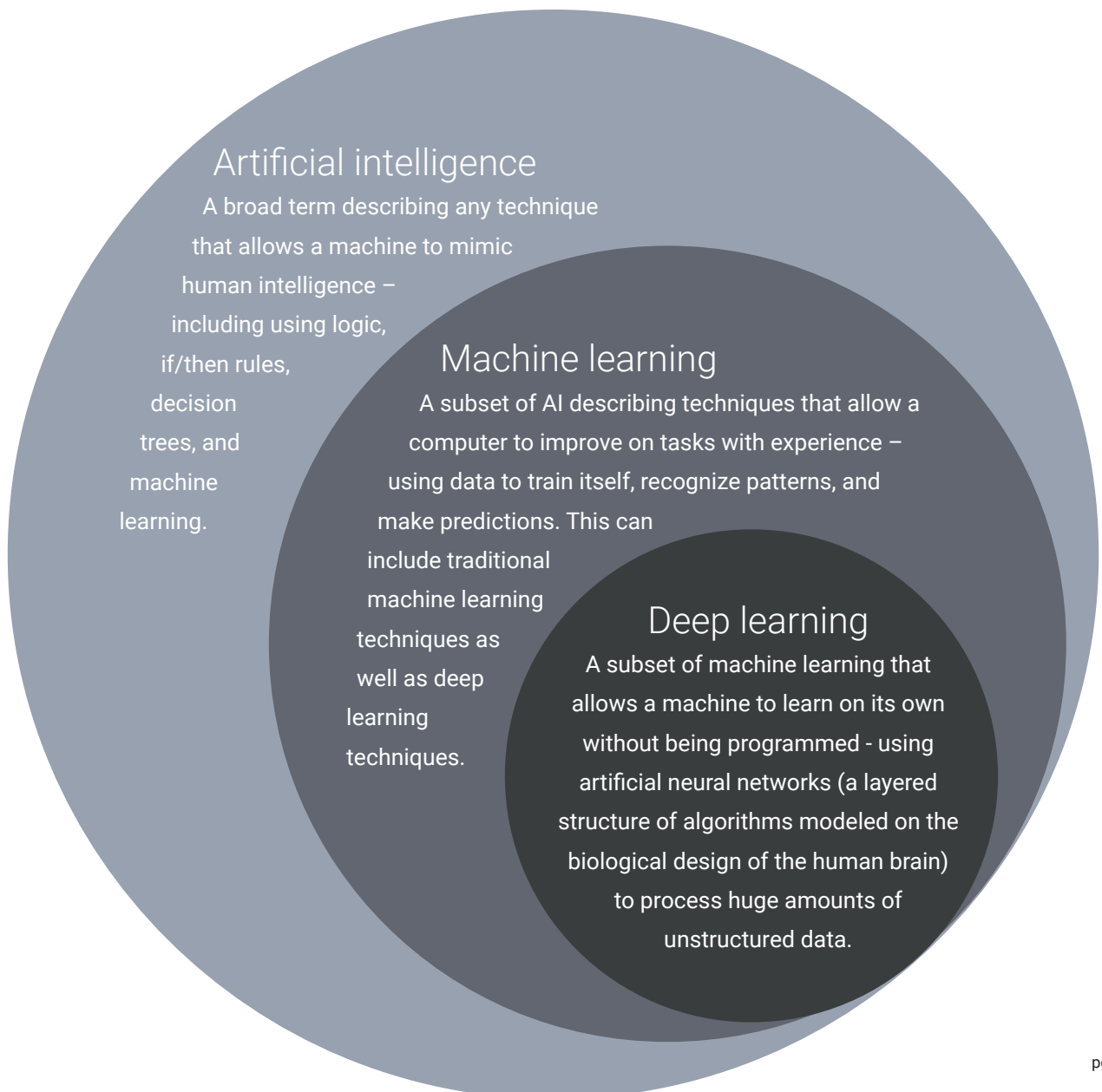




# Part 1:

## A primer on artificial intelligence and machine learning

Artificial intelligence – a term coined by John McCarthy,<sup>2</sup> one of the founding fathers of artificial intelligence during the 1950s – is an umbrella term used to describe all possible approaches that might be used to create human-style reasoning in machines. These include:



Examples:

