

## Autonomous Vehicle Technology A Guide For Policymakers Rand Transportation Space And Technology Program

When will we see autonomous vehicles on our roads? The answer is that to some degree, they are already here. Numerous organisations are testing fully autonomous prototypes on public roads in the UK, and even commercially available vehicles already have several 'quasi-autonomous' features. KPMG has forecasted that the connected and autonomous vehicles market could be worth as much as £51 billion to the British economy by 2030 and could create some 30,000 new jobs over the same period. Accordingly, the UK and a number of other jurisdictions are already implementing legal reforms with a view to smoothing the path for this technology. Notably, Parliament has passed the Automated and Electric Vehicles Act 2018 dealing with the insurance of such vehicles, and changes are currently being made to the Road Vehicle (Construction and Use) Regulations 1986 and to the Highway Code to accommodate highly automated technologies. The government has also issued non-statutory guidance in relation to testing on public roads, and in relation to vehicle cybersecurity. Against this rapidly changing landscape, this book analyses the key legal issues facing autonomous vehicles, including testing on public roads, insurance, product liability, and cyber security and data protection. It also examines the approach being taken in other jurisdictions, including Austria, Germany, Greece, Italy, the USA, and South Africa.

Take a look at the vehicle sitting in your driveway. It may be the last one you ever own. With an estimated 33 million fully autonomous cars and taxis projected to hit the road by 2040, an automotive renaissance is soon to be upon us. Personal car ownership currently costs the average medium-sized sedan owner \$9,282 annually. But personal car ownership may soon be a thing of the past. The A.I.-powered machines of the future will be doing the driving for us. Autonomous vehicles will be the most disruptive technology ever deployed by mankind.

The technology and engineering behind autonomous driving is advancing at pace. This book presents the latest technical advances and the economic, environmental and social impact driverless cars will have on individuals and the automotive industry.

Policy Implications of Autonomous Vehicles, Volume Five in the Advances in Transport Policy and Planning series systematically reviews policy relevant implications of AVs and the associated possible policy responses, and discusses future avenues for policy making and research. It comprises 13 chapters discussing: (a) short-term implications of AVs for traffic flow, human-automated bus systems interaction, cyber-security and safety, cybersecurity certification and auditing, non-commuting journeys; (b) long-term implications of AVs for carbon dioxide (CO2) emissions and energy, health and well-being, data protection, ethics, governance; (c) implications of AVs for the maritime industry and urban deliveries; and (d) overall synthesis and conclusions. Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Advances in Transport Policy and Planning series Updated release includes the latest information on the policy implications of autonomous vehicles

When human drivers let intelligent software take the wheel: the beginning of a new era in personal mobility.

The robot population is rising on Earth and other planets. (Mars is inhabited entirely by robots.) As robots slip into more domains of human life--from the operating room to the bedroom--they take on our morally important tasks and decisions, as well as create new risks from psychological to physical. This makes it all the more urgent to study their ethical, legal, and policy impacts. To help the robotics industry and broader society, we need to not only press ahead on a wide range of issues, but also identify new ones emerging as quickly as the field is evolving. For instance, where military robots had received much attention in the past (and are still controversial today), this volume looks toward autonomous cars here as an important case study that cuts across diverse issues, from liability to psychology to trust and more. And because robotics feeds into and is fed by AI, the Internet of Things, and other cognate fields, robot ethics must also reach into those domains, too. Expanding these discussions also means listening to new voices; robot ethics is no longer the concern of a handful of scholars. Experts from different academic disciplines and geographical areas are now playing vital roles in shaping ethical, legal, and policy discussions worldwide. So, for a more complete study, the editors of this volume look beyond the usual suspects for the latest thinking. Many of the views as represented in this cutting-edge volume are provocative--but also what we need to push forward in unfamiliar territory.

