

## Sociable Robots And The Future Of Social Relations

For readers of *The Second Machine Age* or *The Soul of an Octopus*, a bold, exciting exploration of how building diverse kinds of relationships with robots—inspired by how we interact with animals—could be the key to making our future with robotic technology work. There has been a lot of ink devoted to discussions of how robots will replace us and take our jobs. But MIT Media Lab researcher and technology policy expert Kate Darling argues just the opposite, and that treating robots with a bit of humanity, more like the way we treat animals, will actually serve us better. From a social, legal, and ethical perspective, she shows that our current ways of thinking don't leave room for the robot technology that is soon to become part of our everyday routines. Robots are likely to supplement—rather than replace—our own skills and relationships. So if we consider our history of incorporating animals into our work, transportation, military, and even families, we actually have a solid basis for how to contend with this future. A deeply original analysis of our technological future and the ethical dilemmas that await us, *The New Breed* explains how the treatment of machines can reveal a new understanding of our own history, our own systems and how we relate—not just to non-humans, but also to each other.

How to develop robots that will be more like humans and less like computers, more social than machine-like, and more playful and less programmed. Most robots are not very friendly. They vacuum the rug, mow the lawn, dispose of bombs, even perform surgery—but they aren't good conversationalists. It's difficult to make eye contact. If the future promises more human-robot collaboration in both work and play, wouldn't it be better if the robots were less mechanical and more social? In *How to Grow a Robot*, Mark Lee explores how robots can be more human-like, friendly, and engaging. Developments in artificial intelligence—notably Deep Learning—are widely seen as the foundation on which our robot future will be built. These advances have already brought us self-driving cars and chess match-winning algorithms. But, Lee writes, we need robots that are perceptive, animated, and responsive—more like humans and less like computers, more social than machine-like, and more playful and less programmed. The way to achieve this, he argues, is to “grow” a robot so that it learns from experience—just as infants do. After describing “what's wrong with artificial intelligence” (one key shortcoming: it's not embodied), Lee presents a different approach to building human-like robots: developmental robotics, inspired by developmental psychology and its accounts of early infant behavior. He describes his own experiments with the iCub humanoid robot and its development from newborn helplessness to ability levels equal to a nine-month-old, explaining how the iCub learns from its own experiences. AI robots are designed to know humans as objects; developmental robots will learn empathy. Developmental robots, with an internal model of “self,” will be better interactive partners with humans. That is the kind of future technology we should work toward.

Social robotics is a cutting edge research area gathering researchers and stakeholders from various disciplines and organizations. The transformational potential that these machines, in the form of, for example, caregiving, entertainment or partner robots, pose to our societies and to us as individuals seems to be limited by our technical limitations and phantasy alone. This collection

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contributes to the field of social robotics by exploring its boundaries from a philosophically informed standpoint. It constructively outlines central potentials and challenges and thereby also provides a stable fundament for further research of empirical, qualitative or methodological nature.

Your relationships with your "smart" products are about to get a lot more personal. Think how commonplace it is now for people to ask Siri for the weather forecast, deploy Roomba to clean their homes, or summon Alexa to turn on the lights. The "smart home" market will reach well over \$100 billion in the next five years on the promise of products that are truly integrated with our cooking, cleaning, entertainment, security, and hygiene habits. But the reality is, these first-generation "smart" products aren't very smart—yet. We're clearly seeing only the tip of the iceberg in terms of capability and how such products can enhance our lives. How do we take it to the next level? In a word, design—and more specifically, social design. In this fascinating and instructive book, leading product design expert Carla Diana describes how new technology is allowing designers to humanize consumer products in delightfully subtle ways. Showcasing vivid examples of social design principles such as "product presence," "object expression," and "interaction intelligence," we see how inventive uses of light, sound, and movement can evoke human responses to even the most mundane products. Diana offers clear guidelines and takeaways for conceptualizing, building, and optimizing products using such methods as bodystorming, scenario storyboarding, video prototyping, behavior charting, and more. *My Robot Gets Me* provides keen insights and practical advice to anyone interested or involved in the burgeoning smart marketplace, from product designers and developers to managers and venture capitalists.