## Artificial intelligence

### IBM's Deep Blue Chess Program

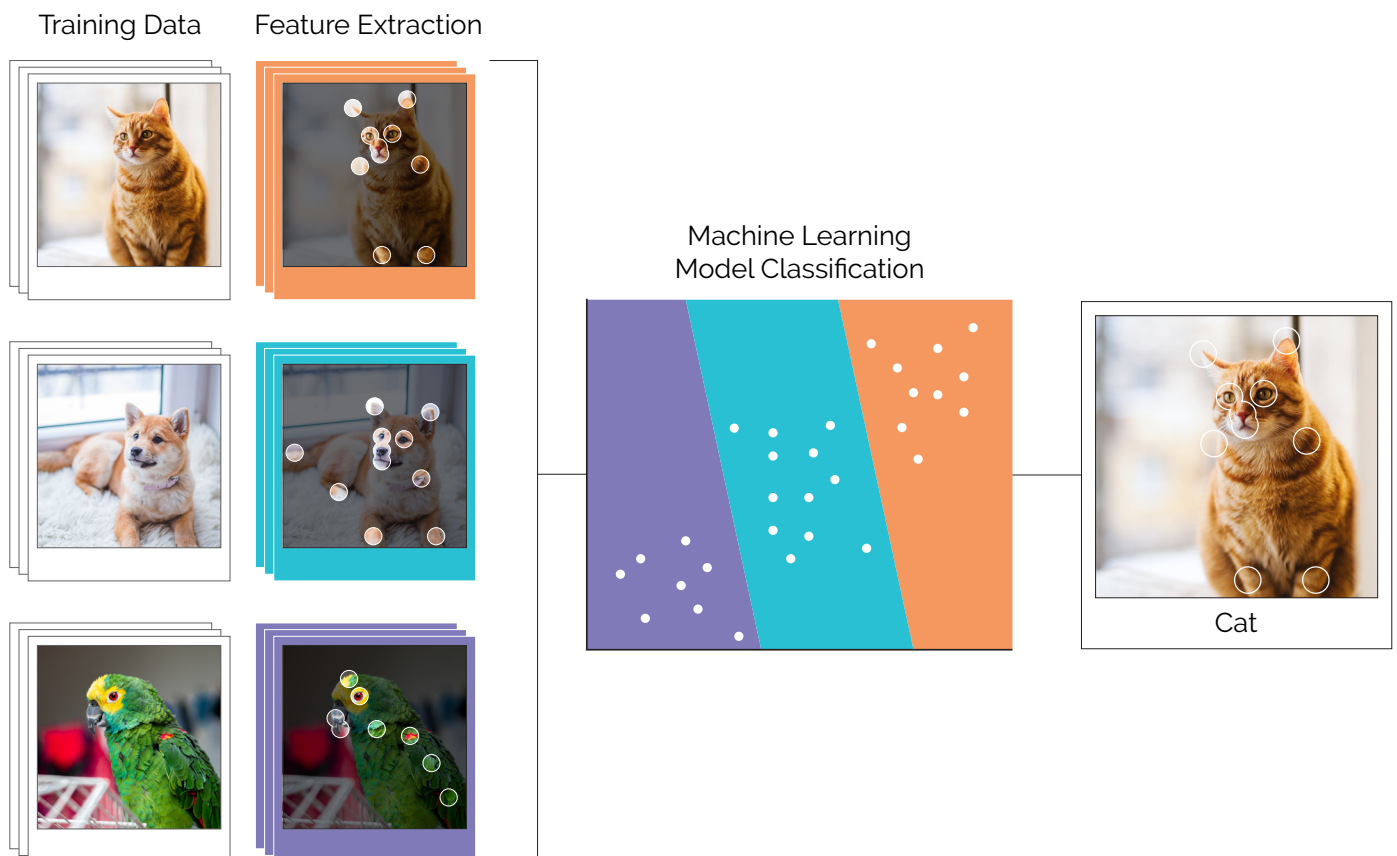
In 1997, IBM developed an AI-based chess program that beat world chess champion Gerry Kasparov. This program is an example of AI, but not machine learning, because it was programmed using rule-based coding to respond to certain situations with specific behavior. There isn't a "learning" component to it.

## Machine learning

### Early image recognition

The early techniques used in computer vision (a field of AI that trains computers to interpret and classify visual information) provide an example of machine learning that is not deep learning. To teach a computer to identify images, a programmer would hand-code identifying features (like shape detection) to help the computer correctly classify the images.

In the below example, the computer would be given the data (images in this case) and would be "told" through programming that something is a cat because it has the features that tell you it's a cat – and these features are defined by the programmer. After feeding the computer this information, it would be able to identify the animal. Through feedback about the accuracy of its choice, the program would improve through practice – "learning" to correctly identify the animal.



## Deep learning

### Computer vision – Google Brain

Google Brain achieved computer vision through deep learning in 2012. In this case, the program was given a larger set of images and told the output (e.g., this is a cat), but unlike the traditional machine learning example above, it did not need to know the defining features of the animal in order to identify it. The program took the input and – using neural networks – it processed the data and learned to define the identifying features on its own. This is closer to the way a human child would learn to identify a cat; the child would be told “Jimmy, this is a cat” and through the experience of seeing enough cats, he would eventually be able to correctly identify the animal.

### AlphaGo

Alphabet/Google subsidiary DeepMind developed a computer program that taught itself how to play Go using neural networks to process a large data set of expert moves. Go is an ancient board game that is widely known as one of humankind’s most complicated games. The fact that AlphaGo was able to beat the world’s top Go player, Ke Jie, in 2017 was a huge breakthrough in deep learning.

