Personalisation the artificial intelligence way

FPO

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Abstract   The era of artificial intelligence (AI) has arrived. Companies all over the world are championing their latest progress with AI, machine learning and deep learning, even though most of it is far short of anything that could be described as a breakthrough. Unfortunately, this excitement does not always translate into quantifiable success — it can take up to six months to go from concept to production, and even then, only one in three AI projects turns out successful. These odds might be low, but the effort is well worth it as the potential payoff could be huge. This article describes five different types of AI — sound, time series, text, image and video — and illustrates various ways that AI can be used, including in customer relationship management, e-commerce, customer recommendations, security, voice assistance and natural language processing for customer understanding. This article argues that AI will become the basis for a level of customer personalisation that will not only be recognised but soon be demanded by fickle customers everywhere. As the article will show, it is imperative for brands to utilise AI in their marketing because it allows them to have both a single view of the customer as well as a single view of their media.

KEYWORDS: personalisation, real-time marketing, artificial intelligence, machine learning, deep learning, lookalike marketing, chatbots, customer lifecycle, emotional recognition, psychometrics, image search, website morphing, voice-assisted search, voice recognition, programmatic advertising

INTRODUCTION

'AI is one of the most important things humanity is working on. It is more profound than, I dunno, electricity or fire.' (Sundar Pichai, CEO, Google)[1]

The era of artificial intelligence (AI) is upon us. Companies everywhere are championing their latest progress with AI, machine learning (ML) and deep learning, despite most of it being far short of anything that could be described as a breakthrough. 'AI' has probably superseded 'blockchain', 'crypto' and 'FinTech' as the buzzword of the day. Indeed, one of the best ways to raise venture capital funding right now is to stick 'AI' or 'ML' at the front of the company prospectus and '.ai' at the end of its company's website.

Separating AI fact from fiction is not easy, partly because 'AI' might be the buzzword of all buzzwords. Some argue that it will result

in the end of humanity as we know it; others that it will save the world. Just about every software, semiconductor, tech, advertising, retail, marketing, analytics, customer relationship management (CRM) and robotics company is touting its cutting-edge AI know-how. The hype cycle has hit overdrive and, in times like this, caution must be taken, as many promises are being made in the name of encouraging sales rather than in honest appraisals of the technology's true capabilities.

Companies of all stripes and sizes are pushing AI as a panacea for just about any business problem imaginable: want to automate away an expensive labour force — add some robotic process automation; want to cut down on customer service calls — build a chatbot to handle repetitive and labour-intensive client questions; want to increase personalisation — build a deep-learning model that captures a holistic view of the customer so that the business can understand him or her so intimately that it will be able to predict upcoming purchases, as well as any potential problems that might go with those purchases; want to catch credit card fraud in action — build real-time models that spot outliers fast enough to refuse questionable purchases. In fact, if you want to save the world, AI can do it in 11 different ways according to the Global Challenges Foundation, which sees AI as both mankind's biggest potential global threat risk (a 10 per cent chance of extinguishing the human race) as well as the potential technological saviour of problems like the governance of nuclear weapons, ecological collapse, catastrophic climate change and asteroid impacts, among others.[2]

Major tech companies have embraced AI as if it was one of the most important discoveries ever invented: Google's CEO likens AI to the discovery of fire and electricity, while leading what he calls an 'AI-first' company;[3] Amazon's entire business is shaped by AI, from its customer personalisation and loyalty programmes, to its warehousing, robotics and logistics capabilities, even to Alexa, its voice-activated assistant; IBM has Watson and is pushing what it calls 'cognitive computing';[4] Facebook has AI and ML algorithms that test out which of its AI and ML algorithms are most effective and should be rolled out company-wide;[5] and Adobe, a big player in the multichannel marketing and personalisation space, runs much of its Experience Cloud Marketing platform through its Sensei AI algorithms. Even the analytics powerhouse SAS has recently announced[6] that it will spend US$1bn on AI initiatives over the next three years. With Burger King pretending to produce its commercials with AI, one could say the situation has reached the stage of irreverently poking fun at itself, which often means the end of a technological and/or entertainment cycle.[7] In the case of AI, however, we are far from the end of the cycle; indeed, we are probably just at the end of the beginning.

So why should brands that are not software companies choose to go down the tricky and complex AI road? In the article 'Artificial intelligence unlocks the true power of analytics',[8] Adobe provides examples of the vast difference between doing things in a rules-based analytics way and an AI-powered way, such as:[9]

- Warnings when company activity falls outside the norm:
  - *Rules-based analytics:* You set a threshold for activity (eg '200–275 orders per hour') and then manually investigate whether each alert is important.
  - *AI-powered analytics:* The AI analytics tool automatically determines whether the event is worthy of an alert, then fires one off unaided.
- Conducting root cause analysis and recommending actions:
  - *Rules-based analytics:* You manually investigate why an event may have happened and consider possible actions.

- *AI-powered analytics:* The AI tool automatically evaluates what factors contributed to the event and suggests a cause and an action.
- Evaluating campaign effectiveness:
  - *Rules-based analytics:* The business manually sets rules and weights to attribute the value of each touch that led to a conversion.
  - *AI-powered analytics:* The AI analytics tool automatically weights and reports the factors that led to each successful outcome and attributes credit to each campaign element or step accordingly.
- Identifying customers at risk of defecting:
  - *Rules-based analytics:* You manually study reports on groups of customers that have defected and try to see patterns.
  - *AI-powered analytics:* The AI tool automatically identifies which segments are at greatest risk of defection.
- Selecting those segments that will be the most responsive to upcoming campaigns:
  - *Rules-based analytics:* You manually consider and hypothesise about the attributes of customers that might prove to be predictive of their response.
  - *AI-powered analytics:* The AI tool automatically creates segments based on attributes that currently drive the desired response.
- Finding the best customers:
  - *Rules-based analytics:* You manually analyse segments in order to understand what makes high–quality customers different.
  - *AI-powered analytics:* The AI tool automatically identifies statistically significant attributes that high–performing customers have in common and creates customer segments for you to take action on.

Beyond these impressive differences, AI can also be used in website morphing, customer and media recommendations, programmatic advertising, purchase prediction, demand forecasting, social listening, and much, much more, as this article will explore in due course. As a case in point, AI was used to pick up the trend for fidget spinners in the following way:

> 'The first videos of teenagers doing tricks with fidget spinners began trending on YouTube in February 2017. Hidden deep within online browsing data, YouTube video views, and conversations on social media, AI in its current state is able to identify both the quantitative rise in interest in a topic; as well as the context of that interest from semantic understanding of unstructured text. This enables predictions to be made about which fads could boom in a similar fashion to fidget spinners'.[10]

According to a poll of 300 executives from a wide variety of industries, we are on the verge of a radical momentum shift for the technology. The responses submitted in this study into the benefits of AI (see Figure 1) show:

> 'a level of enthusiasm and AI-focused activity that point to an explosion of AI adoption just around the corner, even as gaps in capabilities and strategy are revealed. Already, 72 per cent of the organisations … surveyed have either deployed AI-based technology or are in the process of doing so'.[11]

The results of the poll also indicate that:

> 'A large percentage of survey respondents report having real success with AI. When looking at only those who have reported having deployed AI, 51 per cent say the impact of deployment of AI-based technologies on their operations has been "successful" or "highly successful".'[12]

