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This text for a second course in linear algebra, aimed at math majors and graduates, adopts a novel approach by banishing determinants to the end of the book and focusing on understanding the structure of linear operators on vector spaces. The author has taken unusual care to motivate concepts and to simplify proofs. For example, the book presents - without having defined determinants - a clean proof that every linear operator on a finite-dimensional complex vector space has an eigenvalue. The book starts by discussing vector spaces, linear independence, span, basics, and dimension. Students are introduced to inner-product spaces in the first half of the book and shortly thereafter to the finite-dimensional spectral theorem. A variety of interesting exercises in each chapter helps students understand and manipulate the objects of linear algebra. This second edition features new chapters on diagonal matrices, on linear functionals and adjoints, and on the spectral theorem; some sections, such as those on self-adjoint and normal operators, have been entirely rewritten; and hundreds of minor improvements have been made throughout the text. This Open access book offers updated and revised information on vessel health and preservation (VHP), a model concept first published in poster form in 2008 and in JVA in 2012, which has received a great deal of attention, especially in the US, UK and Australia. The book presents a model and a new way of thinking applied to vascular access and administration of intravenous treatment, and shows how establishing and maintaining a route of access to the bloodstream is essential for patients in acute care today. Until now, little thought has been given to an intentional process to guide selection, insertion and management of vascular access devices (VADs) and by default actions are based on crisis management when a quickly selected VAD fails. The book details how VHP establishes a framework or pathway model for each step of the patient experience, intentionally guiding, improving and eliminating risk when possible. The evidence points to the fact that reducing fragmentation, establishing a pathway, and teaching the process to all stakeholders reduces complications with intravenous therapy, improves efficiency and diminishes cost. As such this book appeals to bedside nurses, physicians and other health professionals. This is the first textbook on pattern recognition to present the Bayesian viewpoint. The book presents approximate inference algorithms that permit fast approximate answers in situations where exact answers are not feasible. It uses graphical models to describe probability distributions when no other books apply graphical models to machine learning. No previous knowledge of pattern recognition or machine learning concepts is assumed. Familiarity with multivariate calculus and basic linear algebra is required, and some experience in the use of probabilities would be helpful though not essential as the book includes a self-contained introduction to basic probability theory. Modern information and communication technologies, together with a cultural upheaval within the research community, have profoundly changed research in nearly every aspect. Ranging from sharing and discussing ideas in social networks for scientists to new collaborative environments and novel publication formats, knowledge creation and dissemination as we know it is experiencing a vigorous shift towards increased transparency, collaboration and accessibility. Many assume that research workflows will change more in the next 20 years than they have in the last 200. This book provides researchers, decision makers, and other scientific stakeholders with a snapshot of the basics, the tools, and the underlying visions that drive the current scientific (r)evolution, often called 'Open Science.' This open access book provides a broad context for the understanding of current problems of science and of the different movements aiming to improve the societal impact of science and research. The author offers insights with regard to ideas, old and new, about science,

and their historical origins in philosophy and sociology of science, which is of interest to a broad readership. The book shows that scientifically grounded knowledge is required and helpful in understanding intellectual and political positions in various discussions on the grand challenges of our time and how science makes impact on society. The book reveals why interventions that look good or even obvious, are often met with resistance and are hard to realize in practice. Based on a thorough analysis, as well as personal experiences in aids research, university administration and as a science observer, the author provides - while being totally open regarding science's limitations- a realistic narrative about how research is conducted, and how reliable 'objective' knowledge is produced. His idea of science, which draws heavily on American pragmatism, fits in with the global Open Science movement. It is argued that Open Science is a truly and historically unique movement in that it translates the analysis of the problems of science into major institutional actions of system change in order to improve academic culture and the impact of science, engaging all actors in the field of science and academia. Many texts are excellent sources of knowledge about individual statistical tools, but the art of data analysis is about choosing and using multiple tools. Instead of presenting isolated techniques, this text emphasizes problem solving strategies that address the many issues arising when developing multivariable models using real data and not standard textbook examples. It includes imputation methods for dealing with missing data effectively, methods for