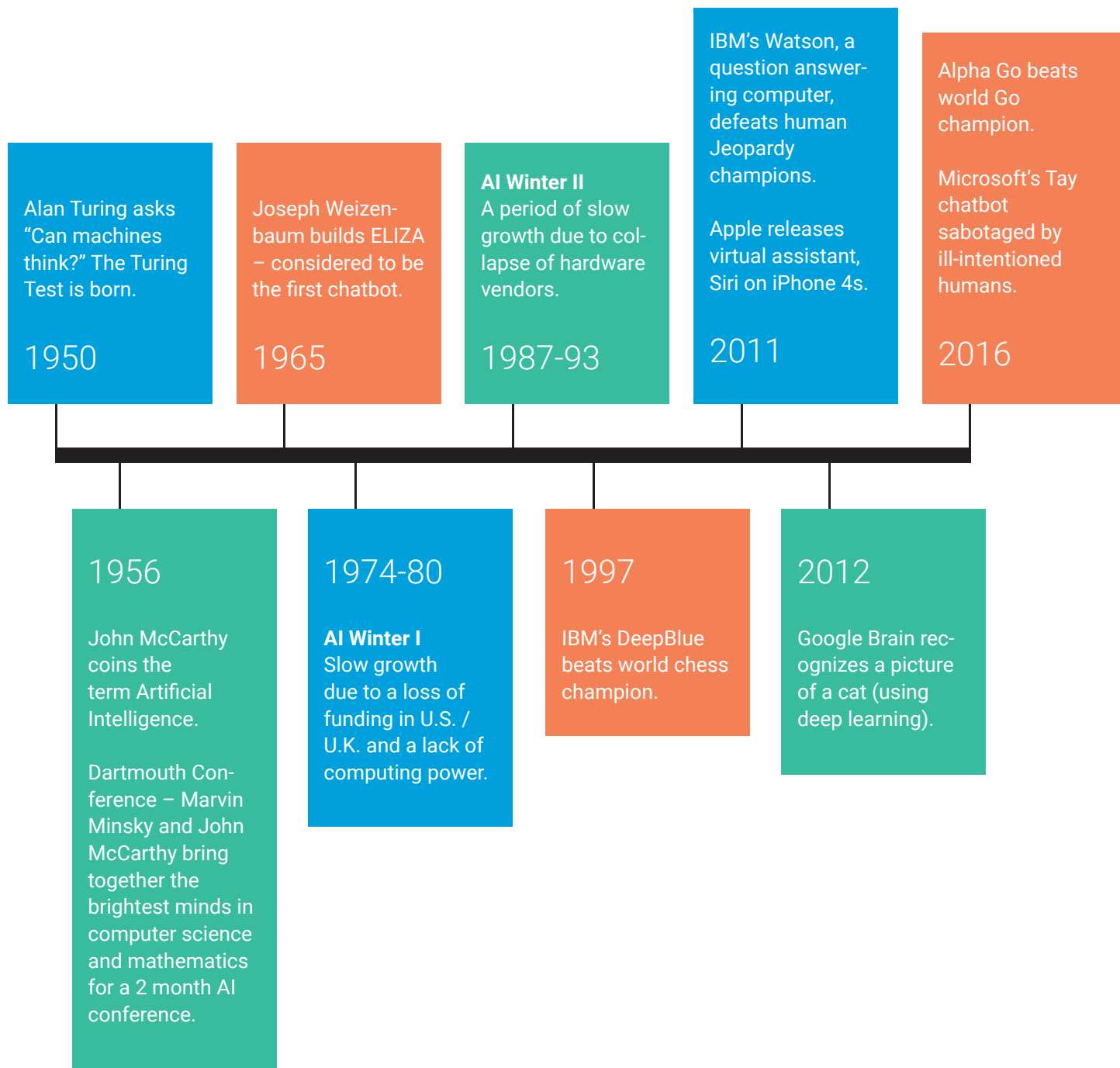




## History (and future) of AI

Humans have been fascinated with the concept of intelligent machines since antiquity. AI myths have been present since around 1,000 years BC in ancient Greek, Egyptian and Chinese cultures.<sup>3</sup> But the fascination was entirely anecdotal until the birth of modern artificial intelligence research in the 1940s and '50s.

### Timeline of modern AI



The capabilities of AI that describe where we are now and where we hope to go in the future are classified below. Note that while terms like 'machine learning' and 'deep learning' describe the techniques used to achieve specific results, the terms below describe the results themselves:

- **Narrow AI** (also known as Weak AI): This AI is designed to achieve a specific task. All of our current AI technologies are narrow AI – even sophisticated ones like self-driving cars and IBM's Watson – because they are designed to perform highly specialized tasks.
- **Artificial General Intelligence** (AGI): Also known as Strong AI, this term describes machines that are able to perform all the intellectual tasks that a human can. With AGI, the intelligence of a machine matches human-level capabilities and the system can complete any generalized task that a human could – e.g., making coffee AND solving a crossword AND caring for a baby AND driving a car AND tying a shoe, etc. No AI currently exists that can match the breadth of human intellect.
- **Super intelligent AI**: This is the term for computer intelligence that surpasses human abilities - outsmarting humans in creativity, scientific thinking, problem solving, abstract thinking, etc.

## A dose of reality – challenges and limitations of AI

There's a lot of speculation that every career, from truck driver to artist to musician, will soon be replaced with computers. Change is coming, but the rumors that an AI revolution is nigh are not quite accurate. The truth is, AI will continue to see slow progress with bursts of advances (like the one we're currently seeing) as well as "AI Winters" when progress loses steam because of hurdles that must be overcome before advances can continue.

- When it comes to AI, we tend to underestimate the difficulties and overestimate our ability to overcome them.
- The goal posts keep moving; as computers become smarter and AI capabilities improve, our definition of "thinking" machines becomes more refined.

*“ Within ten years a **digital computer** will be the world's chess champion.”*

H.A. Simon and Allen Newell | 1958  
(achieved in 1997)



## Some examples of why AI is so difficult to develop:

### Nuances in human interaction

All virtual assistants on the market today required human authors to create realistic interactions. Even with AI technologies like Natural Language Processing (NLP) and Natural Language Generation (NLG), human language is often too nuanced for AI to replicate unaided.



*“Authoring is required, not because the algorithms aren’t brilliant, but because language is so brilliantly subtle.”*

**Jonathan Foster,**  
Microsoft <sup>4</sup>

### Bias in data sets/inaccurate data sets

Machine learning is only as good as the data feeding it. In some cases, the data that feeds machine learning exposes human biases and weaknesses.

### Lack of computing power

Progress in AI has historically been stifled by a lack of computing power. Computing power is just now catching up to ideas from 40 to 60 years ago. Technologies and algorithms we’re developing today could take decades to come to fruition.

### Funding for AI research

Throughout AI’s modern history, there have been periods of stagnation including several “AI Winters” when funding for AI waned because of slow growth in the field.

While some technologists may be warning of the AI revolution upending every aspect of human society, the reality is that we still do not have a machine that is capable of unequivocally passing the Turing Test<sup>5, 6</sup> (a test to evaluate whether a computer program can fool a skeptical human judge). If we haven’t yet cracked the Turing Test in 70 years of AI research and development, how long will it be before we have developed a computer that can match human intellect?