The New York Times-bestselling guide to how automation is changing the economy, undermining work, and reshaping our lives Winner of Best Business Book of the Year awards from the Financial Times and from Forbes "Lucid, comprehensive, and unafraid...;an indispensable contribution to a long-running argument."--Los Angeles Times What are the jobs of the future? How many will there be? And who will have them? As technology continues to accelerate and machines begin taking care of themselves, fewer people will be necessary. Artificial intelligence is already well on its way to making "good jobs" obsolete: many paralegals, journalists, office workers, and even computer programmers are poised to be replaced by robots and smart software. As progress continues, blue and white collar jobs alike will evaporate, squeezing working- and middle-class families ever further. At the same time, households are under assault from exploding costs, especially from the two major industries-education and health care-that, so far, have not been transformed by information technology. The result could well be massive unemployment and inequality as well as the implosion of the consumer economy itself. The past solutions to technological disruption, especially more training and education, aren't going to work. We must decide, now, whether the future will see broad-based prosperity or catastrophic levels of inequality and economic insecurity. *Rise of the Robots* is essential reading to understand what accelerating technology means for our economic prospects-not to mention those of our children-as well as for society as a whole.

Sixteen "lovely, nuanced" (The New York Times) linked stories from a potent new voice—a doctor with an M.D. from Harvard and an M.F.A. in fiction. *A History of the Present Illness* takes readers into overlooked lives in the neighborhoods, hospitals, and

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nursing homes of San Francisco, offering a deeply humane and incisive portrait of health and illness in America today. An elderly Chinese immigrant sacrifices his demented wife's well-being to his son's authority. A busy Latina physician's eldest daughter's need for more attention has disastrous consequences. A young veteran's injuries become a metaphor for the rest of his life. A gay doctor learns very different lessons about family from his life and his work. And a psychiatrist who advocates for the underserved may herself be crazy. Together, these honest and compassionate stories introduce a striking new literary voice and provide a view of what it means to be a doctor and a patient unlike anything we've read before. In the tradition of Oliver Sacks and Abraham Verghese, Aronson's writing is based on personal experience and addresses topics of current social relevance. Masterfully told, *A History of the Present Illness* explores the role of stories in medicine and creates a world pulsating with life, speaking truths about what makes us human.

The terrifying new role of technology in a world at war

Social robots not only work with humans in collaborative workspaces – we meet them in shopping malls and even more personal settings like health and care. Does this imply they should become more human, able to interpret and adequately respond to human emotions? Do we want them to help elderly people? Do we want them to support us when we are old ourselves? Do we want them to just clean and keep things orderly – or would we accept them helping us to go to the toilet, or even feed us if we suffer from Parkinson's disease? The answers to these questions differ from person to person. They depend on cultural background, personal experiences – but probably most of all on the robot in question. This book covers the phenomenon of social robots from the historic roots to today's best practices and future perspectives. To achieve this, we used a hands-on, interdisciplinary approach, incorporating findings from computer scientists, engineers, designers, psychologists, doctors, nurses, historians and many more. The book also covers a vast spectrum of applications, from collaborative industrial work over education to sales. Especially for developments with a high societal impact like robots in health and care settings, the authors discuss not only technology, design and usage but also ethical aspects. Thus this book creates both a compendium and a guideline, helping to navigate the design space for future developments in social robotics.

*From AI to Robotics: Mobile, Social, and Sentient Robots* is a journey into the world of agent-based robotics and it covers a number of interesting topics, both in the theory and practice of the discipline. The book traces the earliest ideas for autonomous machines to the mythical lore of ancient Greece and ends the last chapter with a debate on a prophecy set in the apparent future, where human beings and robots/technology may merge to create superior beings – the era of transhumanism. Throughout the text, the work of leading researchers is presented in depth, which helps to paint the socio-economic picture of how robots are transforming our world and will continue to do so. This work is presented along with the influences and ideas from futurists, such as Asimov, Moravec, Lem, Vinge, and of course Kurzweil. The book furthers the discussion with concepts of Artificial Intelligence and how it manifests in robotic agents. Discussions across various topics are presented in the book, including control paradigm, navigation, software, multi-robot systems, swarm robotics, robots in social roles, and artificial consciousness in robots. These

discussions help to provide an overall picture of current day agent- based robotics and its prospects for the future. Examples of software and implementation in hardware are covered in Chapter 5 to encourage the imagination and creativity of budding robot enthusiasts. The book addresses several broad themes, such as AI in theory versus applied AI for robots, concepts of anthropomorphism, embodiment and situatedness, extending theory of psychology and animal behavior to robots, and the proposal that in the future, AI may be the new definition of science. Behavior-based robotics is covered in Chapter 2 and retells the debate between deliberative and reactive approaches. The text reiterates that the effort of modern day robotics is to replicate human-like intelligence and behavior, and the tools that a roboticist has at his or her disposal are open source software, which is often powered by crowd-sourcing. Open source meta-projects, such as Robot Operating System (ROS), etc. are briefly discussed in Chapter 5. The ideas and themes presented in the book are supplemented with cartoons, images, schematics and a number of special sections to make the material engaging for the reader. Designed for robot enthusiasts – researchers, students, or the hobbyist, this comprehensive book will entertain and inspire anyone interested in the exciting world of robots.