In early 2018, I was chatting to a friend, who is a professor at the Hong Kong University of Science and Technology, about my recent AI talks. After listing off a few of the exotic locales where I had been invited to speak, my friend chimed in with the rather dismissive comment, 'You know AI is just a neural net, right?'. I answered that I did, but his point stuck with me. It was not meant to be dismissive or mean–spirited; it was simply the question of an annoyed expert who had been
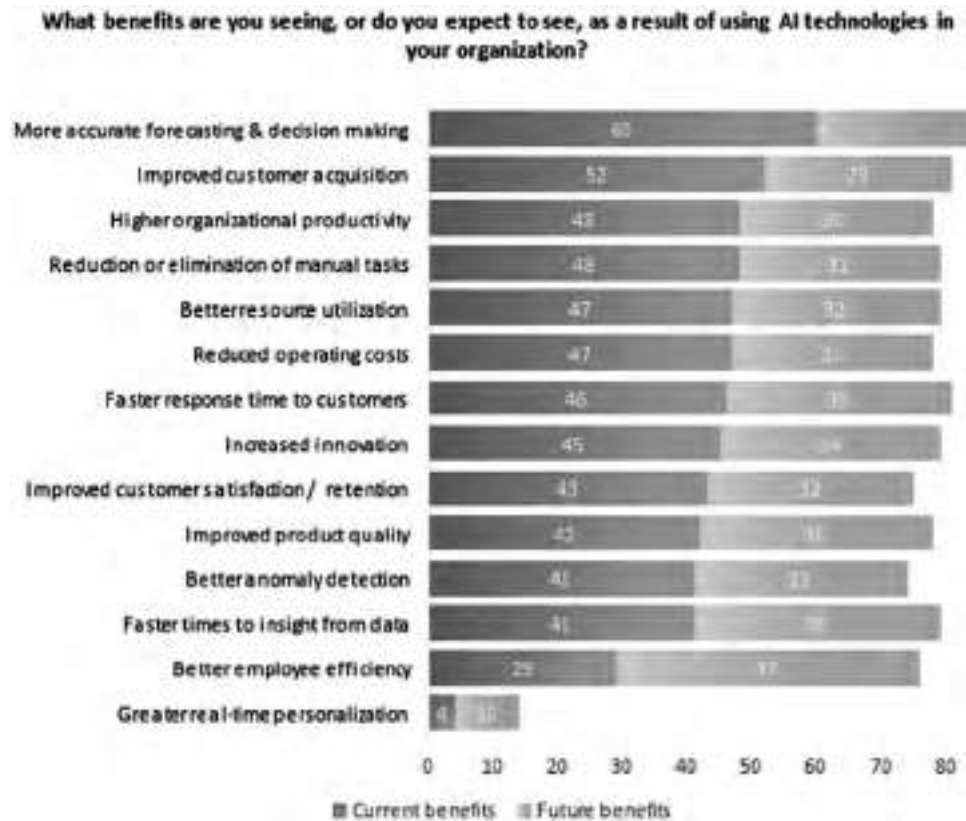
Figure 1: The benefits of AI

Source: SAS, Accenture Applied Intelligence and Intel, with Forbes Insights (2018) 'AI momentum, maturity, & models for success', available at: https://www.accenture.com/_acnmedia/pdf-86/accenture-ai-momentum-final.pdf (accessed 29th May, 2019)

training neural nets for over a decade and was bothered, as well as probably a little surprised, by all the attention AI was suddenly receiving. If nothing else, my friend's comment made me realise how the hype machine had hit overdrive with AI, machine learning and deep learning, and that anyone delving into this technology should be ultracautious.

WHAT EXACTLY IS AI?

The *Artificial Intelligence and Life in 2030* study states that, "Artificial Intelligence (AI) is a science and a set of computational technologies that are inspired by—but typically operate quite differently from—the ways people use their nervous systems and bodies to sense, learn, reason, and take action." The study adds that, "While the rate of progress in AI has been patchy and unpredictable, there have been significant advances since the field's inception sixty years ago."[13]

According to PWC:

'AI could contribute up to $15.7tn to the global economy in 2030, more than the current output of China and India combined. Of this, $6.6tn is likely to come from increased productivity and $9.1 trillion is likely to come from consumption-side effects … global GDP will be up to 14 per cent higher in 2030 as a result of the accelerating development and take-up of AI — the equivalent of an additional $15.7tn'.[14]

For PWC, the economic impact of AI will be driven by:[15]

- productivity gains from businesses automating processes (including use of robots and autonomous vehicles);
- productivity gains from businesses augmenting their existing labour force with AI technologies (assisted and augmented intelligence); and
- increased consumer demand resulting from the availability of personalised and/or higher-quality AI-enhanced products and services.

One of the most important things AI brings to personalisation marketing is the ability to have such a deep customer understanding that marketing becomes simple, seamless and as close to automatic as possible. As behavioural economist Susan Menke explains:

> 'Decision fatigue and cognitive fatigue are the opposite of flow and seamlessness. We are making too many decisions that tax our cognitive bank account. We dole it out on important things and not on things that are already operating well'.[16]

Menke touches upon the concept of the psychological script — the idea that the mind does not have to focus on many day-to-day activities as they can be handled without much thought.[17] The more seamless a company can make the customer interaction and purchasing process, the more likely a customer will buy from it.[18] In almost any McDonald's in the world, for example, ordering has been reduced to one word, and it is often a numerical choice — 'one' for a Big Mac meal, 'two' for a Quarter Pounder meal and so forth. AI can help make marketing and purchasing become so seamless that customers will become conditioned to spend their money in an almost automatic fashion.

Once a mostly academic area of study, 21st-century AI has enabled a plethora of mainstream technologies to have a substantial impact on our everyday lives. Computer vision and AI planning, for example, have helped the video game sector dominate the entertainment industry, overshadowing even Hollywood.[19] Through its Amazon Web Services platform, Amazon brings natural language processing (NLP), automatic speech recognition (ASR), text-to-speech (TTS) and neural machine translation (NMT) technologies within reach of every developer. Today, brands can utilise Amazon's AI products, including Lex, Transcribe and Comprehend, to produce multilingual content for their marketing efforts. Amazon even has a product called Polly that allows users to turn text into speech in multiple languages, in voices that sound eerily human and, in some cases, almost as good as professional actors. Not to be outdone, Chinese internet search giant Baidu has demonstrated an AI-powered tool that translates Chinese into English in real time, right as it is being spoken.[20]

According to Singh and Chauhan, a neural network is:

> 'A mathematical model or computational model based on biological neural networks, in other words, is an emulation of a biological neural system. It consists of an interconnected group of artificial neurons and processes information using a connectionist approach to computation. In most cases an ANN [artificial neural net] is an adaptive system that changes its structure based on external or internal information that flows through the network during the learning phase'.[21]

Neural nets are extremely good at finding patterns in data. A key feature of neural networks is that they learn the relationship between inputs and outputs through training.[22] For marketing purposes, neural networks can be used to classify a consumer's spending pattern, analyse a new product, identify a customer's characteristics, as well as forecast sales.[23] The advantages of neural networks include high accuracy, high noise tolerance and ease of use as they can be updated with fresh data, which makes them useful for dynamic environments.[24]

Today, success in AI is partly because huge advances in computer chips and memory allow state-of-the-art software to quickly run the highly complex algorithms upon which AI is based. AI now has the potential to radically alter the world of aviation, retail, medicine, automobiles, telcos, airlines, manufacturing, finance, insurance, government and gaming, as well as a whole host of other industries.

For marketers, AI can be broken down into five prominent segments (see Table 1) — sound, time series, text, image and video. Areas such as CRM, customer loyalty, data governance, marketing automation, personalisation, social marketing and social listening will all be radically affected by AI and ML.

Above all else, AI is a problem solver. For example, when it comes to marketing, the question for AI to solve might be, 'How can I send an offer to a customer to assure its use?' Here, the variables to include would be things like what is the best offer to send, what is the best time to send it, what is the best channel to send it on and, perhaps, is there a way to add social activity to increase the

Table 1: AI use cases

General use case	Industry
Sound	
Voice recognition	UX/UI, automotive, security, internet of things
Voice search	Handset manufacturing, telecoms
Sentiment analysis	Customer relationship management
Flaw detection	Automotive, aviation
Fraud detection	Finance, credit cards
Time series	
Log analysis/risk detection	Data centres, security, finance
Enterprise resource planning	Manufacturing, auto, supply chain
Predictive analytics using sensor data	Internet of things, smart home, hardware manufacturing
Business and economic analytics	Finance, accounting, government
Recommendation engine	E-commerce, media, social networks
Text	
Sentiment analysis	Customer relationship management, social media, reputation management
Augmented search, theme detection	Finance
Threat detection	Social media, government
Fraud detection	Insurance, finance
Image	
Facial recognition	Multiple industries
Image search	Social media
Machine vision	Automotive, aviation
Photo clustering	Telecom, handset manufacturing
Video	
Motion detection	Gaming, UX, UI
Real-time threat detection	Security, airports

Source: Nicholson, C. (n.d.) 'Deep learning, machine learning & AI use cases', available at: https://skymind.ai/wiki/use-cases (accessed 3rd September, 2019)

odds of offer use? In this example, it could be that the customer has a habit of tweeting in the evening and the system notices that the customer's tweets are often followed by the brand's marketing offers being opened. The system then identifies a strong correlation between the tweets and the opening of e-mail offers in the past. The natural conclusion could be that the customer arrives home, sits down at his or her computer, goes through his or her e-mail, and jumps on his or her social channels to communicate with family, friends and, potentially, followers. The AI marketing system then watches for

the evening tweet and, once it sees it, sends out the latest offer, fully expecting it to be opened within minutes of being sent out. Clearly, this way of doing business is much more powerful than rules-based analytics.