dealing with nonlinear relationships and for making the estimation of transformations a formal part of the modeling process, methods for dealing with "too many variables to analyze and not enough observations," and powerful model validation techniques based on the bootstrap. This text realistically deals with model uncertainty and its effects on inference to achieve "safe data mining". Optimization is an important tool used in decision science and for the analysis of physical systems used in engineering. One can trace its roots to the Calculus of Variations and the work of Euler and Lagrange. This natural and reasonable approach to mathematical programming covers numerical methods for finite-dimensional optimization problems. It begins with very simple ideas progressing through more complicated concepts, concentrating on methods for both unconstrained and constrained optimization. While modern science has always recognized the central role that biodiversity plays in the ecological processes that maintain the Earth's equilibrium, our increasing knowledge of nature has deepened our appreciation of this principle. Consequently, those involved with implementing and maintaining sustainable agriculture systems have begun to take a far more sophisticated approach to understanding and making use of the components and mechanics of biodiversity. Providing a comprehensive and highly practical exploration of the subject, Biodiversity in Agricultural Production Systems examines abiotic ecosystem diversity and biological complexity at every relevant level. Leading researchers detail subspecies diversity, covering ecotypes, lifecycles, genes, physiology, and behavior. They also discuss species richness and supraspecies diversity, which includes foodweb interactions and non-trophic relationships, as well as above- and belowground relationships. Exploring various facets of agricultural crops and cultivation practices, this inter-disciplinary volume- Gives an overview of the pore space dynamic in agroecosystems where most soil microorganisms reside, including bacteria, fungi, protozoa, nematodes, and Tardigrada Examines the highly diverse and prominent role played by earthworms Looks at the metabolic processes occurring in soils that result in the release of greenhouse gases Outlines principles and strategies of order between interacting molecules, cells, species and communities Looks at mechanisms of competition, exploring growth regulation, transformation, and feeding strategies, as well as toxin production, mutation, and biofilm formation Discusses matter recycling and the diversity of microbial metabolism in soils Shows how long-term observation plots are used to assess soil quality Biodiversity in Agricultural Production Systems provides important information for those involved with researching and implementing sustainable agricultural systems, as well as those addressing specific challenges related to soil degradation, water management, and climatic impacts. It also provides recent research and fresh perspectives to enhance the approaches of those working in horticulture, biology, and the environmental sciences. R, linear models, random, fixed, data, analysis, fit. This open access book offers a summary of the development of Digital Earth over the past twenty years. By reviewing the initial vision of Digital Earth, the evolution of that vision, the relevant key technologies, and the role of Digital Earth in helping people respond to global challenges, this publication reveals how and why Digital Earth is becoming vital for acquiring, processing, analysing and mining the rapidly growing volume of global data sets about the Earth. The main aspects of Digital Earth covered here include: Digital Earth platforms, remote sensing and navigation satellites, processing and visualizing geospatial information, geospatial information infrastructures, big data and cloud computing, transformation and zooming, artificial intelligence, Internet of Things, and social media. Moreover, the book covers in detail the multi-layered/multi-faceted roles of Digital Earth in response to sustainable development goals, climate changes, and mitigating disasters, the applications of Digital Earth (such as digital city and digital heritage), the citizen science in support of Digital Earth, the economic value of Digital Earth, and so on. This book also reviews the regional and national development of Digital Earth around the world, and discusses the role and effect of education and ethics. Lastly, it concludes with a summary of the challenges and forecasts the future trends of Digital Earth. By sharing case studies and a broad range of general and scientific insights into the science and technology of Digital Earth, this book offers an essential introduction for an ever-growing international audience. This open access book focuses on both the theory and practice associated with the tools and approaches for decisionmaking in the face of deep uncertainty. It explores approaches and tools supporting the design of strategic plans under deep uncertainty, and their testing in the real world, including barriers and enablers for their use in practice. The book broadens traditional approaches and tools to include the analysis of actors and networks related to the problem at hand. It also shows how lessons learned in the application process can be used to improve the approaches and tools used in the design process. The book offers guidance in identifying and applying appropriate approaches and tools to design plans, as well as advice on implementing these plans in the real world. For decisionmakers and practitioners, the book includes realistic examples and practical guidelines that should help them understand what decisionmaking under deep uncertainty is and how it may be of assistance to them. Decision Making