AI in
MARKETING,
SALES and
SERVICE

**How Marketers without a
Data Science Degree can
use AI, Big Data and Bots**

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Peter Gentsch
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Notes on Contributors

Alex Dogariu has over 10 years of experience in customer management, corporate strategy and disruptive technologies (e.g. artificial intelligence, RPA, blockchain) in e-commerce, banking services and automotive OEMs. Alex began his career at Accenture, driving CRM and sales strategy innovations. He then moved on to be managing director at logicsale AG, revolutionizing e-commerce through dynamic repricing. In 2015, he joined Mercedes-Benz Consulting, leading the customer management strategy and innovation department. He was recently awarded twice the 1st place in the Best of Consulting competition hosted by *WirtschaftsWoche* in the categories Digitization as well as Sales and Marketing.

Klaus Eck is a blogger, speaker, author and founder of the content marketing agency d.Tales.

Prof. Dr. rer. pol. Nils Hafner is an international expert in building consistently profitable customer relations. He is professor for customer relationship management at the Lucerne University of Applied Sciences and Arts and heads a program for customer relations management.

Prof. Dr. Hafner studied economics, psychology, philosophy and modern history in Kiel and Rostock (Germany). He earned his Ph.D. in innovation management/marketing with a dissertation on KPIs of call center services. After his engagement as a practice leader CRM in one of the largest business consulting firms, he established from 2002 to 2006 the first CRM Master program in the German-speaking countries.

At present, he advises the management of medium-sized and major enterprises in Germany, Switzerland and Europe in matters of CRM. In his blog

"Hafner on CRM", he is trying to emphasize the informative, delightful, awkward, tragic and funny aspects of the subject. Since 2006, he publishes the "Top 5 CRM Trends of the Year" and speaks about these trends in over 80 Speeches per year for international top companies.

Bruno Kollhorst works as Head of advertising and HR-marketing at Techniker Krankenkasse (TK), Germanys biggest public health insurance company. He is also member of the Social Media Expert Board at BVDW. The media and marketing-specialist works also as lecturer at University of Applied Sciences in Lübeck and is a freelance author. Beneath advertising, content marketing and its digitalization, he is also an expert in the sectors brand cooperation and games/e-sports.

Jens Scholz studied mathematics at the TU Chemnitz with specialization in statistics. After this, he worked as managing director of die WDI media agentur GmbH. He is one of the founders of the prudsys AG. Since 2003 he was responsible for marketing and later sales at prudsys. Since 2006 he is the CEO of the company.

Andreas Schwabe in his role as Managing Director of Blackwood Seven Germany, he revolutionizes media planning through artificial intelligence and machine learning. With a specifically developed platform, the software company calculates for each customer the "Media Affect Formula", which enables an attribution of all online channels such as Search, YouTube and Facebook along with offline such as TV, radio broadcast, print and OOH. This simulates the ideal media mix for the customers. Blackwood Seven has 175 employees in Munich, Copenhagen, Barcelona, New York and Los Angeles.

Dr. Michael Thess studied mathematics in Chemnitz und St. Petersburg. He specialized in numerical analysis and received the Ph.D. at the TU Chemnitz. As one of the founders of the prudsys AG, he was responsible for research and development. Since 2017 he manages the Signal Cruncher GmbH, a daughter company of prudsys.

Dr. Thomas Wilde is an entrepreneur and lecturer at LMU Munich. His area of expertise lies in digital transformation, especially in software solutions for marketing and service in social media, e-commerce, messaging platforms and communities.

Prior to that, he worked as an entrepreneur, consultant and manager in strategic business development. He studied economics and did his doctor's degree in business informatics and new media at the Ludwig-Maximilian University in Munich.

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Part I

AI 101

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AI Eats the World

Artificial intelligence (AI) has catered for an immense leap in development in business practice. AI is also increasingly addressing administrative, dispositive and planning processes in marketing, sales and management on the way to the holistic algorithmic enterprise. This introductory chapter deals with the motivation for and background behind the book: It is meant to build a bridge from AI technology and methodology to clear business scenarios and added values. It is to be considered as a transmission belt that translates the informatics into business language in the spirit of potentials and limitations. At the same time, technologies and methods in the scope of the chapters on the basics are explained in such a way that they are accessible even without having studied informatics—the book is regarded as a book for business practice.

1.1 AI and the Fourth Industrial Revolution

If big data is the new oil, analytics is the combustion engine (Gartner 2015).

Data is only of benefit to business if it is used accordingly and capitalised. Analytics and AI increasingly enable the smart use of data and the associated automation and optimisation of functions and processes to gain advantages in efficiency and competition.