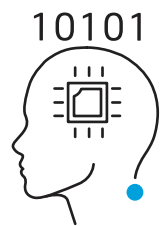
## Part 2:

### Practical AI applications for marketers

Now that we've covered the basics of AI and some of its limitations, let's explore what marketers CAN do with AI and machine learning technologies that exist today. Here are eight smart applications of AI in marketing:

#### 1.

#### Customer data analysis



Perhaps the most important impact of AI on marketing are additional capabilities for data analysis. AI thrives on big data. In fact, machine learning happens because computers are trained using large sets of data. Marketers are among the most consistent users of data in every company – collecting huge amounts of data from many sources to help guide decisions on their quest to optimize customer experience and profitability.

**But all that data creates many challenges for marketing teams including:**

- Collecting data but not using it, or not knowing what to do with it
- Drowning in data
- Inability to act on data in real-time
- Lack of people with the deep analytical skills required to draw useful insights from the data

In a Harvard Business Review survey, only 3% of respondents said they are able to act on all the customer data they collect, and 21% said they can act on very little of it, demonstrating that this is a huge area of opportunity for brands.<sup>7</sup>

The exciting news for marketers? AI can help with these common data challenges because processing, sorting, finding patterns and making sense of data is machine learning at its core. The benefits of incorporating AI to improve data analysis is clear; according to McKinsey, data-driven brands who use customer analytics to inform their marketing strategies and programs are 23 times more likely to acquire customers and six times more likely to retain customers than companies that do not broadly use customer analytics.<sup>8</sup>



## Brand examples



### Yum Brands China (KFC, Pizza Hut, Taco Bell)

China's biggest fast-food operation is using AI technology to help preserve and grow its market share while facing increasing competition from other U.S. chains. The brand is putting data from more than 180 million customers who are members of KFC and Pizza Hut's loyalty programs to work, using artificial intelligence to customize a menu for each diner (delivered via mobile app or digital kiosk) based on preferences and local tastes. The AI-powered menu, introduced in January 2019, has already boosted average per-order spending by 1% —the equivalent of about \$840 million each year.<sup>9</sup>



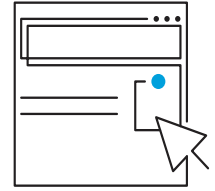
### Tumi

The luxury luggage brand turned to machine learning to help them analyze consumer behavior to predict purchasing behavior and understand where consumers are on the purchase path. Their machine learning system combines data across multiple channels — purchase history, email activity, search, browse behavior, social media activity — to give an accurate picture of consumer needs. The information is used both to personalize marketing messages and improve in-store experiences to help employees deliver exceptional one-to-one shopping experiences to their customers.

For example, after launching the system, an in-store sales associate received an update that a regular customer who was male was interested in women's luggage; the associate was surprised, since the customer had never purchased any merchandise for women. On the customer's next visit to the store, the associate was able to anticipate his needs and help him pick out a gift for his wife — a need that the system was able to accurately predict. Tumi's investment in AI paid off: the year after implementing the system, the brand sent 40 million fewer emails while increasing e-commerce revenue 6 times over the previous year.<sup>10</sup>

## 2.

### Product recommendations & dynamic personalization



A recent report from Accenture revealed that 91% of consumers are more likely to shop with brands that recognize, remember, and provide them with relevant offers and recommendations.<sup>11</sup> In addition, a recent report from Data Axle found that 50% of consumers say irrelevant product recommendations play a role in their decision to ignore marketing messages. To keep up with these increasing consumer demands for personalization, marketing departments are investing in AI technology to help them deliver personalized content to consumers at scale.

Marketers have been using algorithms to find patterns in purchasing history to predict future purchases and presenting offers on those products for a number of years now. Amazon, a pioneer of automated product recommendations, was able to differentiate itself and build much of its e-commerce empire on the success of this consumer-friendly tech.

For Amazon, the investment paid off – with their recommendation engine driving 35% consumer purchases.<sup>12</sup> Other brands have seen similar success, a recent study found that average order value (AOV) increased by 369% when prospects engaged with a single product recommendation and conversion rates increased by 288%.<sup>13</sup> AI-driven personalization will only continue to improve marketers' ability to personalize their offers.





## Brand examples

## Lands' End

Lands' End extends the value of their product recommendations and delivers greater personalization by incorporating dynamic content blocks in their emails. The dynamically personalized product recommendations are delivered to shoppers automatically in their email using content modules. The emails that include product recommendations generate double the click-through-rate (CTR) and a 46% increase in revenue per message over the average marketing email.



## Netflix

Netflix's proprietary recommendation engine delivers personalized content recommendations to their users. The brand estimates that 75% of what subscribers watch on Netflix comes from content suggestions based on machine learning algorithms.<sup>14</sup> The brand's relevant recommendations keep subscribers coming back for more. In fact, Netflix estimates that their recommendation engine saves them \$1 billion per year.<sup>15</sup>