PROGRAMMATIC ADVERTISING

One way of categorising AI technologies for marketing across the customer life cycle is to break them down into three different types of technology — machine-learning techniques, applied propensity models and AI applications. As Figure 2 shows, these can
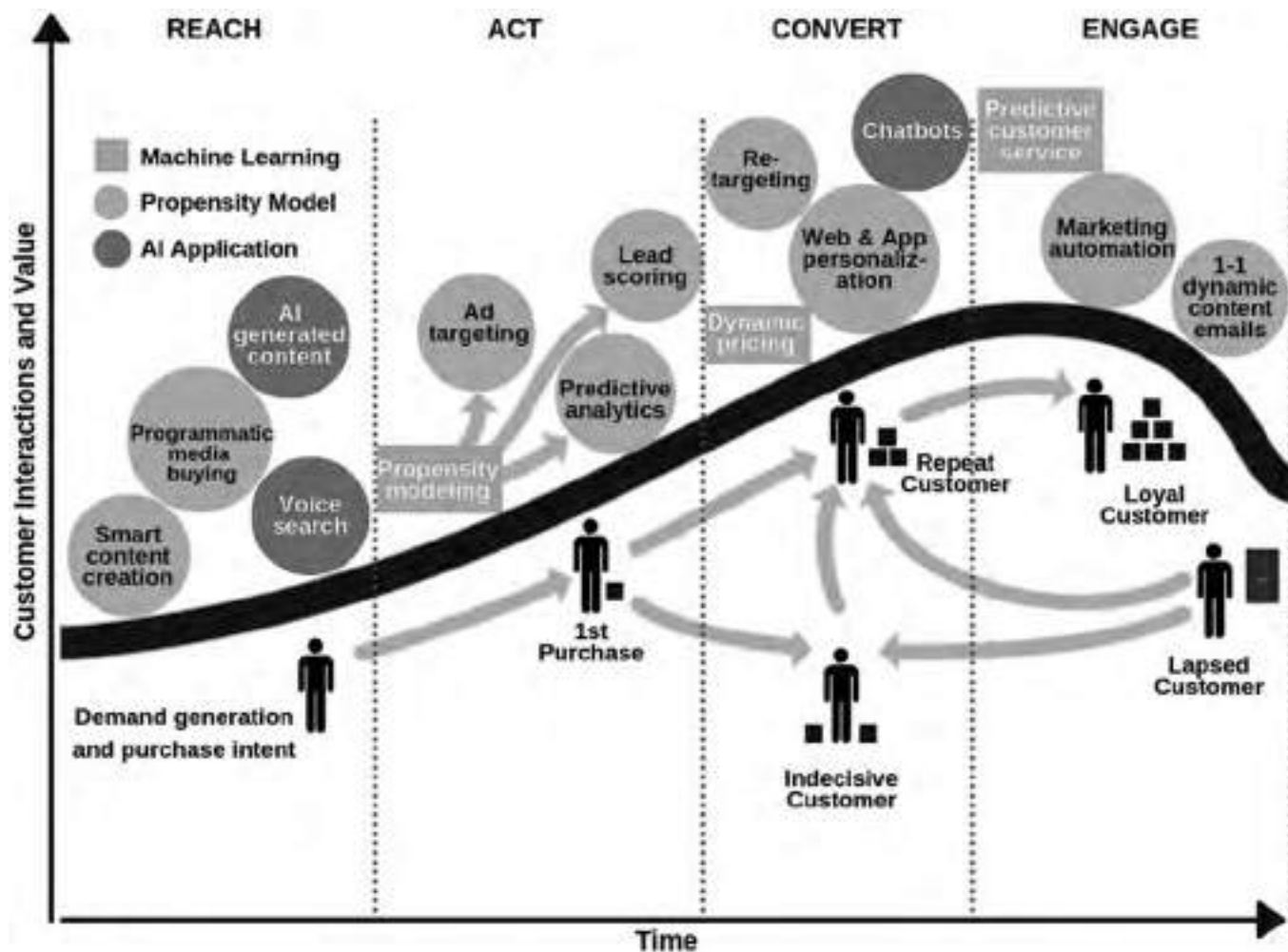

Figure 2: AI for marketers across the customer life cycle

Source: Chaffey, D. (2019) '15 applications of artificial intelligence in marketing', available at: https://www.smartinsights.com/managing-digital-marketing/marketing-innovation/15-applications-artificial-intelligence-marketing/ (accessed 18th March, 2019)

be mapped to the four stages of the so-called 'RACE' customer life-cycle framework, namely: reach, act, convert and engage.[25]

'Each different application has major implications for marketers, but the applications have different roles to play across the customer journey.[26] Some are better for attracting customers, while others are more useful for conversion or re-engaging past customers.'[27]

According to Dave Chaffey, reach 'involves using techniques such as content marketing, SEO and other 'earned media' to bring visitors to your site and start them on the buyer's journey', while 'AI & applied propensity models can be used at this stage to attract more visitors and provide those that do reach your site with a more engaging experience'.[28]

Programmatic media buying — the algorithmic purchase and sale of advertisements in real time — 'can use propensity models generated by machine-learning algorithms to more effectively target ads at the most relevant customers'.[29] AI can ensure programmatic advertisements do not appear on questionable websites and/or remove them from a list of sites that the advertiser does not want them to appear on.[30]

Derek Thompson explains that, 'The emergence of an advertising duopoly has coincided with the rise of "programmatic advertising", a torpid term that essentially means "companies using algorithms to buy and place ads in those little boxes all over the internet".'[31] Thompson adds that:

> 'advertising has long been a relationship-driven business, in which multimillion-dollar contracts are hammered out over one-on-one meetings, countless lunches, and even more-countless drinks. With programmatic technology, however, companies can buy access to specific audiences across several publishing platforms at once, bypassing the work of building relationships with each one'.[32]

Because advertising has become more automated, more advertisements can be produced with fewer people.[33] AI should be a part of this programmatic advertising process.

Sara Vicioso defines programmatic advertising as 'the automated process of buying and selling ad inventory through an exchange, connecting advertisers to publishers', a process that uses AI technologies 'and real-time bidding for inventory across mobile, display, video and social channels — even making its way into television'.[34] She adds that, 'Artificial intelligence technologies have algorithms that analyse a visitor's behavior allowing for real-time campaign optimisations towards an audience more likely to convert. Programmatic companies have the ability to gather this audience data to then target more precisely, whether it's from first party (their own) or from a third-party data provider'.[35]

Programmatic media buying includes the use of demand-side platforms (DSPs), supply-side platforms (SSPs) and data management platforms (DMPs).[36] DSPs facilitate the process of buying advertising inventory on the open market, as well as provide the ability to reach a brand's target audience due to the integration of DMPs.[37] In the words of Sara Vicioso:

> 'DMPs collect and analyse a substantial amount of cookie data to then allow the marketer to make more informed decisions of whom their target audience may be. On the publisher side of things, publishers manage their unsold ad inventory through a SSP'.[38]

These SSP report such clickstream activity as how long a visitor was on a specific site or how many pages were viewed per visit. As Vicioso explains, 'SSPs will ultimately be in charge of picking the winning bid and will serve the winning banner ad on the publisher's site'.[39]

The second step of the RACE framework is 'act'. Brands must draw visitors in and make them aware of the company's product and/or services. Machine-learning algorithms can build propensity models that predict the likelihood of a given customer to convert, the price at which a customer is

likely to convert, and/or what customers are most likely to turn into repeat customers.[40]