Robotic Persons will introduce the evangelical community to the journey of Robotic Futurism and how current and forthcoming AI-driven robots will impact human value and dignity. This book will consider three key areas of robotic development and the existential risks on the horizon for humans in the fields of work, war, and sex. There are risks in the fields of work, because there is a temptation to replace human workers with automation. Current arguments for the benefit of war fighting robots posit that these robots will eliminate war and the risk of war, but there is much more to the story. Arguments for sex and companion robots proffer that they will benefit the fringe community or help those who do not have a relative to care for them, but again there are many ethical and philosophical problems with these arguments. Robotic Persons not only introduces the reader to these issues, but also gives an evangelical response to each. There is presently no evangelical work addressing these critical issues. Robotic Persons will argue that granting legal personhood to qualified robots will further prevent dehumanizing use of robots and protect human dignity and value.

The robotics industry is growing rapidly, and to a large extent the development of this market sector is due to the area of social robotics – the production of robots that are designed to enter the space of human social interaction, both physically and semantically. Since social robots present a new type of social agent, they have been aptly classified as a disruptive technology, i.e. the sort of technology which affects the core of our current social practices and might lead to profound cultural and social change. Due to its disruptive and innovative potential, social robotics raises not only questions about utility, ethics, and legal aspects, but calls for “robo-philosophy” – the comprehensive philosophical reflection from the perspectives of all philosophical disciplines. This book presents the proceedings of the first conference in this new area, “Robo-Philosophy 2014 – Sociable Robots and the Future of Social Relations, held in Aarhus, Denmark, in August 2014. The short papers and abstracts collected here address questions of social robotics from the perspectives of philosophy of mind, social ontology, ethics, meta-ethics, political philosophy, aesthetics, intercultural philosophy, and metaphilosophy. Social robotics is still in its early stages, but it is precisely

now that we need to reflect its possible cultural repercussions. This book is accessible to a wide readership and will be of interest to everyone involved in the development and use of social robotics applications, from social roboticists to policy makers. Social robotics drives a technological revolution of possibly unprecedented disruptive potential, both at the socio-economic and the socio-cultural level. The rapid development of the robotics market calls for a concerted effort across a wide spectrum of academic disciplines to understand the transformative potential of human-robot interaction. This effort cannot succeed without the special expertise in the study of socio-cultural interactions, norms, and values that humanities research provides. This book contains the proceedings of the conference “What Social Robots Can and Should Do,” Robophilosophy 2016 / TRANSOR 2016, held in Aarhus, Denmark, in October 2016. The conference is the second event in the biennial Robophilosophy conference series, this time combined with an event of the Research Network for Transdisciplinary Studies in Social Robotics (TRANSOR). Featuring 13 plenaries and 74 session and workshop talks, the event turned out to be the world’s largest conference in Humanities research in and on social robotics. The book is divided into 3 sections: Part I and Part III contain the abstracts of plenary lectures and contributions to 6 workshops: Artificial Empathy; Co-Designing Children Robot Interaction; Human-Robot Joint Action; Phronesis for Machine Ethics?; Robots in the Wild; and Responsible Robotics. Part II contains short papers for presentations in 7 thematically organized sessions: methodological issues; ethical tasks and implications; emotions in human robot interactions; education, art and innovation; artificial meaning and rationality; social norms and robot sociality; and perceptions of social robots. The book will be of interest to researchers in philosophy, anthropology, sociology, psychology, linguistics, cognitive science, robotics, computer science, and art. Since all contributions are prepared for an interdisciplinary readership, they are highly accessible and will be of interest to policy makers and educators who wish to gauge the challenges and potentials of putting robots in society.

The subject of social robotics has enormous projected economic significance. However, social robots not only present us with novel opportunities but also with novel risks that go far beyond safety issues. It is a potentially highly disruptive technology which could negatively affect the most valuable parts of the fabric of human social interactions in irreparable ways. Since engineering educations do not yet offer the necessary competences to analyze, holistically assess, and constructively mitigate these risks, new alliances must be established between engineering and SSH disciplines, with special emphasis on the humanities (i.e. disciplines specializing in the analysis of socio-cultural interactions and human experience). The Robophilosophy Conference Series was established in 2014 with the purpose of creating a new forum and catalyzing the research discussion in this important area of applied humanities research, with focus on robophilosophy. Robophilosophy conferences have been the world’s largest venues for humanities research in and on social robotics. The book at hand presents the proceedings of Robophilosophy Conference 2020: Culturally Sustainable Social Robotics, the fourth event in the international, biennial Robophilosophy Conference Series, which brought together close to 400 participants from 29 countries. The speakers of the conference, whose contributions are collected in this volume, were invited to offer concrete proposals for how the Humanities can help to shape a future where social

robotics is guided by the goals of enhancing socio-cultural values rather than by utility alone. The book is divided into 3 parts; Abstracts of Plenaries, which contains 6 plenary sessions; Session Papers, with 44 papers under 8 thematic categories; and Workshops, containing 25 items on 5 selected topics. Providing concrete proposals from philosophers and other SSH researchers for new models and methods, this book will be of interest to all those involved in developing artificial 'social' agents in a culturally sustainable way that is also – a fortiori – ethically responsible.