### 3.

## Chatbots



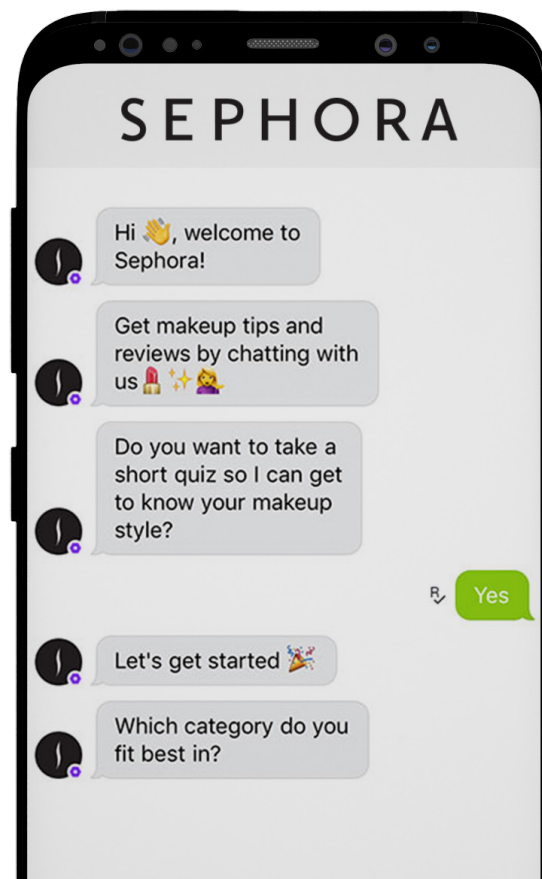
Because of the challenge presented by the nuances of human communication, chatbots are still in their early days. Many chatbots rely heavily on predetermined responses and scripts. In fact, some chatbots are so scripted that many experts would argue that they barely qualify as AI. Chatbots that use machine learning technologies, like Microsoft's Xiaoice in China, are mainly being employed in experimental or research environments.

Despite their limitations, chatbots are seeing widespread use by brands. Marketers are employing chatbots to solve a number of challenges, from customer service to product recommendations, and the use cases will continue to become more exciting as advances in natural language processing make unaided or minimally aided human-computer interaction possible.

### Brand examples

#### Sephora

Sephora's Kik chatbot puts a new twist on electronic assistants. Delivered on Kik, a mobile messaging app popular among teens and young adults, the chatbot was developed to improve the customer experience by serving up personalized content, tips, makeup tutorials and product recommendations based on customer feedback. The chatbot opens with a quiz to help it learn the customer's style and give product recommendations that appeal to their individual tastes.<sup>16</sup>





## North Face

North Face developed a virtual shopping assistant built with IBM Watson technology to interact with consumers, give recommendations and help them find the right product for their needs. After a two-month test and data from more than 50,000 users, North Face discovered that consumers spent 40% more time on the site when they interacted with the chatbot. In addition, 75% of consumers said they would use the Watson-powered chatbot again, and the platform drove a 60% click-through rate to try product recommendations.<sup>17</sup>



## 4.

### Content curation



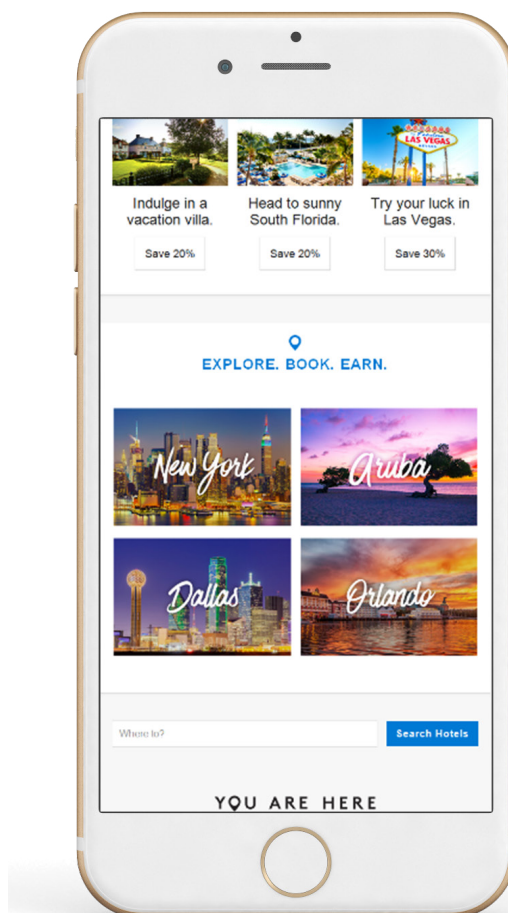
Marketers are implementing machine learning technologies to automate delivery of personalized content based on analysis of consumer behaviors. This approach delivers higher and more frequent customer engagement, reduces campaign production times and optimizes content based on user preferences.

### Brand example

#### Marriott “Explore. Book. Earn.” Module

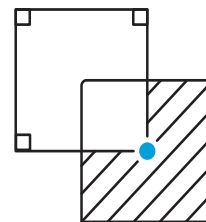
In an ongoing effort to improve campaign performance, Marriott incorporated the “Explore. Book. Earn” module into their emails; the module uses AI technology to produce personalized content that generates the highest response rates.

The content module uses real-time machine learning to select which four (out of 22 destinations) to show an individual. The decision is based on AI-driven learning that factors in the subscriber’s previous responses and considers not only click activity but other factors such as geo-location. The “Explore. Book. Earn” module can be incorporated across multiple campaigns and the AI-driven optimization has repeatedly generated a 25% lift in click-to-open rates.



## 5.

### Computer vision & augmented reality



Computer vision (technology that allows computers to recognize objects) and augmented reality (AR technology that allows computers to enhance images that exist in the real world with virtual objects like images and text) are helping brands showcase their products in new and interactive virtual environments.

A recent report from Gartner indicated that at least 100 million consumers are expected to utilize AR enabled shopping technologies in 2019.<sup>18</sup> In addition, a survey report from BRP Consulting revealed that 48% of consumers are more likely to shop with retailers that offer virtual or augmented reality.<sup>19</sup> Consumers and retailers alike are excited about these technologies because they give consumers the power to try on products in a virtual environment before they buy – solving a key downside to shopping online – not knowing how a product will look on you or in your