Machine-learning algorithms can run through vast amounts of historical data to establish which advertisements perform best on which people and at what stage in the buying process.[41] Using such data, advertisements can be served to people using the most effective content at the most effective time.[42] By using machine learning to constantly optimise thousands of variables, businesses can place their advertisements more effectively than with traditional methods.[43] However, humans will still be needed for the creative parts.[44]

As Allie Shaw notes:

'In short, AI programs draw from data pools to make decisions about where and when to buy or sell ad space according to demographic and cost-versus-benefit information. Essentially, your television can learn about your habits in the way your web browser already does, allowing advertisers to present you with ads based on that information — so you'll see fewer repetitive ads that you don't care about. This means you and your neighbors may all be watching the premiere of The Walking Dead but seeing different ads based on your unique interests. Thanks to programmatic television advertising, advertisers can know how many people have viewed their ads, where these viewers are located, and what their viewing history looks like — with information updating by the minute. They're also able to get more accurate data about an ad's cost per impression (CPM, or the cost for each 1,000 people who see the ad), allowing for more relevant and cost-efficient targeting'.[45]

Although programmatic advertising was designed to be scalable, efficient and precise, some brands have been reluctant to embrace it. However, as Giselle Abramovich argues, it is imperative for companies to have both a single view of the customer as well as a single view of their media.[46]

It is not just on the client side where things are changing — a radical realignment is also ongoing in the advertising industry. While media companies might be tempted to blame the demise in their advertising revenue on Google and Facebook's duopoly,[47] given that the two companies not only receive more than half of all the dollars spent on digital advertising, but also commanded 90 per cent of the growth in digital advertising sales in 2017,[48] the truth is that the threat is far greater. As Derek Thompson explains, 'just about every big tech company is talking about selling ads, meaning that just about every big tech company may become another competitor in the fight for advertising revenue'.[49]

Amazon's ad business exploded in 2018; 'its growth exceeded that of every other major tech company, including the duopoly'.[50] Wanting to move beyond just selling people iPhones, Apple is shifting its growth strategy to selling services,[51] while, 'Microsoft will make about $4bn in advertising revenue this year, thanks to growth from LinkedIn and Bing'.[52] Thompson adds that, 'AT&T is building an ad network to go along with its investment in Time Warner's content, and Roku, which sells equipment for streaming television, is building ad tech'.[53] 'In short, the future of the advertising business is being moved to technology companies managing ad networks and media companies making branded content — that is, away from the ad agencies'.[54] These are cross-currents that brands need to be aware of because they are not just revolutionising the marketing landscape but also offering huge marketing opportunities to brands willing to embrace them.

Becoming more self-sufficient may not be a bad thing for brand marketers either. Software that does everything from automating marketing campaigns, to inexpensively segmenting customers, to simplifying the mundane and repetitive processes of producing and categorising content can help marketers speed up the

creative process enormously. As Bill Marino and Ben Vegneron explain,[55] AI models can be used to recommend the optimal budget mix across advertising portfolios. AI can build landscapes for each individual programmatic advertising 'bid unit', which could be a keyword, for example.[56] AI can also help predict aggregated elasticity between advertising spend and revenue, as well as recommend optimal budget mix across portfolios.[57] AI can also propose the most optimum media mix, pace advertising in real time to ensure best pricing, and also evaluate bids hourly for improved pacing on highly seasonal days.[58] AI can identify the point of diminishing returns and stay away from it, ensuring budgets are spent optimally.[59]

LOOK-AI-LIKE MARKETING

According to Jordan Elkind, lookalike marketing modelling is not new, 'it's been a mainstay of the ad tech industry for years, used to help advertisers expand digital audiences while maintaining relevancy of targeting'.[60] Elkind explains:

'The principle is simple. Brands want to attract new visitors to their site. What better way to do this than to identify prospects who resemble existing visitors (or customers)? What *is* new is the dazzling variety of ways in which digital marketers are deploying lookalike modeling techniques to enhance the return on investment across marketing channels — both online and offline. 'With more data than ever before on user journeys and behaviors, increased adoption of platforms (like customer data platforms and data management platforms) to centralise and analyse that data, and growing ubiquity of machine learning tools and techniques, lookalike modeling is breathing new life into old channels … Customer-centric businesses have long recognised that the best way to acquire new visitors is to focus on users who resemble their *existing* visitors (or better yet, high-value customers). For digital marketers looking to drive traffic and conversions, this

means identifying and purchasing media against audiences based on a small number of static demographic attributes. Your recent site visitors are statistically more likely to be females, aged 18–29? Perfect — serve display advertisements to similar audiences elsewhere on the web!'[61]

As Elkind sees it, the problem is that:

'demographic segment-based targeting, while enabling advertisers to reach audiences at scale, isn't a great proxy for relevancy. Women aged 18–29 are a diverse demographic, only a subset of whom are likely to be interested in a brand's offering. As a result, performance can tend to show a steep drop-off as audience size increases'.[62]

This is where lookalike modelling — 'a form of statistical analysis that uses machine learning to process vast amounts of data and seek out hidden patterns across pools of users'[63] comes into the equation:

'Lookalike modeling works by identifying the composition and characteristics of a 'seed' audience (for example, a group of recent site visitors or high-value customers), and identifying other users who show similar attributes or behaviors. By analyzing not just demographic but behavioral similarities — eg users who have demonstrated similar browsing patterns — lookalike modeling enables advertisers to leverage powerful and complex data signals to find the perfect audience … Lookalike modeling is a trusty tool in the digital media arsenal — and it's quickly becoming indispensable to other channels as well. The convergence of ad tech and CRM — powered by platforms that enable advertisers to go well beyond cookies and CRM professionals to gain visibility into the digital journeys of known users — has made it possible to build lookalike audiences of unprecedented sophistication.'[64]

AI and machine learning can add even more sophistication to the process, including contextual, geolocation, social, and perhaps even emotional data.

With a single source of customer data spanning online and offline engagement, a brand can unify disparate signals of purchase intent from many customer touch points, including onsite and transaction behaviour, e-mail engagement, offline purchases, app usage, call centre contacts, product reviews and more.[65] This provides a rich and highly accurate view of customer behaviour, which could power high-performing lookalike models.[66]

Lookalike audiences can also be found on social channels like Facebook. As Elkind explains, 'Facebook Lookalike Audiences enables marketers to build a seed list based on pixel audiences (eg users who have recently visited the site or browsed a particular page) or a custom list of users.'[67] For example, a fashion retailer 'could use a platform to identify all customers with a predicted affinity — based on dozens of behavioral data points — for haute couture, and simply transfer that audience directly to Facebook. Marketers can then indicate how targeted vs broad they would like the lookalike targeting to be'.[68]

For search, 'getting in front of high-potential prospects when they are in-market — searching or doing price comparison for a relevant category — is every marketer's dream.[69] The introduction of Similar Audiences through Google Customer Match enables marketers to automatically optimise bidding strategies around key lookalike audiences'.[70]

In the first quarter of 2019, LinkedIn also added lookalike marketing to its offerings. 'If someone searched for an article on digital marketing trends, that would map them to a category of being interested in marketing', explained LinkedIn's director of product, Abhishek Shrivastava.[71]

Adobe's Audience Manager, meanwhile, 'can now subtract traits in a lookalike model and report impressions by user segment'.[72] As Barry Levine explains:

> 'Lookalike models are often developed from the attributes of a group of users

a brand wants to find more of. A model of the common attributes of the best customers, according to this thinking, can help find other users with similar attributes, who are more likely to become customers of this particular product or service. One problem, Adobe says, is that when a brand creates a model from attribute data — either the brand's own data or third-party data from a provider — there might be attributes that could bias the model in the wrong direction. For instance, the attributes creating the model might include visits to the brand's site or other specific sites, when those site visits are not useful for finding lookalike users.'[73]

The new Trait Exclusion capability lets marketers

> 'remove selected traits, and it employs Adobe's Sensei machine learning to help make the subtraction. In addition to removing traits that don't add value, like site visits … the new feature helps marketers focus on influential traits. When the brand has to comply with specific privacy regulations, the model can exclude certain demographic attributes.'[74]

AI: A PERSONALISATION ENGINE ON STEROIDS

Today, 'personalisation' — the process of utilising geo-location, mobile app, Wi-Fi and over-the-top (OTT) technology to tailor messages or experiences to the individual interacting with them — is becoming the optimum word in a radically new customer intelligence environment. Even though this personalisation comes at a cost — that is privacy — it is a price most consumers seem more than willing to pay if a recognised value is received in return. For marketers, 'personalisation' requires an investment in CRM, marketing, analytical and social media software, but businesses should recognise that this price must be paid because highly sophisticated consumers will soon need an exceptional customer shopping experience to keep them from visiting a competitor

(who will, undoubtedly, offer such services). This kind of personalisation also gives the business powerful data to build optimisation models that can reduce cost and increase productivity.