This volume offers eleven philosophical investigations into our future relations with social robots--robots that are specially designed to engage and connect with human beings. The contributors present cutting edge research that examines whether, and on which terms, robots can become members of human societies. Can our relations to robots be said to be "social"? Can robots enter into normative relationships with human beings? How will human social relations change when we interact with robots at work and at home? The authors of this volume explore these questions from the perspective of philosophy, cognitive science, psychology, and robotics. The first three chapters offer a taxonomy for the classification of simulated social interactions, investigate whether human social interactions with robots can be genuine, and discuss the significance of social relations for the formation of human individuality. Subsequent chapters clarify whether robots could be said to actually follow social norms, whether they could live up to the social meaning of care in caregiving professions, and how we will need to program robots so that they can negotiate the conventions of human social space and collaborate with humans. Can we perform joint actions with robots, where both sides need to honour commitments, and how will such new commitments and practices change our regional cultures? The authors connect research in social robotics and empirical studies in Human-Robot Interaction to recent debates in social ontology, social cognition, as well as ethics and philosophy of technology. The book is a response to the challenge that social robotics presents for our traditional conceptions of social interaction, which presuppose such essential capacities as consciousness, intentionality, agency, and normative understanding. The authors develop insightful answers along new interdisciplinary pathways in "robophilosophy," a new research area that will help us to shape the "robot revolution," the distinctive technological change of the beginning 21st century.

The influence of AI is beginning to filter into every aspect of life, spanning across education, healthcare, business, and more. However, as its prevalence grows, challenges must be addressed including AI replication and even exacerbation of human bias and discrimination and the development of policies and laws that appropriately regulate AI. Stakeholders from all sectors of society need to collaborate on co-designing innovative, agile frameworks for governing AI that allow for its continued adoption while minimizing risk and reducing disruption. *Understanding the Role of Artificial Intelligence and Its Future Social Impact* is a pivotal reference source that provides vital research on the application of AI within contemporary society and comprehends the future effects of this technology within modern civilization. While highlighting topics such as cognitive computing, ethical issues, and robotics, this publication explores the possible consequences of AI adoption as well as its disruption within industries and emerging markets. This book is ideally designed for researchers, developers, strategists, managers, practitioners, executives,

analysts, scientists, policymakers, academicians, and students seeking current research on the future of AI and its influence on the global culture and society.

This book constitutes the refereed proceedings of the Third International Conference on Social Robotics, ICSR 2011, held in Amsterdam, The Netherlands, in November 2011. The 23 revised full papers were carefully selected during two rounds of reviewing and improvement from 51 submissions. The papers are organized in topical sections on social interaction with robots; nonverbal interaction with social robots; robots in society; social robots in education; affective interaction with social robots; robots in the home.

This book provides state of the art scientific and engineering research findings and developments in the field of humanoid robotics and its applications. It is expected that humanoids will change the way we interact with machines, and will have the ability to blend perfectly into an environment already designed for humans. The book contains chapters that aim to discover the future abilities of humanoid robots by presenting a variety of integrated research in various scientific and engineering fields, such as locomotion, perception, adaptive behavior, human-robot interaction, neuroscience and machine learning. The book is designed to be accessible and practical, with an emphasis on useful information to those working in the fields of robotics, cognitive science, artificial intelligence, computational methods and other fields of science directly or indirectly related to the development and usage of future humanoid robots. The editor of the book has extensive R

As we approach a great turning point in history when technology is poised to redefine what it means to be human, *The Fourth Age* offers fascinating insight into AI, robotics, and their extraordinary implications for our species. “If you only read just one book about the AI revolution, make it this one” (John Mackey, cofounder and CEO, Whole Foods Market). In *The Fourth Age*, Byron Reese makes the case that technology has reshaped humanity just three times in history: 100,000 years ago, we harnessed fire, which led to language; 10,000 years ago, we developed agriculture, which led to cities and warfare; 5,000 years ago, we invented the wheel and writing, which led to the nation state. We are now on the doorstep of a fourth change brought about by two technologies: AI and robotics. “Timely, highly informative, and certainly optimistic” (Booklist), *The Fourth Age* provides an essential background on how we got to this point, and how—rather than what—we should think about the topics we’ll soon all be facing: machine consciousness, automation, changes in employment, creative computers, radical life extension, artificial life, AI ethics, the future of warfare, superintelligence, and the implications of extreme prosperity. By asking questions like “Are you a machine?” and “Could a computer feel anything?”, Reese leads you through a discussion along the cutting edge in robotics and AI, and provides a framework by which we can all understand, discuss, and act on the issues of the Fourth Age and how they’ll transform humanity.