AI is not another industrial revolution. This is a new step on the path of the universe. The last time we had a step of that significance was 3.5 billion years ago with the invention of life.

In recent years, AI has catered for an immense leap in development in business practice. Whilst the optimisation and automation of production and logistics processes are focussed on in particular in the scope of Industry 4.0, AI increasingly also addresses administrative, dispositive and planning processes in marketing, sales and management on the path towards the holistic algorithmic enterprise.

AI as a possible mantra of the massive disruption of business models and the entering of fundamental new markets is asserting itself more and more. There are already many cross-sectoral use cases that give proof of the innovation and design potential of the core technology of the twenty first century. Decision-makers of all industrial nations and sectors are agreed. Yet there is a lack of a holistic evaluation and process model for the many postulated potentials to also be made use of. This book proposes an appropriate design and optimisation approach.

Equally, there is an immense potential for change and design for our society. Former US President Obama declared the training of data scientists a priority of the US education system in his keynote address on big data. Even in Germany, there are already the first data science studies to ensure the training of young talents. In spite of that, the "war of talents" is still on the rampage as the pool of staff is still very limited, with the demand remaining high in the long term.

Furthermore, digital data and algorithms facilitate totally new business processes and models. The methods applied range from simple hands-on analytics with small data down to advanced analytics with big data such as AI.

At present, there are a great many informatics-related explanations by experts on AI. In equal measure, there is a wide number of popular scientific publications and discussions by the general public. What is missing is the bridging of the gap from AI technology and methodology to clear business scenarios and added values. IBM is currently roving around from company to company with Watson, but besides the teaser level, the question still remains open about the clear business application. This book bridges the gap between AI technology and methodology and the business use and business case for various industries. On the basis of a business AI reference model, various application scenarios and best practices are presented and discussed.

After the great technological evolutionary steps of the Internet, mobiles and the Internet of Things, big data and AI are now stepping up to be the greatest ever evolutionary step. The industrial revolution enabled us to get rid of the limitations of physical work like these innovations enable us to overcome intellectual and creative limitations. We are thus in one of the

most thrilling phases of humanity in which digital innovations fundamentally change the economy and society.

1.2 AI Development: Hyper, Hyper…

If we take a look at business articles of the past 20 years, we notice that every year, there is always speak of the introduction of "constantly increasing dynamisation" or "shorter innovation and product cycles"—similar to the washing powder that washes whiter every year. It is thus understandable that with the much-quoted speed of digitalisation, a certain degree of immunity against the subject has crept into one person or the other. The fact that we have actually been exposed to a non-existing dynamic is illustrated by Fig. 1.1: On the historic time axis, the rapid peed of the "digital hyper innovation" with the concurrently increasing effect on companies, markets and society becomes clear. This becomes particularly clear with the subject of AI.

The much-quoted example of the AI system AlphaGo, which defeated the Korean world champion in "Go" (the world's oldest board game) at the beginning of 2016 is an impressive example of the rapid speed of development, especially when we look at the further developments and successes in 2017.

The game began at the beginning of 1996 when the AI system "Deep Blue" by IBM defeated the reigning world champion in chess, Kasparow. Celebrated in public as one of the breakthroughs in AI, the enthusiasm among AI experts was contained. After all, in the spirit of machine
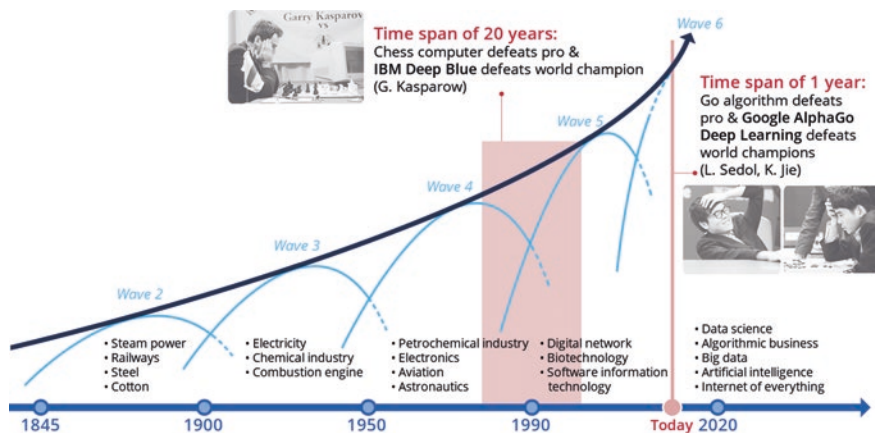
Fig. 1.1 The speed of digital hyper innovation