According to Giselle Abramovich, 'Personalisation is table stakes for today's retailers, who are increasingly competing to be relevant in the hearts and minds of shoppers'.[75] This is a great quote as personalisation will soon be the base level upon which strong customer relationships will be built, an ante that must be tossed in simply to be in the marketing game.

We live in an instant gratification world and the companies that will thrive in this new and challenging environment will be the ones who can both keep up with the requirements of their discerning and demanding customers as well as predict what their customers need throughout their customer journeys. As the marketing landscape continues to evolve, companies today need every competitive advantage they can get in order to provide better service than their counterparts. The difference between the marketing environment of today and that of the 1980s is amusingly summarised by Dan Woods:

> 'Technology has changed marketing and market research into something less like golf and more like a multi-player first-person-shooter game. Crouched behind a hut, the stealthy marketers, dressed in business-casual camouflage, assess their weapons for sending outbound messages. E-mail campaigns, events, blogging, tweeting, PR, e-books, white papers, apps, banner ads, Google Ad Words, social media outreach, search engine optimization. The brave marketers rise up and blast away, using weapons not to kill consumers but to attract them to their sites, to their offers, to their communities. If the weapons work, you get incoming traffic'.[76]

AI must be a part of this frenetic and fast-moving environment, because connecting with people on a personal level would be completely impossible without it. A consolidated customer view is a necessary component of personalisation, but, unfortunately, as Andrew Jones explains, 'most marketers today are working with customer data that is decentralised, spread across the organisation in multiple databases that are updated in batch processes. To find success, marketers must prioritise consolidating data into a single database'.[77] Jones adds that another important step to bringing personalisation efforts up to the user's expectation level will be by using behavioural data: 'In order to create these types of customer experiences, marketers must strategically collect and utilise customer data, including real-time signals of intent, which are typically not captured today'.[78]

Psychographics — the study and classification of people according to their attitudes, aspirations and other psychological criteria, especially in market research — is an important element of personalisation and will become more significant as more and more data collection occurs. These days, the large tech companies all seem to be following the 'A–B–C–D–E's' of data collection, that is, Always Be Collecting Data Everywhere, all with an attitude of privacy be damned. The Cambridge Analytica/Facebook scandal is only now starting to reveal how powerful this kind of psychographic information can be, but, because of the extensive fallout from that scandal, Facebook has tightened access to its user information. By contrast, Twitter, with its tweet data publicly available to all, offers up all manner of customer psychographic detail. Figure 3 shows a breakdown of my Twitter profile after it has been run through IBM Watson's Personality Insights service (https://www.ibm.com/watson/services/personality-insights/).

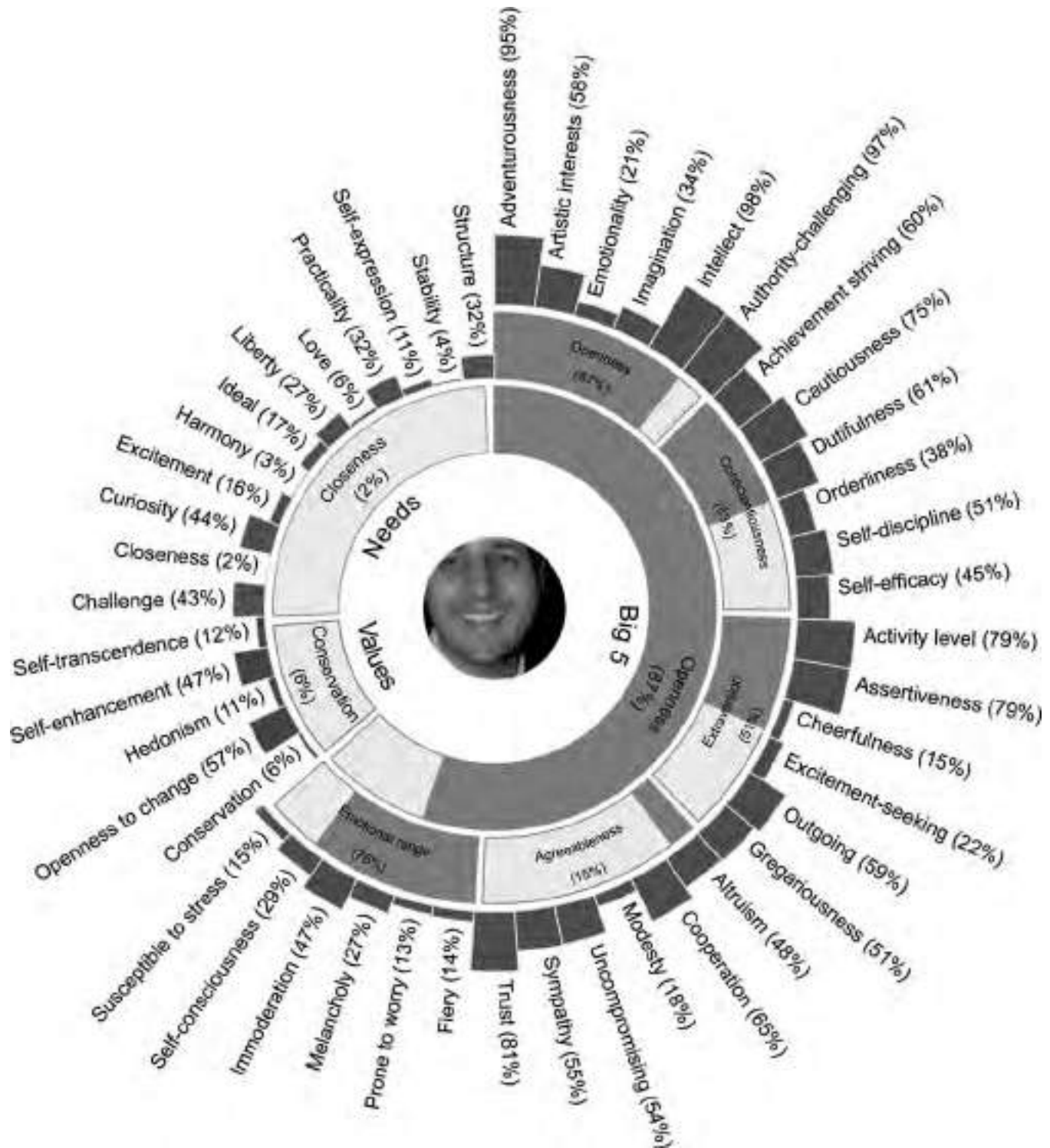The IBM Watson™ Personality Insights service derives insights about

Figure 3: The author's Twitter profile run through IBM Watson™ Personality Insights

personality characteristics from social media, enterprise data or other digital communications. According to IBM:

> 'The service uses linguistic analytics to infer individuals' intrinsic personality characteristics from digital communications such as e-mail, text messages, tweets, and forum posts … The service infers, from potentially noisy social media, portraits of individuals that reflect their personality characteristics. It can also determine individuals' consumption preferences, which indicate their likelihood to prefer various products, services, and activities'.[79]

The IBM Watson™ Personality Insights service infers personality characteristics based on three primary models: the Big Five personality model, the Needs model and the Values model.[80] The Big Five personality model represents 'the most widely used model for generally describing how a person engages with the world' and includes five primary dimensions: agreeableness, conscientiousness, extraversion, emotional range and openness.[81] The Needs model 'describes which aspects of a product are likely to resonate with a person' and includes 12 characteristic needs: excitement, harmony, curiosity, ideal, closeness, self-expression, liberty, love, practicality, stability, challenge and structure.[82] The Values model describes 'motivating factors that influence a person's decision making' and includes five values: self-transcendence/helping others, conservation/tradition, hedonism/taking pleasure in life, self-enhancement/achieving success, and open to change/excitement.[83]