Driving to safety: how many miles of driving would it take to demonstrate autonomous vehicle reliability? Will this hold a new set of business ethics? What are the appropriate crash metrics for evaluating the relative safety performance of an autonomous vehicle? How would the company's stakeholders feel about it? Autonomous cars must comply with cybersecurity practices, and how is self-driving technology related to security? This best-selling Autonomous car self-assessment will make you the established Autonomous car domain leader by revealing just what you need to know to be fluent and ready for any Autonomous car challenge. How do I reduce the effort in the Autonomous car work to be done to get problems solved? How can I ensure that plans of action include every Autonomous car task and that every Autonomous car outcome is in place? How will I save time investigating strategic and tactical options and ensuring Autonomous car costs are low? How can I deliver tailored Autonomous car advice instantly with structured going-forward plans? There's no better guide through these mind-expanding questions than acclaimed best-selling author Gerard Blokdyk. Blokdyk ensures all Autonomous car essentials are covered, from every angle: the Autonomous car self-assessment shows succinctly and clearly that what needs to be clarified to organize the required activities and processes so that Autonomous car outcomes are achieved. Contains extensive criteria grounded in past and current successful projects and activities by experienced Autonomous car practitioners. Their mastery, combined with the easy elegance of the self-assessment, provides its superior value to you in knowing how to ensure the outcome of any efforts in Autonomous car are maximized with professional results. Your purchase includes access details to the Autonomous car

self-assessment dashboard download which gives you your dynamically prioritized projects-ready tool and shows you exactly what to do next. Your exclusive instant access details can be found in your book. You will receive the following contents with New and Updated specific criteria: - The latest quick edition of the book in PDF - The latest complete edition of the book in PDF, which criteria correspond to the criteria in... - The Self-Assessment Excel Dashboard - Example pre-filled Self-Assessment Excel Dashboard to get familiar with results generation - In-depth and specific Autonomous car Checklists - Project management checklists and templates to assist with implementation INCLUDES LIFETIME SELF ASSESSMENT UPDATES Every self assessment comes with Lifetime Updates and Lifetime Free Updated Books. Lifetime Updates is an industry-first feature which allows you to receive verified self assessment updates, ensuring you always have the most accurate information at your fingertips.

This book aims to teach the core concepts that make Self-driving vehicles (SDVs) possible. It is aimed at people who want to get their teeth into self-driving vehicle technology, by providing genuine technical insights where other books just skim the surface. The book tackles everything from sensors and perception to functional safety and cybersecurity. It also passes on some practical know-how and discusses concrete SDV applications, along with a discussion of where this technology is heading. It will serve as a good starting point for software developers or professional engineers who are eager to pursue a career in this exciting field and want to learn more about the basics of SDV algorithms. Likewise, academic researchers, technology enthusiasts, and journalists will also find the book useful. Key Features: Offers a comprehensive technological walk-through of what really matters in SDV development: from hardware, software, to functional safety and cybersecurity Written by an active practitioner with extensive experience in series development and research in the fields of Advanced Driver Assistance Systems (ADAS) and Autonomous Driving Covers theoretical fundamentals of state-of-the-art SLAM, multi-sensor data fusion, and other SDV algorithms. Includes practical information and hands-on material with Robot Operating System (ROS) and Open Source Car Control (OSCC). Provides an overview of the strategies, trends, and applications which companies are pursuing in this field at present as well as other technical insights from the industry.

"A Vision for Safety replaces the Federal Automated Vehicle Policy released in 2016. This updated policy framework offers a path forward for the safe deployment of automated vehicles by: encouraging new entrants and ideas that deliver safer vehicles; making Department regulatory processes more nimble to help match the pace of private sector innovation; and supporting industry innovation and encouraging open communication with the public and with stakeholders."--Introductory message.