learning, the system had quite mechanically and, in fact, not very intelligently, discovered success patterns in thousands of chess games and then simply applied these in real time faster than a human could ever do. Instead, the experts challenged the AI system to beat the world champion in the board game "Go". This would then have earned the attribute "intelligent", as Go is far more complex than chess and in addition, demands a high degree of creativity and intuition. Well-known experts predicted a period of development of about 100 years for this new milestone in AI. Yet as early as March 2016, the company DeepMind (now a part of Google) succeeded in defeating the reigning Go world champion with AI. At the beginning of 2017, the company brought out a new version of AlphaGo out with Master, which has not only beaten 60 well-experienced Go players, but had also defeated the first version of the system that had been highly celebrated only one year prior. And there's more: In October 2017 came Zero as the latest version, which not only defeated AlphaGo but also its previous version. The exciting aspect about Zero is that, on the one hand, it got by with a significantly leaner IT infrastructure, on the other hand, in contrast to its previous version, it was not fed any decided experience input from previously played games. The system learned how to learn. And in addition to that, with fully new moves that the human race had never made in thousands of years. This proactive, increasingly autonomous acting makes AI so interesting for business. As a country that sees itself as the digital leader, this "digital hyper innovation" should be regarded as the source of inspiration for business and society and be used, instead of being understood and repudiated as a stereotype as a danger and job killer.

The example of digital hyper innovation shows vividly what a nonlinear trend means and what developments we can look forward to or be prepared for in 2018. In order to emphasise this exponentiality once again with the board game metaphor: If we were to take the famous rice grain experiment by the Indian king Sheram as an analogy, which is frequently used to explain the underestimation of exponential development, the rice grain of technological development has only just arrived at the sixth field of the chess board.

1.3   AI as a Game Changer

In the early phases of the industrial revolutions, technological innovations replaced or relieved human muscle power. In the era of AI, our intellectual powers are now being simulated, multiplied and partially even substituted

by digitalisation and AI. This results in fully new scaling and multiplication effects for companies and economies.

Companies are developing increasingly strongly towards algorithmic enterprises in the digital ecosystems. And it is not about a technocratic or mechanistic understanding of algorithms, but about the design and optimisation of the digital and analytical value added chain to achieve sustainable competitive advantages. Smart computer systems, on the one hand, can support decision-making processes in real time, but furthermore, big data and AI are capable of making decisions that today already exceed the quality of human decisions.

The evolution towards the algorithmic enterprise in the spirit of the data- and analytics-driven design of business processes and models directly correlates with the development of the Internet. However, we will have to progressively bid farewell to the narrow paradigm of usage of the user sitting in front of the computer accessing a website. "Mobile" has already changed digital business significantly. Thanks to the development of the IoT, all devices and equipment are progressively becoming smart and proactively communicate with each other. Conversational interfaces will equally change human-to-machine communication dramatically—from the use of a text-based Internet browser down to natural language dialogue with everybody and everything (Internet of Everything).

Machines are increasingly creating new scopes for development and possibilities. The collection, preparation and analysis of large amounts of data eats up time and resources. The work that many human workers used to perform in companies and agencies is now automated by algorithms. Thanks to new algorithmics, these processes can be automated so that employees have more time for the interpretation and implementation of the analytical results.

In addition, it is impossible for humans to tap the 70 trillion data points available on the Internet or unstructured interconnectedness of companies and economic actors without suitable tools. AI can, for example, automate the process of customer acquisition and the observation of competition so that the employees can concentrate on contacting identified new customers and on deriving competitive strategies.

Recommendations and standard operation procedures based on AI and automated evaluation are often eyed critically by companies. It surely feels strange at the beginning to follow these automated recommendations that are created from algorithms and not from internal corporate consideration. However, the results show that it is worthwhile because we are already surrounded by these algorithms today. The "big players" (GAFA = Google,

Apple, Facebook, Amazon) are mainly to solely relying on algorithms that are classified in the category "artificial intelligence" for good reason. The advantage: These recommendations are free of subjective influences They are topical, fast and take all available factors into consideration.

Even at this stage, the various successful use and business cases for the AI-driven optimisation and design of business processes and models can be illustrated (Chapter 5). What they all have in common is the great change and disruption potential The widespread mantra in the digital economy of "software eats the world" can now be brought to a head as "AI & algorithmics eat the world".

1.4   AI for Business Practice

Literature on the subject of big data and AI is frequently very technical and informatics-focused. This book sees itself as a transmission belt that translates the language of business in the spirit of potentials and limitations. At the same time, the technologies and methods do not remain to be a black box. They are explained in the scope of the chapters on the basics in such a way that they are accessible even without having studied informatics.