Looking for ways to handle the transition to a digital economy Robots, artificial intelligence, and driverless cars are no longer things of the distant future. They are with us today and will become increasingly common in coming years, along with virtual reality and digital personal assistants. As these tools advance deeper into everyday use, they raise the question—how will they transform

society, the economy, and politics? If companies need fewer workers due to automation and robotics, what happens to those who once held those jobs and don't have the skills for new jobs? And since many social benefits are delivered through jobs, how are people outside the workforce for a lengthy period of time going to earn a living and get health care and social benefits? Looking past today's headlines, political scientist and cultural observer Darrell M. West argues that society needs to rethink the concept of jobs, reconfigure the social contract, move toward a system of lifetime learning, and develop a new kind of politics that can deal with economic dislocations. With the U.S. governance system in shambles because of political polarization and hyper-partisanship, dealing creatively with the transition to a fully digital economy will vex political leaders and complicate the adoption of remedies that could ease the transition pain. It is imperative that we make major adjustments in how we think about work and the social contract in order to prevent society from spiraling out of control. This book presents a number of proposals to help people deal with the transition from an industrial to a digital economy. We must broaden the concept of employment to include volunteering and parenting and pay greater attention to the opportunities for leisure time. New forms of identity will be possible when the "job" no longer defines people's sense of personal meaning, and they engage in a broader range of activities. Workers will need help throughout their lifetimes to acquire new skills and develop new job capabilities. Political reforms will be necessary to reduce polarization and restore civility so there can be open and healthy debate about where responsibility lies for economic well-being. This book is an important contribution to a discussion about tomorrow—one that needs to take place today.

Robots are predicted to play a role in many aspects of our lives in the future, affecting work, personal relationships, education, business, law, medicine and the arts. As they become increasingly intelligent, autonomous, and communicative, they will be able to function in ever more complex physical and social surroundings, transforming the practices, organizations, and societies in which they are embedded. This book presents the proceedings of the Robophilosophy 2018 conference, held in Vienna, Austria, from 14 to 7 February 2018. The third event in the Robophilosophy Conference Series, the conference was entitled Envisioning Robots in Society – Politics, Power, and Public Space. It focused on the societal, economic, and political issues related to social robotics. The book is divided into two parts and an Epilogue. Part I, entitled Keynotes, contains abstracts of the keynotes and two longer papers. Part II is divided into 7 subject sections containing 37 papers. Subjects covered include robots in public spaces; politics and law; work and business; military robotics; and policy. The book provides an overview of the questions, answers, and approaches that are currently at the heart of both academic and public discussions. The contributions collected here will be of interest to researchers and policy makers alike, as well as other stakeholders.

Artificial Intelligence for Future Generation Robotics offers a vision for potential future robotics applications for AI technologies. Each chapter includes theory and mathematics to stimulate novel research directions based on the state-of-the-art in AI and smart robotics. Organized by application into ten chapters, this book offers a practical tool for researchers and engineers looking for new avenues and use-cases that combine AI with smart robotics. As we witness exponential growth in automation and the rapid advancement of underpinning technologies, such as ubiquitous computing, sensing, intelligent data processing, mobile computing

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and context aware applications, this book is an ideal resource for future innovation. Brings AI and smart robotics into imaginative, technically-informed dialogue Integrates fundamentals with real-world applications Presents potential applications for AI in smart robotics by use-case Gives detailed theory and mathematical calculations for each application Stimulates new thinking and research in applying AI to robotics

The two-volume set LNCS 6974 and LNCS 6975 constitutes the refereed proceedings of the Fourth International Conference on Affective Computing and Intelligent Interaction, ACII 2011, held in Memphis, TN, USA, in October 2011. The 135 papers in this two volume set presented together with 3 invited talks were carefully reviewed and selected from 196 submissions. The papers are organized in topical sections on recognition and synthesis of human affect, affect-sensitive applications, methodological issues in affective computing, affective and social robotics, affective and behavioral interfaces, relevant insights from psychology, affective databases, Evaluation and annotation tools.