The Autonomous Vehicle (AV) has been strongly heralded as the most exciting innovation in automobility for decades. Autonomous Vehicles are no longer an innovation of the future (seen only in science fiction) but are now being road-tested for use. And yet while the technical and economic success and possibilities of the AV have been widely debated, there has been a notable lack of discussion around the social, behavioural, and environmental implications. This book is the first to address these issues and to deeply consider the environmental and social sustainability outlook for the AV and how it will impact on communities. Environmental and social sustainability are goals unlike those of technical development (a new tool) and economic development (a new investment). The goal of sustainability is development of societies that live well and equitably within their ecological limits. Is it reasonable and desirable that only technical and economic success comprise the swelling AV parade, or should we be looking at the wider impacts on personal well-being, wider society, and the environment? The uptake for AVs looks to be lengthy, disjointed, and episodic, in large measure because it faces a range of known unknown risks. This book assesses the environmental and social sustainability potential for AVs based on their prospective energy use and their impacts on climate change, urban landscapes, public health, mobility inequalities, and individual and social well-being. It examines public attitudes about AV use and its risk of fostering a rebound effect that compromises potential sustainability gains. The book concludes with a discussion of critical issues involved in sustainable AV diffusion.

The automotive industry appears close to substantial change engendered by "self-driving" technologies. This technology offers the possibility of significant benefits to social welfare—saving lives; reducing crashes, congestion, fuel consumption, and pollution; increasing mobility for the disabled; and ultimately improving land use. This report is intended as a guide for state and federal policymakers on the many issues that this technology raises.

How to leave behind our unwieldy, gas-guzzling, carbon dioxide-emitting vehicles for cars that are green, smart, connected, and fun. This book provides a long-overdue vision for a new automobile era. The cars we drive today follow the same underlying design principles as the Model Ts of a hundred years ago and the tail-finned sedans of fifty years ago. In the twenty-first century, cars are still made for twentieth-century purposes. They are inefficient for providing personal mobility within cities—where most of the world's people now live. In this pathbreaking book, William Mitchell and two industry experts reimagine the automobile, describing vehicles of the near future that are green, smart, connected, and fun to drive. They roll out four big ideas that will make this both feasible and timely. The fundamental reinvention of the automobile won't be easy, but it is an urgent necessity—to make urban mobility more convenient and sustainable, to make cities more livable, and to help bring the automobile industry out of crisis.

Alex Davies tells the dramatic, colorful story of the quest to develop driverless cars—and the fierce competition between Google, Uber, and other companies in a race to revolutionize our lives. The self-driving car has been one of the most vaunted technological breakthroughs of recent years. But early promises that these autonomous vehicles would soon be on the roads have proven premature. Alex Davies follows the twists and turns of this story from its origins to today. The story starts with the Defense Advanced Research Projects Agency (DARPA), which was charged with developing a land-based equivalent to the drone, a vehicle that could operate in war zones without risking human lives. DARPA issued a series of three "Grand Challenges" that attracted visionaries, many of them students and amateurs, who took the

technology from Jetsons-style fantasy to near-reality. The young stars of the Challenges soon connected with Silicon Valley giants Google and Uber, intent on delivering a new way of driving to the civilian world. Soon the automakers joined the quest, some on their own, others in partnership with the tech titans. But as road testing progressed, it became clear that the challenges of driving a car without human assistance were more formidable than anticipated. Davies profiles the industry's key players from the early enthusiasm of the DARPA days to their growing awareness that while this spin on artificial intelligence isn't yet ready for rush-hour traffic, driverless cars are poised to remake how the world moves.

Driven explores this exciting quest to transform transportation and change our lives.

Offers a step-by-step guide to building autonomous vehicles and robots, with source code and accompanying videos The first book of its kind on the detailed steps for creating an autonomous vehicle or robot, this book provides an overview of the technology and introduction of the key elements involved in developing autonomous vehicles, and offers an excellent introduction to the basics for someone new to the topic of autonomous vehicles and the innovative, modular-based engineering approach called DragonFly. Engineering Autonomous Vehicles and Robots: The DragonFly Modular-based Approach covers everything that technical professionals need to know about: CAN bus, chassis, sonars, radars, GNSS, computer vision, localization, perception, motion planning, and more. Particularly, it covers Computer Vision for active perception and localization, as well as mapping and motion planning. The book offers several case studies on the building of an autonomous passenger pod, bus, and vending robot. It features a large amount of supplementary material, including the standard protocol and sample codes for chassis, sonar, and radar. GPSD protocol/NMEA protocol and GPS deployment methods are also provided. Most importantly, readers will learn the philosophy behind the DragonFly modular-based design approach, which empowers readers to design and build their own autonomous vehicles and robots with flexibility and affordability. Offers progressive guidance on building autonomous vehicles and robots Provides detailed steps and codes to create an autonomous machine, at affordable cost, and with a modular approach Written by one of the pioneers in the field building autonomous vehicles Includes case studies, source code, and state-of-the art research results Accompanied by a website with supplementary material, including sample code for chassis/sonar/radar; GPS deployment methods; Vision Calibration methods Engineering Autonomous Vehicles and Robots is an excellent book for students, researchers, and practitioners in the field of autonomous vehicles and robots.