In addition, the frequently existing lack of imagination between the potentials of big data, business intelligence and AI and the successful application thereof in business practice is closed by various best practice examples. The relevance and pressure to act in this area do happen to be repeatedly postulated, yet there is a lack of a systematic reference frame and a contextualisation and process model on algorithmic business. This book would like to close that roadmap and implementation gap.

The discussion on the subjects is very industry-oriented, especially in Germany. Industry 4.0, robotics and the IoT are the dominating topics. The so-called customer facing functions and processes in the fields of marketing, sales and service play a subordinate role in this. As the lever for achieving competitive advantages and increasing profitability is particularly high in these functions, this book has made it its business to highlight these areas in more detail and to illustrate the outstanding potential by numerous best practices:

- How can customer and market potentials be automatically identified and profiled?
- How can media planning be automated and optimised on the basis of AI?

- How can product recommendations and pricing be automatically derived and controlled?
- How can processes be controlled and coordinated smartly by AI?
- How can the right content be automatically generated on the basis of AI?
- How can customer communication in service and marketing be optimised and automated to increase customer satisfaction?
- How can bots and digital assistants make the communication between companies and consumers more efficient and more smart?
- How can the customer journey optimisation be optimised and automated on the basis of algorithmics and AI?
- What significance do algorithmics and AI have for Conversational Commerce?
- How can modern market research by optimised intelligently?

Various best practice examples answer these questions and demonstrate the current and future business potential of big data, algorithmics and AI (Chapter 5 AI Best Practices).

Reference

Gartner. (2015). *Gartner Reveals Top Predictions for IT Organizations and Users for 2016 and Beyond*. http://www.gartner.com/newsroom/id/3143718. Accessed 5 Jan 2017.

2

A Bluffer's Guide to AI, Algorithmics and Big Data

2.1 Big Data—More Than "Big"

A few years ago, the keyword big data resounded throughout the land. What is meant is the emergence and the analysis of huge amounts of data that is generated by the spreading of the Internet, social media, the increasing number of built-in sensors and the Internet of Things, etc.

The phenomenon of large amounts of data is not new. Customer and credit card sensors at the point of sale, product identification via barcodes or RFID as well as the GPS positioning system have been producing large amounts of data for a long time. Likewise, the analysis of unstructured data, in the shape of business reports, e-mails, web form free texts or customer surveys, for example, is frequently part of internal analyses. Yet, what is new about the amounts of data falling under the term "big data" that has attracted so much attention recently? Of course, the amount of data available through the Internet of Things (Industry 4.0), through mobile devices and social media has increased immensely (Fig. 2.1).

A decisive factor is, however, that due to the increasing orientation of company IT systems towards the end customer and the digitalisation of business processes, the number of customer-oriented points of contact that can be used for both generating data and systematically controlling communication has increased. Added to this is the high speed at which the corresponding data is collected, processed and used. New AI approaches raise the analytical value creation to a new level of quality.
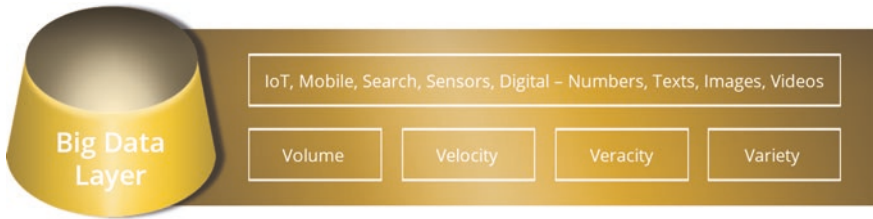
Fig. 2.1   Big data layer (Gentsch)

2.1.1   Big Data—What Is Not New

The approach of gaining insights from data for marketing purposes is nothing new. Database marketing or analytical CRM has been around for more than 20 years. The phenomenon of large amounts of data is equally nothing new: Point of sale, customer and credit cards or web servers have long been producing large amounts of data. Equally, the analysis of unstructured data in the shape of emails, web form free texts or customer surveys, for example, frequently form a part of marketing and research.

2.1.2   Big Data—What Is New

It goes without saying that the amount of data has increased immensely thanks to the Internet of Things, mobiles and social media—yet this is rather a gradual argument. The decisive factor is that thanks to the possibilities of IT and the digitalisation of business processes, customer-oriented points of contact for both generating data and for systematically controlling communication have increased. Added to this is the high speed at which the corresponding data is collected, processed and used. Equally, data mining methods of deep learning and semantic analytics raise the analytical value creation to a new level of quality.

2.1.3   Definition of Big Data

As there are various definitions of big data, one of the most common ones will be used here:

> "Big data" refers to datasets whose size is beyond the ability of typical database software tools to capture, store, manage, and analyse. (Manyika et al. 2011)