Authoritative texts that include interviews with experts, useful time lines, diagrams, glossaries, and more bring readers up to date on the latest findings of specific scientific issues and discoveries as only the experts at National Geographic can.

Award-winning journalist David Ewing Duncan considers 24 visions of possible human-robot futures--Incredible scenarios from Teddy Bots to Warrior Bots, and Politician Bots to Sex Bots--Grounded in real technologies and possibilities and inspired by our imagination. What robot and AI systems are being built and imagined right now? What do they say about us, their creators? Will they usher in a fantastic new future, or destroy us? What do some of our greatest thinkers, from physicist Brian Greene and futurist Kevin Kelly to inventor Dean Kamen, geneticist George Church, and filmmaker Tiffany Shlain, anticipate about our human-robot future? For even as robots and A.I. intrigue us and make us anxious about the future, our fascination with robots has always been about more than the potential of the technology-it's also about what robots tell us about being human.

A roboticist imagines life with robots that sell us products, drive our cars, even allow us to assume new physical form, and more. With robots, we are inventing a new species that is part material and part digital. The ambition of modern robotics goes beyond copying humans, beyond the effort to make walking, talking androids that are indistinguishable from people. Future robots will have superhuman abilities in both the physical and digital realms. They will be embedded in our physical spaces, with the ability to go where we cannot, and will have minds of their own, thanks to artificial intelligence. In *Robot Futures*, the roboticist Illah Reza Nourbakhsh considers how we will share our world with these creatures, and how our society could change as it incorporates a race of stronger, smarter beings. Nourbakhsh imagines a future that includes adbots offering interactive custom messaging; robotic flying toys that operate by means of "gaze tracking"; robot-enabled multimodal, multicontinental telepresence; and even a way that nanorobots could allow us to assume different physical forms. Nourbakhsh examines the underlying technology and the social consequences of each scenario. He also offers a counter-vision: a robotics designed to create civic and community empowerment. His book helps us understand why that is the robot future we should try to bring about.

A New York Times technology columnist's timely, counterintuitive, and highly practical guide to success in the age of A.I. and automation. The machines are here. After decades of sci-fi doomsaying and marketing hype, advanced A.I. and automation technologies have leapt out of research labs and Silicon Valley engineering departments and into the center of our lives. Robots once primarily threatened blue-collar

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manufacturing jobs, but today's machines are being trained to do the work of lawyers, doctors, investment bankers, and other white-collar jobs previously considered safe from automation's reach. The world's biggest corporations are racing to automate jobs, and some experts predict that A.I could put millions of people out of work. Meanwhile, runaway algorithms have already changed the news we see, the politicians we elect, and the ways we interact with each other. But all is not lost. With a little effort, we can become futureproof. In *Futureproof: 9 Rules for Machine-Age Humans*, New York Times technology columnist Kevin Roose lays out an optimistic vision of how people can thrive in the machine age by rethinking their relationship with technology, and making themselves irreplaceably human. In nine pragmatic, accessible lessons, Roose draws on interviews with leading technologists, trips to the A.I. frontier, and centuries' worth of history to prepare readers to live, work, and thrive in the coming age of intelligent machines. He shares the secrets of people and organizations that have successfully survived technological change, including a nineteenth-century rope-maker and a Japanese auto worker, and explains how people, organizations, and communities can apply their lessons to safeguard their own futures. The lessons include: - Do work that is surprising, social, and scarce (the types of work machines can't do) - Break your phone addiction with the help of a rubber band - Work in an office - Treat A.I. like the office gorilla - Resist "hustle porn" and efficiency culture and do less, slower Roose's examination of the future rejects the conventional wisdom that in order to compete with machines, we have to become more like them--hyper-efficient, data-driven, code-writing workhorses. Instead, he says, we should let machines be machines, and focus on doing the kinds of creative, inspiring, and meaningful work only humans can do.

"I love my robot lawn mowers, my laptop, wifi, Google, Facetime, Whatsapp and the possibility of drone postal deliveries and more.. Yet worries nag about being overwhelmed by an artificial intelligence revolution whose ethical and moral parameters are less clear than its rampant profiteering from and monetising of your lives and mine. This hugely informative book shakes us out of our massage armchairs and demands that we engage immediately with these galloping advances so we can shape them to the benefit of the many and not leave them to the enrichment of the few at the awful cost of the impoverishment of swathes of humanity". Mary McAleese, former President of Ireland. "Robots, Ethics and The Future of Jobs is a wakeup call for political, civic, media and church leaders, urging a response to the deepening and accelerating pace of technological change and its potential consequences. Artificial Intelligence, robotics, drones, the internet of things and 3D printing are the building blocks of the 4th industrial revolution. These technologies offer great potential but also carry real risks and are reaching into every corner of our lives, civilian and military. Who will win and who will lose? Who will set the rules and the ethical boundaries within which they should develop and operate? Will the displaced be included, if so, how; or ignored and, if so, with what political, social and economic consequences? That these questions cannot be avoided and should not be postponed - and that we do not need to wait for change to happen because it is already upon us - are central messages of this thought provoking text." Pat Cox, former President European Parliament.