under Deep Uncertainty: From Theory to Practice is divided into four parts. Part I presents five approaches for designing strategic plans under deep uncertainty: Robust Decision Making, Dynamic Adaptive Planning, Dynamic Adaptive Policy Pathways, Info-Gap Decision Theory, and Engineering Options Analysis. Each approach is worked out in terms of its theoretical foundations, methodological steps to follow when using the approach, latest methodological insights, and challenges for improvement. In Part II, applications of each of these approaches are presented. Based on recent case studies, the practical implications of applying each approach are discussed in depth. Part III focuses on using the approaches and tools in real-world contexts, based on insights from real-world cases. Part IV contains conclusions and a synthesis of the lessons that can be drawn for designing, applying, and implementing strategic plans under deep uncertainty, as well as recommendations for future work. The publication of this book has been funded by the Radboud University, the RAND Corporation, Delft University of Technology, and Deltares. This book is published open access under a CC BY 4.0 licence. The book offers a concise guide for librarians, helping them understand the challenges, processes and technologies involved in managing access to online resources. After an introduction the book presents cases of general authentication and authorisation. It helps readers understand web based authentication and provides the fundamentals of IP address recognition in an easy to understand manner. A special chapter is dedicated to Security Assertion Markup Language (SAML), followed by an overview of the key concepts of OpenID Connect. The book concludes with basic troubleshooting guidelines and recommendations for further assistance. Librarians will benefit from this quick and easy read, which demystifies the technologies used, features real-life scenarios, and explains how to competently employ authentication and access management. The book outlines a pathway to the development of fusion of electromagnetic resonance and artificial intelligence which will dominate the world of communication engineering. Electromagnetic resonance is fundamental to all biomaterials. The authors explore the peculiarities of this typical resonance behaviour in the literatures and provide the key points where the research should direct. Biological antennas are inspiring designing of several electromagnetic devices. From biomimetic engineering to humanoid bots a revolution is undergoing. Authors include entire development in the form of a book along with their contribution to this field. A Practical Guide to TPM 2.0: Using the Trusted Platform Module in the New Age of Security is a straight-forward primer for developers. It shows security and TPM concepts, demonstrating their use in real applications that the reader can try out. Simply put, this book is designed to empower and excite the programming community to go out and do cool things with the TPM. The approach is to ramp the reader up quickly and keep their interest. A Practical Guide to TPM 2.0: Using the Trusted Platform Module in the New Age of

Security explains security concepts, describes the TPM 2.0 architecture, and provides code and pseudo-code examples in parallel, from very simple concepts and code to highly complex concepts and pseudo-code. The book includes instructions for the available execution environments and real code examples to get readers up and talking to the TPM quickly. The authors then help the users expand on that with pseudo-code descriptions of useful applications using the TPM. This book describes the path ahead. It combines system transformation research with political economy and change leadership insights when discussing the need for a great mindshift in how human wellbeing, economic prosperity and healthy ecosystems are understood if the Great Transformations ahead are to lead to more sustainability. It shows that history is made by purposefully acting humans and introduces transformative literacy as a key skill in leading the radical incremental change. This book covers both classical and modern models in deep learning. The primary focus is on the theory and algorithms of deep learning. The theory and algorithms of neural networks are particularly important for understanding important concepts, so that one can understand the important design concepts of neural architectures in different applications. Why do neural networks work? When do they work better than off-the-shelf machine-learning models? When is depth useful? Why is training neural networks so hard? What are the pitfalls? The book is also rich in discussing different applications in order to give the practitioner a flavor of how neural architectures are designed for different types of problems. Applications associated with many different areas like recommender systems, machine translation, image captioning, image classification, reinforcement-learning based gaming, and text analytics are covered. The chapters of this book span three categories: The basics of neural networks: Many traditional machine learning models can be understood as special cases of neural networks. An emphasis is placed in the first two chapters on understanding the relationship between traditional machine learning and neural networks. Support vector machines, linear/logistic regression, singular value decomposition, matrix factorization, and recommender systems are shown to be special cases of neural networks. These methods are studied together with recent feature engineering methods like word2vec. Fundamentals of neural networks: A detailed discussion of training and regularization is provided in Chapters 3 and 4. Chapters 5 and 6 present radial-basis function (RBF) networks and restricted Boltzmann