Autonomous Vehicles and Future Mobility presents novel methods for examining the long term effects on individuals, society, and on the environment on a wide range of forthcoming transport scenarios such self-driving vehicles, workplace mobility plans, demand responsive transport analysis, mobility as a service, multi-source transport data provision, and door-to-door mobility. With the development and realization of new mobility options comes change in long term travel behavior and transport policy. Autonomous Vehicles and Future Mobility addresses these impacts, considering such key areas as attitude of users towards new services, the consequences of introducing of new mobility forms, the impacts of changing work related trips, the access to information about mobility options and the changing strategies of relevant stakeholders in transportation. By examining and contextualizing innovative transport solutions in this rapidly evolving field, Autonomous Vehicles and Future Mobility provides insights into current implementation of these potentially sustainable solutions, serving as general guidelines and best practices for researchers, professionals, and policy makers. Covers hot topics including travel behavior change, autonomous vehicle impacts, intelligent solutions, mobility planning, mobility as a service, sustainable solutions, and more Examines up to date models and applications using novel technologies Contributions from leading scholars around the globe Case studies with latest research results Mobility - flows, movement and migration in social life - has emerged as a central area of sociological debate, yet one of its most dominant forms, automobility, has remained largely ignored. Automobilities presents one of the first examinations of the car and its promise of autonomy and mobility.

This book takes a look at fully automated, autonomous vehicles and discusses many open questions: How can autonomous vehicles be integrated into the current transportation system with diverse users and human drivers? Where do automated vehicles fall under current legal frameworks? What risks are associated with automation and how will society respond to these risks? How will the marketplace react to automated vehicles and what changes may be necessary for companies? Experts from Germany and the United States define key societal, engineering, and mobility issues related to the automation of vehicles. They discuss the decisions programmers of automated vehicles must make to enable vehicles to perceive their environment, interact with other road users, and choose actions that may have ethical consequences. The authors further identify expectations and concerns that will form the basis for individual and societal acceptance of autonomous driving. While the safety benefits of such vehicles are tremendous, the authors demonstrate that these benefits will only be achieved if vehicles have an appropriate safety concept at the heart of their design. Realizing the potential of automated vehicles to reorganize traffic and transform mobility of people and goods requires similar care in the design of vehicles and networks. By covering all of these topics, the book aims to provide a current, comprehensive, and scientifically sound treatment of the emerging field of "autonomous driving".

A Clear Outline of Current Methods for Designing and Implementing Automotive Systems Highlighting requirements, technologies, and business models, the Automotive Embedded Systems Handbook provides a comprehensive overview of existing and future automotive electronic systems. It presents state-of-the-art methodological and technical solutions in the areas of in-vehicle architectures, multipartner development processes, software engineering methods, embedded communications, and safety and dependability assessment. Divided into four parts, the book begins with an introduction to the design constraints of automotive-embedded systems. It also examines AUTOSAR as the emerging de facto standard and looks at how key technologies, such as sensors and wireless networks, will facilitate the conception of partially and fully autonomous vehicles. The next section focuses on networks and protocols, including CAN, LIN, FlexRay, and TTCAN. The third part explores the design processes of electronic embedded systems, along with new design methodologies, such as the virtual platform. The final section presents validation and verification techniques relating to safety issues. Providing domain-specific solutions to various technical challenges, this handbook serves as a reliable, complete, and well-documented source of information on automotive embedded systems.