Social robots are embodied agents that perform knowledge-intensive tasks involving several kinds of information from different heterogeneous sources. This book, *Engineering Background Knowledge for Social Robots*, introduces a component-based architecture for supporting the knowledge-intensive tasks performed by social robots. The design was based on the requirements of a real socially-assistive robotic application, and all the components contribute to and benefit from the knowledge base which is its cornerstone. The knowledge base is structured by a set of interconnected and modularized ontologies which model the information, and is initially populated with linguistic, ontological and factual knowledge retrieved from Linked Open Data. Access to the knowledge base is guaranteed by Lizard, a tool providing

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software components, with an API for accessing facts stored in the knowledge base in a programmatic and object-oriented way. The author introduces two methods for engineering the knowledge needed by robots, a novel method for automatically integrating knowledge from heterogeneous sources with a frame-driven approach, and a novel empirical method for assessing foundational distinctions over Linked Open Data entities from a common-sense perspective. These effectively enable the evolution of the robot's knowledge by automatically integrating information derived from heterogeneous sources and the generation of common-sense knowledge using Linked Open Data as an empirical basis. The feasibility and benefits of the architecture have been assessed through a prototype deployed in a real socially-assistive scenario, and the book presents two applications and the results of a qualitative and quantitative evaluation.

This book presents a comprehensive overview of the human dimension of social robots by discussing both transnational features and national peculiarities. Addressing several issues that explore the human side of social robots, this book investigates what a social robot is and how we might come to think about social robots in the different areas of everyday life. Organized around three sections that deal with Perceptions and Attitudes to Social Robots, Human Interaction with Social Robots, and Social Robots in Everyday Life, it explores the idea that even if the challenges of robot technologies can be overcome from a technological perspective, the question remains as to what kind of machine we want to have and use in our daily lives. Lessons learned from previous widely adopted technologies, such as smartphones, indicate that robot technologies could potentially be absorbed into the everyday lives of humans in such a way that it is the human that determines the human-machine interaction. In a similar way to how today's information and communication technologies were initially designed for professional/industrial use, but were soon commercialized for the mass market and then personalized by humans in the course of daily practice, the use of social robots is now facing the same revolution of 'domestication.' In the context of this transformation, which involves the profound embedding of robots in everyday life, the 'human' aspect of social robots will play a major part. This book sheds new light on this highly topical issue, one of the central subjects that will be taught and studied at universities worldwide and that will be discussed widely, publicly and repeatedly in the near future.

Cynthia Breazeal here presents her vision of the sociable robot of the future, a synthetic creature and not merely a sophisticated tool. A sociable robot will be able to understand us, to communicate and interact with us, to learn from us and grow with us. It will be socially intelligent in a humanlike way. Eventually sociable robots will assist us in our daily lives, as collaborators and companions. Because the most successful sociable robots will share our social characteristics, the effort to make sociable robots is also a means for exploring human social intelligence and even what it means to be human. Breazeal defines the key components of social intelligence for these machines and offers a framework and set of design issues for their realization. Much of the book focuses on a nascent sociable robot she designed named Kismet. Breazeal offers a concrete implementation for Kismet, incorporating insights from the scientific study of animals and people, as well as from artistic disciplines such as classical animation. This blending of science, engineering, and art creates a lifelike quality that encourages people to treat Kismet as a social creature rather than just a machine. The book includes a CD-ROM that shows Kismet in action.

Living with Robots: Emerging Issues on the Psychological and Social Implications of Robotics focuses on the issues that come to bear when humans interact and collaborate with robots. The book dives deeply into critical factors that impact how individuals interact with robots at home, work and play. It includes topics ranging from robot anthropomorphic design, degree of autonomy, trust, individual differences and machine learning. While other books focus on engineering capabilities or the highly conceptual, philosophical issues of human-robot interaction, this resource tackles the human elements at play in these interactions, which are essential if humans and robots are to coexist