In his article 'We Know How You Feel',[84] Raffi Khatchadourian profiles Rana el Kaliouby, co-founder and CEO of Affectiva, a startup that specialises in AI systems that sense and understand human emotions, developing 'cutting-edge AI technologies that apply machine learning, deep learning, and data science to bring new levels of emotional intelligence to AI'.[85] Affectiva is the most visible of a host of competing startups that are building emotionally responsive machines. Its competitors include Emotient, Realeyes and Sension.[86]

Khatchadourian explains that:

> 'Our faces are organs of emotional communication; by some estimates, we transmit more data with our expressions than with what we say, and a few pioneers dedicated to decoding this information have made tremendous progress … Since the nineteen-nineties a small number of researchers have been working to give computers the capacity to read our feelings and react, in ways that have come to seem startlingly human'.[87]

Khatchadourian adds that researchers have trained computers:

> 'to identify deep patterns in vocal pitch, rhythm, and intensity; their software can scan a conversation between a woman and a child and determine if the woman is a mother, whether she is looking the child in the eye, whether she is angry or frustrated or joyful. Other machines can measure sentiment by assessing the arrangement of our words, or by reading our gestures. Still others can do so from facial expressions'.[88]

In Martin Ford's interview with Kaliouby, she describes her thesis as such:

> 'this kind of interface between humans and machines is going to become ubiquitous, that it will just be ingrained in the future human-machine interfaces, whether it's our car, our phone or smart devices at our home or in the office'.[89]

Kaliouby adds that she sees a world where,

> 'We will just be coexisting and collaborating with these new devices, and new kinds of interfaces … ten years down the line, we won't remember what it was like when we couldn't just frown at our device, and our device would say, "Oh, you didn't like that, did you?"'.[90]

Affectiva's signature software, Affdex, tracks four emotional 'classifiers' — happy, confused, surprised and disgusted:

> 'The software scans for a face; if there are multiple faces, it isolates each one. It then identifies the face's main region — mouth, nose, eyes, eyebrows — and it ascribes points to each, rendering the features in simple geometries … Affdex also scans for the shifting texture of skin — the distribution of wrinkles around an eye, or the furrow of a brow — and combines that information with the deformable points to build detailed models of the face as it reacts'.[91]

The algorithm identifies an emotional expression by comparing it with countless others that it has previously analysed. 'If you smile, for example, it recognises that you are smiling in real time'.[92]

Kaliouby explains:

> 'People are pretty good at monitoring the mental states of the people around them … We know that about 55 per cent of the signals we use are in facial expression and your gestures, while about 38 per cent of the signal we respond to is from tone of voice. So how fast someone is speaking, the pitch, and how much energy is in the voice. Only 7 per cent of the signal is in the text and the actual choice of words that someone uses!'[93]

A multi-billion-dollar industry that tracks people's sentiments about this product or that service has been built within just a couple of years, which is especially amazing when all of these tweets, likes and posts only account for about 7 per cent of how humans communicate overall. 'What I like to think about what we're doing here, is trying to capture the other 93 per cent of non-verbal communication', contends Kaliouby.[94]

Kaliouby believes Affectiva's technology has the potential to monetise what she calls an 'emotion economy', explaining that 'Tech gurus have for some time been predicting the internet of things, the wiring together of all our devices to create "ambient intelligence" — an unseen fog of digital knowingness'.[95] Emotion could well play a part in this internet of things.[96] Kaliouby predicts that, in the coming years, mobile devices will contain an 'emotion chip', which would run constantly in the background, much like geolocation currently works on phones now, so that 'Every time you pick up your phone, it gets an emotion pulse, if you like, on how you're feeling'.[97]

Although Affectiva has filed a patent for 'a system that could dynamically price advertising depending on how people responded to it',[98] it is not alone — more than a hundred similar patents for emotion-sensing technology exist, many of them, unsurprisingly, also focused on advertising.[99] Companies like AOL, Hitachi, eBay, IBM, Yahoo! and Motorola are also developing technology in this space.[100] Sony too has filed several patents — 'its researchers anticipated games that build emotional maps of players, combining data from sensors and from social media to create "almost dangerous kinds of interactivity"' notes Khatchadourian.[101]

For Affectiva, there is now plenty of interest in its Affdex solution.[102] The company has conducted research for Facebook, experimenting with video advertising; Samsung has licensed Affdex; a company in San Francisco wants to give its digital nurses the ability to read faces; a Belfast entrepreneur is interested in using it at nightclubs; and a state initiative in Dubai, the 'Happiness Index' wants to measure social contentment.[103] As Kaliouby adds, 'Dubai is known to have one of the world's tightest CCTV networks, so the infrastructure to acquire video footage to be analysed by Affdex already exists'.[104] In short, Affectiva could represent the future of customer engagement. Although somewhat Big Brotheresque, all of this data collection is incredibly seamless, which means it will probably be popping up in all kinds of technology in the coming years. Today's marketer must prepare for tomorrow's emotion-sensing future.

WEBSITE MORPHING

Morphing is one way a brand can hyper-personalise the customer shopping experience. As Hauser *et al.* explain, '"Morphing" involves automatically matching the basic 'look and feel' of a website, not just the content, to cognitive styles'.[105] Hauser *et al.* use Bayesian updating to 'infer cognitive styles from clickstream data'.[106] They then 'balance exploration (learning how morphing affects purchase probabilities) with exploitation (maximising short-term sales) by solving a dynamic program (partially observable Markov decision process)'.[107]

In a world of deep personalisation, website design becomes a major profit driver.[108] As Hauser *et al.* see it, 'Websites that match the preferences and information needs of visitors are efficient; those that do not forego potential profit and may be driven from the market'.[109] Hauser *et al.* argue that 'retailers might serve their customers better and sell more products and services if their websites matched the cognitive styles of their visitors', but it is fair to say that it would probably benefit most business-to-consumer companies with a big web presence too.[110]

Keeping with the themes of simplicity and seamlessness, Hauser *et al.* do not believe personal self-selection — the process in which a customer is given many options and allowed to select how to navigate and interact with the site — is viable, arguing that 'As the customer's options grow, this strategy leads to sites that are complex, confusing, and difficult to use'.[111] The second option, which requires 'visitors to complete a set of cognitive style tasks and then select a website from a predetermined set of websites' is just as problematic.[112] Website visitors probably will not see value in taking the time to answer these questions and there is always the problem of self-bias hindering any potential results.[113]

Hauser *et al.* propose another approach: '"morphing" the website automatically by matching website characteristics to customers' cognitive styles'.[114] A cognitive style is 'a person's preferred way of gathering, processing, and evaluating information'[115] It can be identified as 'individual differences in how we perceive, think, solve problems, learn and relate to others'.[116] 'A person's cognitive style is fixed early on in life and is thought to be deeply pervasive [and is] a relatively fixed aspect of learning performance', contend Riding and Rayner.[117]

The 'goal is to morph the website's basic structure (site backbone) and other functional characteristics in real time'.[118] 'Website morphing complements self-selected branching (as in http://www.dell.com), recommendations (as in http://www.amazon.com), factorial experiments (Google's Website Optimiser), or customised content'.[119-121]

For Hauser *et al.*, cognitive styles dimensions 'might include impulsive (makes decisions quickly) versus deliberative (explores options in depth before making a decision), visual (prefers images) versus verbal (prefers text and numbers), or analytic (wants all details) versus holistic (just the bottom line)'.[122] For example:

> 'a website might morph by changing the ratio of graphs and pictures to text, by reducing a display to just a few options (broadband service plans), or by carefully selecting the amount of information presented about each plan. A website might also morph by adding or deleting functional characteristics such as column headings, links, tools, persona, and dialogue boxes.'[123]

There are, literally, hundreds of thousands or even millions of ways a website can morph to better serve its customers and AI has to be an integral part of this process simply because of the enormous amount of data involved.