This book highlights papers presented at the Second International Conference on Smart Vehicular Technology, Transportation, Communication and Applications (VTCA 2018), which was held at Mount Emei, Sichuan Province, China from 25 to 28 October 2018. The

conference was co-sponsored by Springer, Southwest Jiaotong University, Fujian University of Technology, Chang'an University, Shandong University of Science and Technology, Fujian Provincial Key Lab of Big Data Mining and Applications, and the National Demonstration Center for Experimental Electronic Information and Electrical Technology Education (Fujian University of Technology). The conference was intended as an international forum for researchers and professionals engaged in all areas of smart vehicular technology, vehicular transportation, vehicular communication, and applications.

Autonomous vehicles have attracted a great deal of attention in the media, however there are some inconsistencies between the perception of autonomous vehicles' capabilities and their actual functions. This book provides an accessible explanation of how autonomous vehicles function, suggesting appropriate regulatory responses to the existing and emerging technology.

This book teaches you the different techniques and methodologies associated while implementing deep learning solutions in self-driving cars. You will use real-world examples to implement various neural network architectures to develop your own autonomous and automated vehicle using the Python environment.

"This book is framed around five areas of automated vehicle law: (1) background on automated vehicles, (2) the regulation of automated vehicles, (3) civil liability for automated vehicle crashes, (4) data security and privacy, and (5) criminal law"--

The Routledge Handbook of Public Transport is a reference work of chapters providing in-depth examination of the current issues and future developments facing public transport. Chapters in this book are dedicated to specific key topics, identifying the challenges therein and pointing to emerging areas of research and concern. The content is written by an international group of expert contributors and is enhanced through contributions from practitioners to deliver a broader perspective. The Handbook deals with public transport policy context, modal settings, public transport environment, public transport delivery issues, smart card data for planning and the future of public transport. This comprehensive reference work will be a vital source for academics, researchers and transport practitioners in public transport management, transport policy and transport planning.

The automobile industry is one of Germany's strongest and most important industries. But while German carmakers still struggle with the diesel emission scandal, the whole sector is facing a great revolution. Various companies are working intensively on the development of the next major milestone in mobility that incorporates the megatrends of electric, connected, shared and autonomous driving. The combination of these trends can reduce CO2 emissions and eliminate a significant portion of traffic jams while increasing mobility and space utilization in urban areas. The technology of autonomous driving is perceived to be disruptive and thus many challenges and obstacles remain before the new technology becomes superior to human drivers. Jan Kachelmaier explores the status quo of the development of autonomous vehicles at German Manufacturers. The author identifies future impediments until market entrance and recommends managerial actions. Keywords: - Autonomous Vehicles; - Artificial Intelligence; - Germany; - Transportation; - Car Sharing

Throughout human history, technological advancements have been made for the ease of human labor. With our most recent advancements, it has been the work of scholars to discover ways for machines to take over a large part of this labor and reduce human intervention. These advancements may become essential processes to nearly every industry. It is essential to be knowledgeable about automation so that it may be applied. Research Anthology on Cross-Disciplinary Designs and Applications of Automation is a comprehensive resource on the emerging designs and application of automation. This collection features a number of authors spanning multiple disciplines such as home automation, healthcare automation, government automation, and more. Covering topics such as human-machine interaction, trust calibration, and sensors, this research anthology is an excellent resource for technologists, IT specialists, computer engineers, systems and software engineers, manufacturers, engineers, government officials, professors, students, healthcare administration, managers, CEOs, researchers, and academicians.

This report presents a framework for measuring safety in automated vehicles (AVs): how to define safety for AVs, how to measure safety for AVs, and how to communicate what is learned or understood about AVs.

This book will give you insights into the technologies that drive the autonomous car revolution. To get started, all you need is basic knowledge of computer vision and Python.

This comprehensive text/reference presents an in-depth review of the state of the art of automotive connectivity and cybersecurity with regard to trends, technologies, innovations, and applications. The text describes the challenges of the global automotive market, clearly showing where the multitude of innovative activities fit within the overall effort of cutting-edge automotive innovations, and provides an ideal framework for understanding the complexity of automotive connectivity and cybersecurity.