### Brand examples



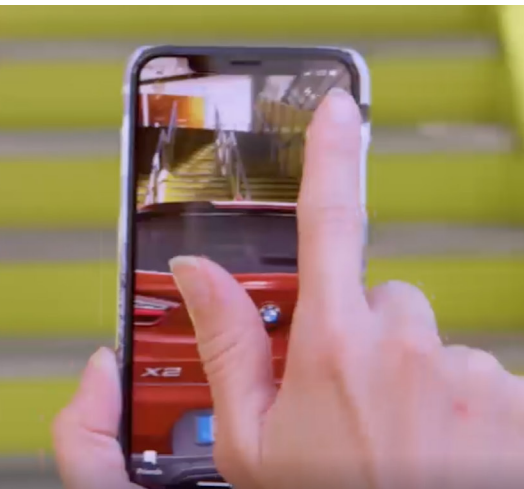
#### Macy's

Macy's is taking customer experience to the digital age with augmented reality features that enable consumers to try on makeup and design their space virtually in their mobile app. After a 2018 test of their AR make-up tool was successful, the retailer decided to expand the feature to all mobile app users – allowing customers to virtually try on makeup from more than 1,000 cosmetics products.<sup>20</sup> Macy's also recently launched their room design feature – giving furniture shoppers the tools to see how their purchases will look (and fit) into their homes.

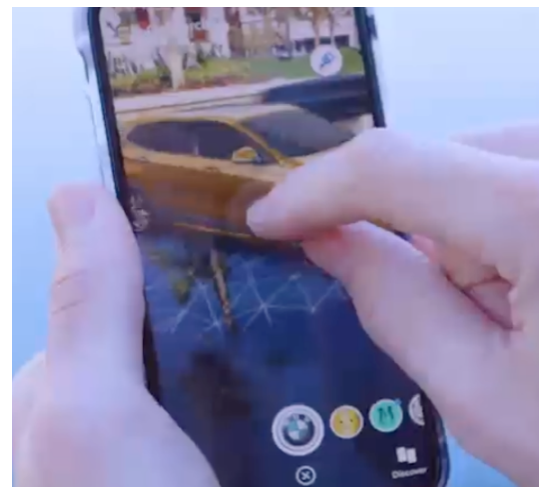
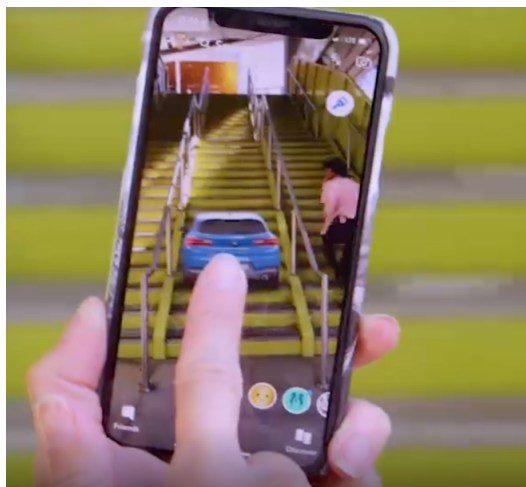
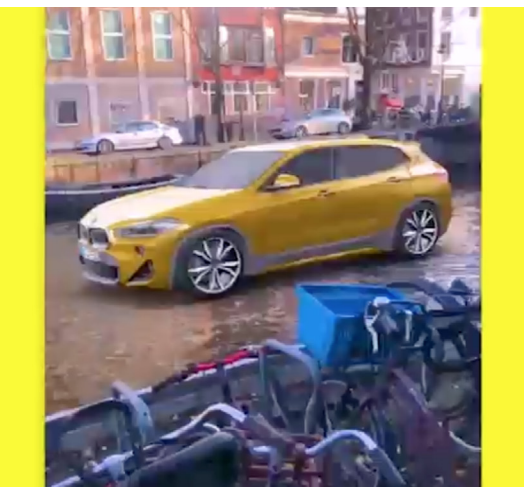


## BMW

BMW used AR and Snapchat Lens to create a “virtual showroom” that allowed consumers to view the new BMW X2 and place it into their own environment. They became the first brand to use 3D augmented reality in partnership with Snapchat to deliver a product experience. Consumers launched the augmented reality lens by engaging with a Snapchat ad and once opened, a gold BMW X2 would appear in their virtual environment, allowing the shopper to walk around the vehicle and see product details from every angle. Consumers interacted with the advertisement for an average of 54 seconds, a 170% increase over the average Snapchat Lens ad.



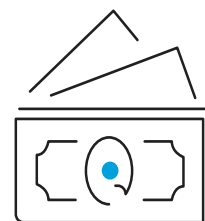
## For the launch of the BMW X2





## 6.

### Dynamic pricing



Advances in machine learning are empowering brands to become more sophisticated in their price modeling capabilities. With machine learning capabilities marketers can respond to changes in demand and adjust price depending on the customer, time of day and other key factors like inventory and competitor pricing to drive significant increases in revenue.

### Brand example



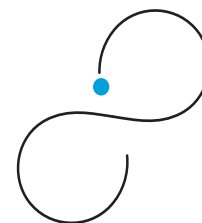
#### AirBnb

When AirBnb noticed that property owners were abandoning the process of listing their short-term rental when it came time to set the price, they decided to build a custom price modeling system to help property owners determine what price to charge for their unit. The system, powered by machine learning, has evolved over the years, and it now tackles the complicated challenge of analyzing a wide range of variables like geographic location, number of bedrooms, amenities, local events, demand, seasonality and many others that define the value of the short-term rental market. The effort has paid off – in early tests property owners that set their prices within 5% of the recommended rental rate provided by machine learning algorithms were four times more likely to get a booking.<sup>21</sup>