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and collaborate effectively. Authored by key psychology robotics researchers, the book limits its focus to specifically those robots who are intended to interact with people, including technology such as drones, self-driving cars, and humanoid robots. Forward-looking, the book examines robots not as the novelty they used to be, but rather the practical idea of robots participating in our everyday lives. Explores how individual differences in cognitive abilities and personality influence human-robot interaction Examines the human response to robot autonomy Includes tools and methods for the measurement of social emotion with robots Delves into a broad range of domains - military, caregiving, toys, surgery, and more Anticipates the issues we will encounter with robots in the next ten years Foreword by Maggie Jackson The next generation of robots will be truly social. How can we make sure that they play well in the sandbox? Most robots are just tools. They do limited sets of tasks subject to constant human control. But a new type of robot is coming. These machines will operate on their own in busy, unpredictable public spaces. They'll ferry deliveries, manage emergency rooms, even grocery shop. Such systems could be truly collaborative, accomplishing tasks we don't do well without our having to stop and direct them. This makes them social entities, so, as robot designers Laura Major and Julie Shah argue, whether they make our lives better or worse is a matter of whether they know how to behave. What to Expect When You're Expecting Robots offers a vision for how robots can survive in the real world and how they will change our relationship to technology. From teaching them manners, to robot-proofing public spaces, to planning for their mistakes, this book answers every question you didn't know you needed to ask about the robots on the way.

The next generation of robots will be truly social, but can we make sure that they play well in the sandbox? Most robots are just tools. They do limited sets of tasks subject to constant human control. But a new type of robot is coming. These machines will operate on their own in busy, unpredictable public spaces. They'll ferry deliveries, manage emergency rooms, even grocery shop. Such systems could be truly collaborative, accomplishing tasks we don't do well without our having to stop and direct them. This makes them social entities, so, as robot designers Laura Major and Julie Shah argue, whether they make our lives better or worse is a matter of whether they know how to behave. What to Expect When You're Expecting Robots offers a vision for how robots can survive in the real world and how they will change our relationship to technology. From teaching them manners, to robot-proofing public spaces, to planning for their mistakes, this book answers every question you didn't know you needed to ask about the robots on the way.

Intelligent algorithms are already well on their way to making white collar jobs obsolete: travel agents, data-analysts, and paralegals are currently in the firing line. In the near future, doctors, taxi-drivers and ironically even computer programmers are poised to be replaced by 'robots'. Without a radical reassessment of our economic and political structures, we risk the very implosion of the capitalist economy itself. In *The Rise of the Robots*, technology expert Martin Ford systematically outlines the achievements of artificial intelligence and uses a wealth of economic data to illustrate the terrifying societal implications. From health and education to finance and technology, his warning is stark – all jobs that are on some level routine are likely to eventually be automated, resulting in the death of traditional careers and a hollowed-out middle class. The robots are coming and we have to decide – now – whether the future will bring prosperity or catastrophe.

This book is for both robot builders and scientists who study human behaviour and human societies. Scientists do not only collect empirical data but they also formulate theories to explain the data. Theories of human behaviour and human societies are traditionally expressed in words but, today, with the advent of the computer they can also be expressed by constructing computer-based artefacts. If the artefacts do what human beings do, the theory/blueprint that has been used to construct the artefacts explains human behaviour and human societies. Since human beings are primarily bodies, the artefacts must be robots, and human robots must progressively reproduce all we know about

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human beings and their societies. And, although they are purely scientific tools, they can have one very important practical application: helping human beings to better understand the many difficult problems they face today and will face in the future - and, perhaps, to find solutions for these problems.

This book constitutes the refereed proceedings of the 7th International Conference on Social Robotics, ICSR 2015, held in Paris, France, in October 2015. The 70 revised full papers presented were carefully reviewed and selected from 126 submissions. The papers focus on the interaction between humans and robots and the integration of robots into our society and present innovative ideas and concepts, new discoveries and improvements, novel applications on the latest fundamental advances in the core technologies that form the backbone of social robotics, distinguished developmental projects, as well as seminal works in aesthetic design, ethics and philosophy, studies on social impact and influence pertaining to social robotics, and its interaction and communication with human beings and its social impact on our society.

Sociable Robots and the Future of Social Relations Proceedings of Robo-Philosophy 2014 IOS Press

Could millions of jobs soon be eliminated by artificial intelligence and robots? From driverless cars to digital assistants, it seems the world of work is on the cusp of a technological revolution that is generating hopes and fears alike. But are the robots really knocking at the door? And what does all this mean for New Zealanders? In this far-sighted and lucid book, Kinley Salmon explores the future of work in New Zealand. He interrogates common predictions about a jobless future and explores what might happen to workers in New Zealand as automation becomes more widespread. This book also asks big questions about the power we have to shape technological progress and to influence how robots and artificial intelligence are adopted. It sketches out two bold alternative futures for New Zealand – and suggests what it might take, and what we might risk, to pursue each of them. It is time, Salmon argues, to start debating and choosing the future we want for New Zealand.

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