Topics and features: discusses the automotive market, automotive research and development, and automotive electrical/electronic and software technology; examines connected cars and autonomous vehicles, and methodological approaches to cybersecurity to avoid cyber-attacks against vehicles; provides an overview on the automotive industry that introduces the trends driving the automotive industry towards smart mobility and autonomous driving; reviews automotive research and development, offering background on the complexity involved in developing new vehicle models; describes the technologies essential for the evolution of connected cars, such as cyber-physical systems and the Internet of Things; presents case studies on Car2Go and car sharing, car hailing and ridesharing, connected parking, and advanced driver assistance systems; includes review questions and exercises at the end of each chapter. The insights offered by this practical guide will be of great value to graduate students, academic researchers and professionals in industry seeking to learn about the advanced methodologies in automotive connectivity and cybersecurity.

Autonomous vehicle technology is a mounting Research field which has the competence to revolutionize Transportation. This technology which seemed like a futuristic dream is already here to stay. Today we see self - driving cars, autonomous drones and swarms that work collaboratively to complete tasks autonomously. The technology is developed from the fields of Computer Vision and Artificial Intelligence. An Autonomous Vehicle is a system which navigates without any human interaction or intervention. The major aspect of any autonomous system is its ability to sense its environment and interact with it. Autonomous vehicles promise numerous improvements to vehicular traffic: an increase in both highway capacity and traffic flow because of faster response times, less fuel consumption and pollution thanks to more foresighted driving, and hopefully fewer accidents thanks to collision avoidance systems. In addition, drivers can save time for more useful activities. In order for these vehicles to safely operate in everyday traffic or in harsh off-road environments, a multitude of problems in perception, navigation, and control have to be solved. The attention of research in autonomous vehicles has switched its focus from the well-structured environments encountered on highways as studied in the beginning to more unstructured environments, like urban traffic or off-road scenarios. Autonomous Ground Vehicles gives in-depth information of the most current trends in autonomous vehicles, highlighting the Autonomous vehicle technology, Semi-Autonomous vehicle common to most successful systems as well as their differences with an outlook into the promising future of autonomous vehicles. Autonomous technology in ground vehicles will give us capabilities like intersection collision warning, lane change warning, backup parking, parallel parking aids, and bus precision parking. Delivering

with a practical understanding of this technology area, this ground-breaking guide provides in-depth coverage of basic autonomous control and feedback for stopping and steering ground vehicles.

A computer beats the reigning human champion of Go, a game harder than chess. Another is composing classical music. Labs are creating life-forms from synthetic DNA. A doctor designs an artificial trachea, uses a 3D printer to produce it, and implants it and saves a child's life. Astonishing technological advances like these are arriving in increasing numbers. Scholar and entrepreneur Vivek Wadhwa uses this book to alert us to dozens of them and raise important questions about what they may mean for us. Breakthroughs such as personalized genomics, self-driving vehicles, drones, and artificial intelligence could make our lives healthier, safer, and easier. But the same technologies raise the specter of a frightening, alienating future: eugenics, a jobless economy, complete loss of privacy, and ever-worsening economic inequality. As Wadhwa puts it, our choices will determine if our future is Star Trek or Mad Max. Wadhwa offers us three questions to ask about every emerging technology: Does it have the potential to benefit everyone equally? What are its risks and rewards? And does it promote autonomy or dependence? Looking at a broad array of advances in this light, he emphasizes that the future is up to us to create—that even if our hands are not on the wheel, we will decide the driverless car's destination.

Autonomous Vehicle Technology A Guide for Policymakers Rand Corporation

An automotive and tech world insider investigates the quest to develop and perfect the driverless car—an innovation that promises to be the most disruptive change to our way of life since the smartphone. We stand on the brink of a technological revolution. Soon, few of us will own our own automobiles and instead will get around in driverless electric vehicles that we summon with the touch of an app. We will be liberated from driving, prevent over 90% of car crashes, provide freedom of mobility to the elderly and disabled, and decrease our dependence on fossil fuels. Autonomy is the story of the maverick engineers and computer nerds who are creating the revolution. Longtime advisor to the Google Self-Driving Car team and former GM research and development chief Lawrence D. Burns provides the perfectly-timed history of how we arrived at this point, in a character-driven and heavily reported account of the unlikely thinkers who accomplished what billion-dollar automakers never dared. Beginning with the way 9/11 spurred the U.S. government to set a million-dollar prize for a series of off-road robot races in the Mojave Desert up to the early 2016 stampede to develop driverless technology, *Autonomy* is a page-turner that represents a chronicle of the past, diagnosis of the present, and prediction of the future—the ultimate guide to understanding the driverless car and navigating the revolution it sparks.