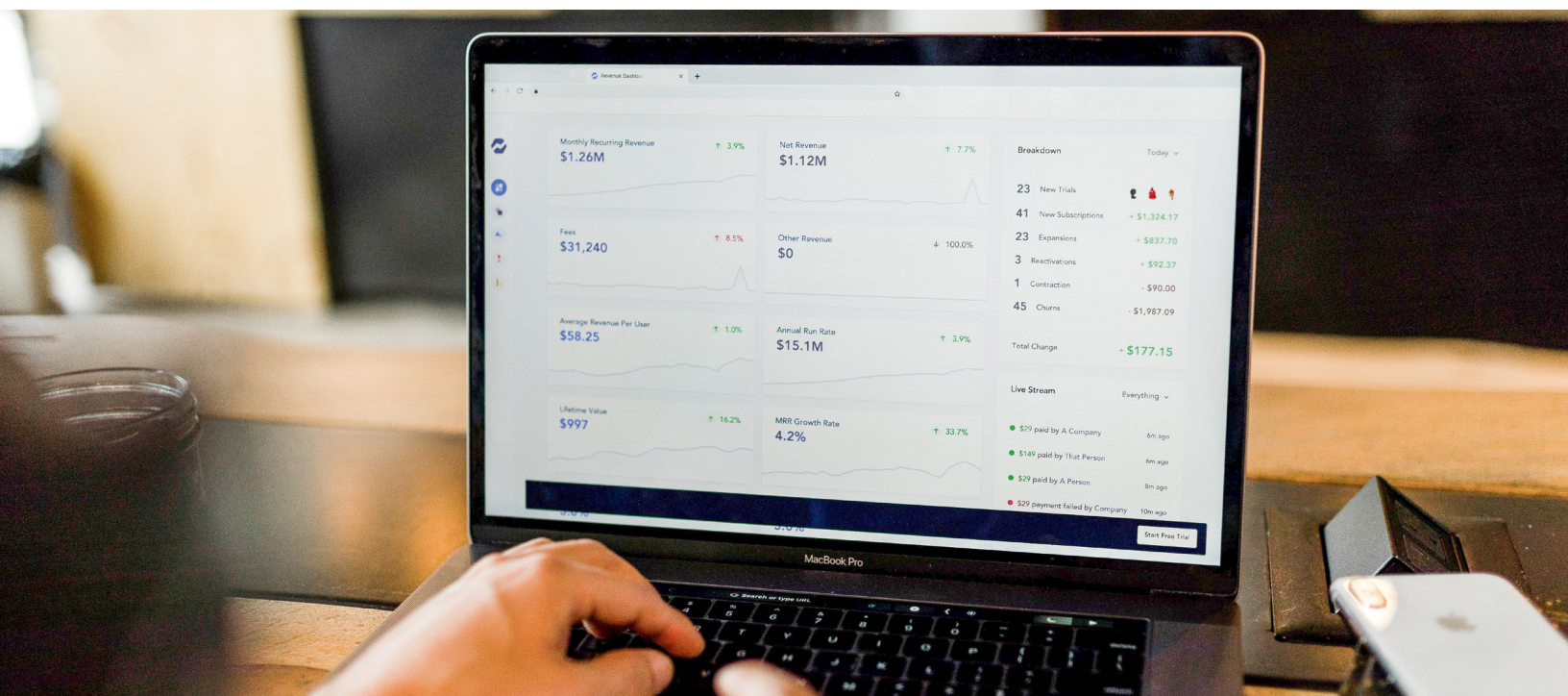
# 7.

## Reducing churn & improving customer retention



All marketers know that the cost of acquiring new customers is much higher than that of retaining existing ones. Machine learning is helping marketers predict and prevent customer attrition. By analyzing customer data for behaviors that might predict churn, brands can discover which customers are about to disengage or become inactive and target those customers with relevant messaging to re-engage them.

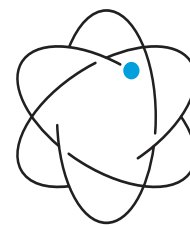
### Brand example



### Paypal

The digital payment company developed a predictive model using machine learning that helped them identify when a customer might lapse and why. Incorporating that model into their marketing strategy reduced churn and enabled them to develop proactive ways to re-engage customers before they leave. By incorporating machine learning, the brand was able to more quickly analyze their data and apply models to their consumer database to identify which customers might become inactive. What used to take days to calculate before implementing machine learning technologies was now done in a matter of minutes.<sup>22</sup>





# 8.

## Testing

Most marketers know how important it is to test their campaigns, but finding the time, resources and people with deep experience to create a testing framework can be a major challenge. AI -powered A/B testing is expanding marketers' ability to test and optimize thousands of different campaign variables. When paired with natural language capabilities, systems and platforms powered by machine learning can automatically generate variants, test them, and then incorporate the findings into future campaigns.