A PICTURE IS WORTH A THOUSAND CLICKS

In the words of Brett Butterfield, 'If a picture is worth a thousand words, visual

search — the ability to use an image to search for other identical or related visual asset — is worth thousands of spot-on searches — and thousands of minutes saved on dead-end queries'.[124] Butterfield argues that visual search could become a big part of a buyer's shopping future.[125] With visual search, a potential buyer does not need to try and guess the brand, style and/or retail outlet where something was purchased, the buyer can simply snap a picture of the item she likes, upload the image, and immediately find exactly the same item or ones like them, and purchase them directly from the site where they are sold, all incredibly seamlessly:

> 'That spot-it/want-it scene is common, and good for business. It could be a shirt on someone walking down the street, an image on Instagram, or a piece of furniture in a magazine — somewhere, your customer saw something that made them want to buy one, and now they're on a mission to find it.'[126]

Making something easy to find does not have to be that hard and AI can help:

> 'While it's a seemingly simple task, in many cases the path from seeing to buying is a circuitous and friction-filled route that leads to a subpar purchase — or no purchase at all. Just one in three Google searches, for example, leads to a click — and these people come to the table with at least a sense of what they're searching for …[127] Like text-based search, visual search interprets and understands a user's input — images, in this case — and delivers the most relevant search results possible. However, instead of forcing people to think like computers, which is how the typical text search works, visual search flips the script. Now, powered by AI, the machine sees, interprets, and takes the visual cues it learns from people. After applying metadata to the image, AI-powered visual search systems can dig through and retrieve relevant results based on visual similarities, such as color and composition.'[128]

Visual search is another technology that can facilitate better, more frictionless retail experiences that can help buyers find what they want faster. Visual search provides another good reason why companies need to get their metadata house in order. Properly tagged retail images and videos will help reduce fruitless buyer searches, as well as assist buyers to find the products they clearly want.

Butterfield provides the example of Synthetic's Style Intelligence Agent (SIA) — powered by Adobe Sensei — as an excellent case study of how AI can be used, in this case 'to help customers not just find specific clothing items, but also find the right accessories to complete their new look'.[129] To use SIA, customers simply upload an image, either from a website, from real life or even from an advertisement in a magazine and from there, 'Adobe Sensei's Auto Tag service extracts attributes from the image based on everything from color, to style, to cut, to patterns'.[130] SIA's custom machine-learning model then kicks in, correlating those tags with a massive catalogue of products.[131] 'SIA then displays visually similar search results as well as relevant recommendations — items with similar styles, cuts, colors, or patterns, for example'.[132] Just as importantly, SIA then 'uses these visual searches to build a rich profile for that customer's preferences and tastes — a much deeper profile than what could be built from text-based searches alone'.[133] This is customer preferences on steroids, producing an enormous amount of personalised data that can then be used in marketing.

'In delivering such a simple, seamless experience, AI-powered visual search removes the friction from traditional search-and-shop experiences', says Butterfield.[134] 'No longer do customers have to visit multiple retailers or sites and strike out. They can now find virtually anything, anywhere, even without knowing exactly where to find it'.[135] This is another important moment for marketers because if brands invest in visual search, they can propel their brand up the Google rankings and get a solid leg up on their competition.

To get started with image search, brands should focus on solving customer problems and getting their own visual assets in order. They should not try to make their visual search workflows all about advertising. Instead, brands should 'aim to have solid metadata on products so that searching is easier and more natural'.[136] From there, brands should work towards 'visual search processes that are real time and increasingly intuitive, creating a positive customer experience that keeps people coming back', recommends Butterfield.[137]

The moving picture, that is, movies and video, will also be radically affected by AI. Matt Cimaglia sees a video advertising world that is completely different from the one currently out there, describing it as such:

> 'Meanwhile, somewhere in another office, in that same year, a different team is creating a different digital video. Except they're not shooting a single video: They're shooting multiple iterations of it. In one, the actor changes shirts. In another, the actor is an actress. In another, the actress is African American.
>
> After finishing the shoot, this agency doesn't pass the footage off to a video editor. They pass it off to an algorithm.
>
> The algorithm can cut a different video ad in milliseconds. Instead of taking one day to edit one video, it could compile hundreds of videos, each slightly different and tailored to specific viewers based on their user data. Then, as the video analytics flows in, the algorithm can edit the video in real-time, too — instead of waiting a week to analyse and act on viewer behavior, the algorithm can perform instantaneous A/B tests, optimising the company's investment in a day.[138]

Cimaglia suggests this is happening right now, adding, 'We are witnessing a moment in video marketing history, like moments experienced across other industries disrupted by the digital revolution, where human editors are becoming obsolete'.[139] This is the next evolution of advertising — personalised advertising, that is, tailoring content to individuals rather than to the masses; surgically striking relevant offers to a market of one, rather than blasting a shotgun of offerings to the uninterested many.[140]

Cimaglia explains:

> 'Savvy agencies are turning to artificial intelligence for help making those new, specialised creative decisions. It's the same logic that's long overtaken programmatic banner and search advertising, machine learning and chatbots: There are some things computers can do faster, cheaper and more accurately than humans … In this future of data-driven dynamic content, viewers' information is siphoned to AI that determines aspects of the video based on their data.'[141]

Cimaglia sees advertising being tailored towards individuals: 'The options for customisation extend beyond user data, too. If it's raining outside, it could be raining in the video', easily done by the agency plugging in a geolocating weather script.[142] Similarly, if a user is watching the video at night, the video could mirror reality and be a night scene filled with cricket sounds.[143] For Cimaglia, 'This is a logical progression for a society already accustomed to exchanging their privacy for free services'.[144] The video could also be in multiple languages thanks to tools like Amazon Polly.

We are currently in the midst of a content explosion. It is also a time when 'Consumers expect to have personalised, relevant experiences at all times, in all places, and on all platforms'.[145]

When thinking about what is needed to create this kind of content for thousands or even millions of customers at the near real-time speed that is necessary, doing it manually is impossible. According to Adobe's 'State of Creativity in Business 2017' survey, '40 per cent of creatives are using AI in photo and design retouching',[146] so it is already being heavily utilised. Currently, it

can take hours for a designer to find just the right image to use in a piece of marketing collateral, and that is without counting the time required to manipulate the image, to crop it, to find the right layout scenario, and then to publish it to an online catalogue and/or social media channel.[147] Serving the right content to the right person at the right time adds even more time. The cost for all this work adds up, as does the cost of photo shoots to create new assets.[148]

According to the Adobe Sensei Team:

'AI can help you create more relevant content and more engaging experiences across the customer journey at the speed your customers expect. On the creative side, AI can speed up all kinds of tedious tasks, from identifying and organising assets to adjusting and refining for specific channels … On the audience level, AI can help you better understand which audiences respond to which content, or how often people prefer to receive e-mails, so you can deliver the experiences your customers want while respecting their preferences and privacy.'[149]

Designers do not tag the hundreds of images uploaded from every photo shoot — they simply do not have the time.[150] Even if they did tag the images, the list of keywords would probably not be adequate.[151] However, when photos are not tagged, finding the right one in an image bank of thousands is virtually impossible.[152] According to IDC, 'marketers report that one-third of marketing assets go unused or underutilised, with the average organisation creating hundreds of new marketing assets each year'.[153] Repurposing images is unlikely, which means return on investment suffers.[154] To tackle this issue, Adobe has created 'Auto Tag', an Adobe Sensei capability that automatically tags images with key words.[155] For example, a marketer might have a picture of a young girl on a beach under a clear blue sky, which could be tagged with keywords like 'beach', 'girl', 'dancing', 'sundress', 'blue sky', 'white

sand', or even a place like 'Aruba'.[156] Using the Sensei framework, marketers can train their AI and machine-learning models to create their own unique auto tags.[157] This includes identifying brand characteristics like the company logo, so the designers adhere to specific brand standards, or training the model to identify a company's products so that they can be tagged in pictures on social media, which helps identify true reach.[158]

Custom auto-tagging not only has the potential to increase a marketing team's efficiency but could also lead to image-based shopping.[159] If a customer who is looking for a new couch uploads a photo of one he or she likes and then shops for something similar based solely on the image, that is metadata the brand can use.[160] As Adobe's Enterprise Content Team explains:

'Auto tagging identifies what is in the photo and finds the best matches for the customer. Auto tagging also allows brands to gain a deeper understanding of their audience and can help uncover market trends on social media, without the brand having to rely on tags and text. If you run a social media feed through Adobe Sensei, it will tag places your brand is pictured — even if it's not mentioned or tagged — allowing you to see what is trending'.[161]

THE IMPORTANCE OF BEING CHATBOT

The third step of the RACE framework — 'Content' — is one of the most important steps and it includes dynamic pricing, retargeting, web and app personalisation and chatbots. 'Much like with ad targeting, machine learning can be used to establish what content is most likely to bring customers back to the site based on historical data'.[162] By building an accurate prediction model of what content works best to win back different customer types, machine learning can help optimise a brand's retargeting ads to make them as effective as possible.[163]

Another way to convert customers is with chatbots that mimic human intelligence

by interpreting a consumer's queries and potentially complete an order for them. Chatbots are relatively easy to build and Facebook is simplifying the process of developing chatbots for brands.[163] Facebook 'wants to make its Messenger app the go-to place for people to have conversations with brand's virtual ambassadors'.[164] Facebook has created the wit.ai bot engine, which allows brands to train bots with sample conversations and have these bots continually learn from customer interactions.[165]

Giselle Abramovich claims that chatbots are probably 'the most common AI-powered customer service application today … To date, bots have predominantly been used to provide search and discovery and product recommendations'.[166]

There are several commercial chatbot development platforms that simplify the creation and maintenance of chatbots. These let users add more functionality to a bot by creating a flow, machine-learning capabilities and API integration. According to Maruti Tech,[167] chatbot platforms can be simple to use, without the need for deep technical knowledge or programming skills as many chatbot platforms come with drag-and-drop functionality.

Calling itself 'the leading bot platform for creating AI chatbots for Facebook, Chatfuel (https://chatfuel.com) claims that 46 per cent of Messenger bots run on its platform. No coding is required with Chatfuel, and it claims to provide 'features like adding content cards and sharing it to your followers automatically, gathering information inside Messenger chats with forms'. Chatfuel also uses AI to script interactive conversations.

'Let your bot chat like a human' is the tagline on Botsify's website (https://botsify.com) — another popular Facebook Messenger chatbot platform that uses a drag-and-drop template to create bots. Botsify offers features like easy integrations via plugins, smart AI, machine learning and analytics integration. Botsify's platform also allows seamless transition from bot to human

as well, which is not always the case with the other platforms

Other chatbot development platforms include Motion.ai, Flow XO, Chatty People, Recast.ai, Botkit, ChatterOn, Octane AI, Converse AI, GupShup and Microsoft's QnA Bot, which can be integrated into Microsoft Cognitive Services to enable the bot to see, hear, interpret and interact in more human ways.[168] QnA Maker integrates seamlessly with other APIs and can scale to be a know-it-all part of a bigger bot.[169]

With the availability of such platforms, Maruti Tech argues that anyone can create a chatbot, even if they do not know how to code.[170] However, to make an intelligent chatbot that works seamlessly requires AI, machine learning and NLP. Chatbots will undoubtedly revolutionise the future of industries by their rich features.[171] They will reduce human errors, 'provide round the clock availability, eliminate the need for multiple mobile applications and make it a very seamless experience for the customer'.[172]

CONCLUSION

The final step of the RACE framework is 'Engage'. As various studies have shown, it is far easier to sell to an existing customer than it is to attract new ones, meaning that keeping current customers happy is of paramount importance.[173]

This is particularly true in subscription-based business, where a high churn rate can be extremely costly," advises Chaffey.[174] "Predictive analytics can be used to work out which customers are most likely to unsubscribe from a service, by assessing what features are most common in customers who do unsubscribe," says Chaffey.[175] "It's then possible to reach out to these customers with offers, prompts or assistance to prevent them from churning," recommends Chaffey.[176] Today, there is almost a 'fear of being left out' attitude to AI, but businesses must be extremely cautious when jumping onto the latest and greatest technology, as plenty of

wiped-out crypto and blockchain investors can attest to. Anyone planning to utilise AI should be aware that the technology is not new, but many of the so-called experts are, and their depth of knowledge is often exceedingly shallow.

As James Somers notes, 'Just about every AI advance you've heard of depends on a breakthrough that's three decades old'.[177] Of course, many recent advances in hardware and software technology have turned AI's potential into reality, but still anyone wishing to jump into AI should have a good understanding of where it came from and how long it has been around, as well as the inherent limitations of the technology. In reality, the technology is decades old and might be near the end of its life cycle rather than at the beginning of it, but it is still some of the most powerful technology around.

Not only is AI old, but it is also a difficult technology to implement. According to Databricks, only '1 in 3 AI projects are successful and it takes more than 6 months to go from concept to production, with a significant portion of them never making it to production — creating an AI dilemma for organisations'.[178]

Further more, there is a dark side to AI, particularly with deepfakes, which are a class of synthetic media generated by AI. Deepfakes make people appear to do or say things they really did not do or say. For example:

> 'The recent rapid spread of a doctored video of Nancy Pelosi has frightened lawmakers in Washington. The video — edited to make her appear drunk — is just one of a number of examples in the last year of manipulated media making it into mainstream public discourse'.[179]

As Joan Solsman explains:

> 'Like Photoshop for video on steroids, deepfake software produces forgeries by using machine learning to convincingly fabricate a moving, speaking human. Though computer manipulation of video has existed for decades, deepfake systems

have made doctored clips not only easier to create but also harder to detect. Think of them as photo-realistic digital puppets.'[180]

The software for creating deepfakes 'usually requires Big Data sets of images in order to create a realistic forgery.[181] Now Samsung has developed a new artificial intelligence system that can generate a fake clip by feeding it as little as one photo'.[182] Solsman adds, 'These kinds of techniques and their rapid development also create risks of misinformation, election tampering and fraud',[183] according to Hany Farid, a Dartmouth researcher who specialises in media forensics to root out deepfakes.[184]

Congress's response to the deepfakes problem has been to hold hearings and introduce a draft bill that includes three provisions; first, requirements to add watermarks to forged creations by 'companies and researchers who create tools that can be used to make deepfakes';[185] secondly, social companies would be required to build better manipulation detection directly into their platforms; and, thirdly, violators who create malicious deepfakes that harm individuals or threaten national security would be threatened with fines and even jail time.[186] The legislation also introduces a new framework for legal recourse for people who have reputations damaged by synthetic media.[187] While deepfakes are not yet mainstream as 'they still require specialised skills to produce, and they often leave artifacts within the video, like glitches and pixilation, that make the forgery obvious',[188] brands nonetheless need to be vigilant as deepfakes clearly show the potential for weaponising video manipulation against them.[189]

Dan Woods' frenetic marketing world of 'E-mail campaigns, events, blogging, tweeting, PR, e-books, white papers, apps, banner ads, Google Ad Words, social media outreach, search engine optimisation'[190] would be impossible to operate with normal marketing automation technology. Lookalike

modelling that includes contextual, geolocation, social, and perhaps even emotional data would overwhelm normal CRM systems as well. Personality insights services, website morphing, chatbot services, programmatic advertising, emotional, image and facial recognition technology all require massive amounts of data to be crunched in real time and would be almost useless without AI, machine learning and deep learning.

Bill Gates has stated that 'If you invent a breakthrough in artificial intelligence, so machines can learn, that is worth ten Microsofts'.[191] AI sure seems to have a million uses, but it is vital to keep an eye on the potential threat that AI holds. One can only hope that this is just the end of the beginning of AI's technological curve and not at the beginning of the end of us all.

It has been a few years since I had that lunch with my professor friend, and I have come to realise that his question really went to the very heart of the simplicity and beauty that is AI. Perhaps he was one of those who had laboured through the 'AI winter' and found the technology so frustrating to work with because of the limitations of the tools he was using; nevertheless, he had a good point. We often get caught up in the buzzword mumbo jumbo of technological hype. AI really is no more than a neural net that goes around and around, improving upon itself as it learns more and more and more about a problem. But then again, what beauty and form can be created out of that little old neural net.

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