By the dawn of the new millennium, robotics has undergone a major transformation in scope and dimensions. This expansion has been brought about by the maturity of the field and the advances in its related technologies. From a largely dominant industrial focus, robotics has been rapidly expanding into the challenges of the human world. The new generation of robots is expected to safely and dependably co-habitat with humans in homes, workplaces, and communities, providing support in services, entertainment, education, healthcare, manufacturing, and assistance. Beyond its impact on physical robots, the body of knowledge robotics has produced is revealing a much wider range of applications reaching across diverse research areas and scientific disciplines, such as: biomechanics, haptics, neurosciences, virtual simulation, animation, surgery, and sensor networks among others. In return, the challenges of the new emerging areas are proving an abundant source of stimulation and insights for the field of robotics. It is indeed at the intersection of disciplines that the most striking advances happen. The goal of the series of Springer Tracts in Advanced Robotics (STAR) is to bring, in a timely fashion, the latest advances and developments in robotics on the basis of their significance and quality. It is our hope that the wider dissemination of research developments will stimulate more exchanges and collaborations among the research community and contribute to further advancement of this rapidly growing field.

Autonomous vehicle technology has the potential to significantly improve social welfare. This report addresses the numerous legislative, regulatory, and liability issues this technology will raise.

The largest high-tech companies and leading automobile manufacturers in the world have unleashed torrents of effort and capital to position themselves for the arrival of autonomous vehicles. What is the fuss about? What is at stake? What are the leading sensor technologies? What is meant by "flash lidar" or "time-of-flight" sensors? With no less than 40 - 50 lidar companies vying to create mainstream automotive sensors, the climate is unique for young scientists and engineers to enter the field. What are the alliances forming between the companies, and how are they shifting? Who are current incumbents in the field? This tutorial text aims to introduce a technical but nonspecialist reader to autonomous vehicle lidar, starting from the fundamental physics of lidar and motivation for its application to autonomous vehicle systems. We will then introduce time of flight design concepts, following the light pathway through the source and transmitter optics to the photodetector. Next two distinct timing methods will be introduced, followed up by a brief discussion of beam steering. After finishing this text, the reader should be prepared to enter into laboratory explorations on the topic.

The proven, effective strategy for reinventing your business in the age of ever-present disruption. Disruption by digital technologies? That's not a new story. But what is new is the "wise pivot," a replicable strategy for harnessing disruption to survive, grow, and be relevant to the future. It's a strategy for perpetual reinvention across the old, now, and new elements of any business. Rapid recent advances in technology are forcing leaders in every business to rethink long-held beliefs about how to adapt to emerging technologies and new markets. What has become abundantly clear: in the digital age, conventional wisdom about business transformation no longer works, if it ever did. Based on Accenture's own experience of reinventing itself in the face of disruption, the company's real world client work, and a rigorous two-year study of thousands of businesses across 30 industries, *Pivot to the Future* reveals methodical and bold moves for finding and releasing new sources of trapped value—unlocked by bridging the gap between what is technologically possible and how technologies are being used. The freed value enables companies to simultaneously reinvent their legacy, and current and new businesses. *Pivot to the Future* is for leaders who seek to turn the existential threats of today and tomorrow into sustainable growth, with the courage to understand that a wise pivot strategy is not a one-time event, but a commitment to a future of perpetual reinvention, where one pivot is followed by the next and the next.

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Discover all perspectives surround the phenomenon of the Autonomous Vehicle here. From technology and economics, to legal and ethical. All right here.

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