### Brand example



#### Virgin Airlines

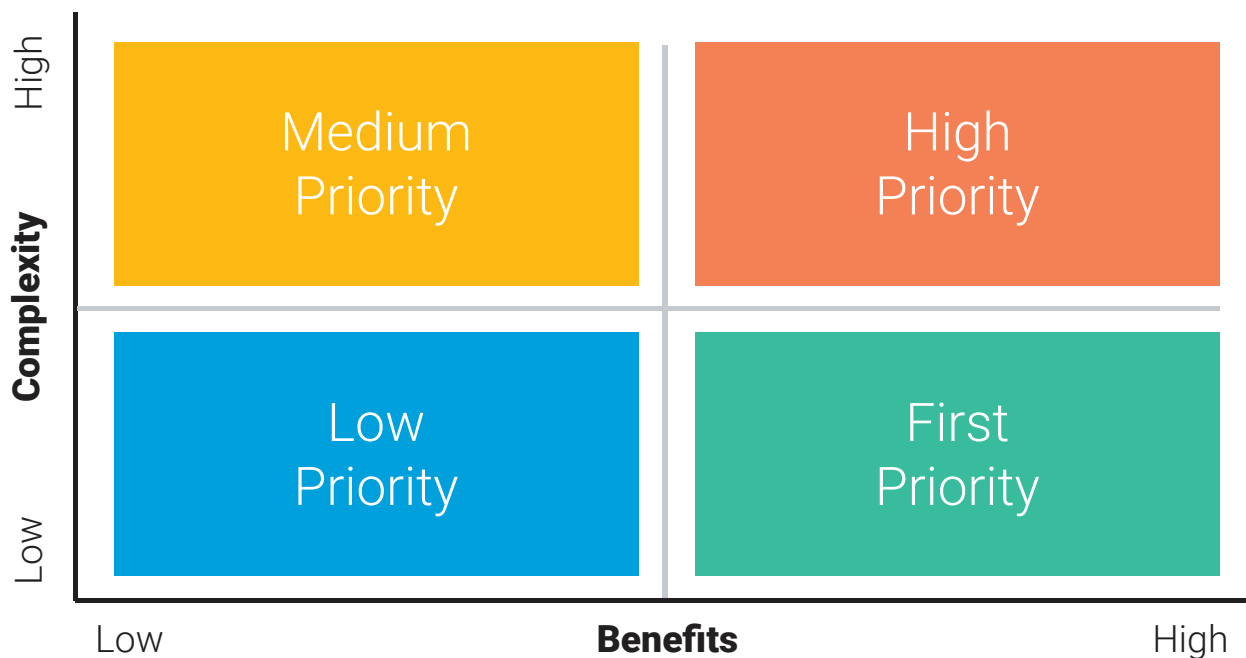
Virgin Airlines uses AI-powered technology to automatically generate and A/B test email subject lines. The brand's technology solution uses both natural language and deep learning capabilities to create and test subject lines and copy much faster than a human could. After implementing the technology, Virgin Airlines saw a 22% increase in clicks. Their AI-powered email campaigns also generated a 66% increase in awareness and a 33% increase in web traffic.<sup>23</sup>



# Incorporating AI into your marketing program

AI is primed to help marketers with many different business needs. Like with any new marketing technology, however, brands need to ensure they are using it effectively and purposely. By taking a measured approach and developing a vision for how and where to make use of AI, marketers can implement technology solutions that truly make an impact on their efficiency and their bottom line without wasting time and money.

1. Brands looking into AI solutions should start by identifying their biggest marketing challenges and prioritizing them.
2. When deciding where to apply an AI-powered solution, brands should focus on the functions that provide the most value with the least complexity to solve their challenges.



3. Asking these questions can provide a framework for the process:
  - Can AI help me with this challenge?
  - Is an AI solution plausible? Does it make sense financially?
  - Can it be implemented with the resources I have available?
  - Can it be implemented with my current technology partners?
  - If not, can my technology partners help me find a solution that will work with my current systems in the most efficient way possible?
  - If I need to find new technology partners, do I have the resources I need to dedicate to the process?



# Conclusion

It's an exciting time to be a marketer. Progress in AI and machine learning is helping brands solve some of their longest-standing challenges. With AI and machine learning capabilities, marketers are beginning to understand consumers better than ever and deliver more effective and efficiently built campaigns that drive better customer experiences. Brands that take advantage of the progress in this field of technology are poised to make a major leap ahead of their competitors.

## Sources

1. <https://digiday.com/marketing/state-ai-marketing-5-charts/>
2. <https://courses.cs.washington.edu/courses/csep590/06au/projects/history-ai.pdf>
3. <https://press.princeton.edu/titles/14162.html>
4. <https://medium.com/microsoft-design/what-did-we-get-ourselves-into-36ddae39e69b>
5. <http://isturingtestpassed.github.io/>
6. <https://rctom.hbs.org/submission/google-duplex-does-it-pass-the-turing-test/>
7. <https://hbr.org/sponsored/2017/08/closing-the-customer-experience-gap>
8. <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/five-facts-how-customer-analytics-boosts-corporate-performance>
9. <https://www.bloomberg.com/news/articles/2019-03-20/yum-china-is-building-the-kfc-of-the-future>
10. <https://digiday.com/marketing/tumi-using-ai-marketing-campaigns-online-stores/>
11. <https://newsroom.accenture.com/news/widening-gap-between-consumer-expectations-and-reality-in-personalization-signals-warning-for-brands-accenture-interactiveresearch-finds.htm>
12. <https://martechtoday.com/roi-recommendation-engines-marketing-205787>
13. <https://www.barilliance.com/personalized-product-recommendations-stats/>
14. <https://www.mckinsey.com/industries/retail/our-insights/how-retailers-can-keep-up-with-consumers>
15. <https://rctom.hbs.org/submission/promise-and-peril-for-machine-learning-at-netflix/>
16. <https://contentmarketinginstitute.com/2017/08/marketers-use-artificial-intelligence/>
17. [https://www.ibm.com/blogs/watson-customer-engagement/2017/01/26/implementing-ai-cognitive-technologiespart-digital-strategy/?mhq=northface%20watson&mhsrc=ibmsearch\\_a](https://www.ibm.com/blogs/watson-customer-engagement/2017/01/26/implementing-ai-cognitive-technologiespart-digital-strategy/?mhq=northface%20watson&mhsrc=ibmsearch_a)
18. <https://mobidev.biz/blog/augmented-reality-future-trends-2018-2020>
19. <https://cstoredecisions.com/2018/11/01/virtual-and-augmented-reality-enter-retailers/>
20. <https://www.mobilemarketer.com/news/macys-expands-ar-beauty-try-ons-to-all-app-users/549714/>
21. <https://www.nextplatform.com/2015/09/10/airbnb-shares-the-keys-to-its-infrastructure/>
22. [https://www.h2o.ai/wp-content/uploads/2019/02/Case-Studies\\_PayPal.pdf](https://www.h2o.ai/wp-content/uploads/2019/02/Case-Studies_PayPal.pdf)
23. <https://econsultancy.com/email-machine-learning-ai-case-studies/>



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