machines. Advanced topics in neural networks: Chapters 7 and 8 discuss recurrent neural networks and convolutional neural networks. Several advanced topics like deep reinforcement learning, neural Turing machines, Kohonen self-organizing maps, and generative adversarial networks are introduced in Chapters 9 and 10. The book is written for graduate students, researchers, and practitioners. Numerous exercises are available along with a solution manual to aid in classroom teaching. Where possible, an application-centric view is highlighted in order to provide an understanding of the practical uses of each class of techniques. The authors of this book set out a system of safety strategies and interventions for managing patient safety on a day-to-day basis and improving safety over the long term. These strategies are applicable at all levels of the healthcare system from the frontline to the regulation and governance of the system. There have been many advances in patient safety, but we now need a new and broader vision that encompasses care throughout the patient's journey. The authors argue that we need to see safety through the patient's eyes, to consider how safety is managed in different contexts and to develop a wider strategic and practical vision in which patient safety is recast as the management of risk over time. Most safety improvement strategies aim to improve reliability and move closer toward optimal care. However, healthcare will always be under pressure and we also require ways of managing safety when conditions are difficult. We need to make more use of strategies concerned with detecting, controlling, managing and responding to risk. Strategies for managing safety in highly standardised and controlled environments are necessarily different from those in which clinicians constantly have to adapt and respond to changing circumstances. This work is supported by the Health Foundation. The Health Foundation is an independent charity committed to bringing about better health and health care for people in the UK. The charity's aim is a healthier population in the UK, supported by high quality health care that can be equitably accessed. The Foundation carries out policy analysis and makes grants to front-line teams to try ideas in practice and supports research into what works to make people's lives healthier and improve the health care system, with a particular emphasis on how to make successful change happen. A key part of the work is to make links between the knowledge of those working to deliver health and health care with research evidence and analysis. The aspiration is to create a virtuous circle, using what works on the ground to inform effective policymaking and vice versa. Good health and health care are vital for a flourishing society. Through sharing what is known, collaboration and building people's skills and knowledge, the Foundation aims to make a difference and contribute to a healthier population. Note to Readers: Publisher does not guarantee quality or access to any included digital components if book is purchased through a third-party seller. Includes 6 months' free ExamPrepConnect Digital Access with print purchase! If you are studying for the adult-gerontology primary care nurse practitioner certification exam, the highly acclaimed Adult-Gerontology Nurse Practitioner Certification Intensive Review is a must-have resource, and with interactive digital prep included with purchase, it is easier than ever to study for the AGNP exam. Lauded for its concise, well-organized format, this fourth edition has been significantly revised and updated to feature key information about the new AANPCB and ANCC certification exams, all new end-of-chapter review questions, and new full-color images. The fourth edition also features four practice tests with hundreds of new questions and rationales--800 questions in total. Extensive test-taking techniques and question dissection and analysis chapters help you identify the best clues during the problem-solving process so that you can strategically master the certification exam. Designed to help AGNP candidates boost their confidence through intensive review and high-quality questions, the fourth edition continues to provide succinct, precisely targeted "need-to-know" details of diseases and classic presentations you can expect to see in practice in patients across the life span. Organized by body system, chapters are consistently formatted to include Danger Signals, Normal Findings, Lab Findings, Benign Variants, and Disease Review topics. Each chapter features valuable Exam Tips and Clinical Pearls that highlight key considerations and information likely to be encountered on the exam, ideal for a last-minute refresher before test day. Ensure success by making this essential resource--praised by thousands for helping them pass their certification--a key part of your exam prep study regimen. Key Features: Includes updated information reflecting the new AANPCB and ANCC certification exams Introduces new end-of-chapter review questions to help you assess knowledge application and retention Features four practice tests with hundreds of new questions and rationales Provides a succinct and highly targeted review of diseases commonly seen in primary care, updated clinical information, all new color photos, and Exam Tips and Clinical Pearls to highlight key exam content Outlines Danger Signals, Normal Findings, Lab Findings, and Benign Variants in physical assessment of each body system Delineates strategic question-dissection techniques to simplify the problem-solving process Offers an intensive pharmacology review and review of professional issues--ethical guidelines, professional roles, reimbursement, research, evidence-based medicine and epidemiology, and cultural considerations ExamPrepConnect Features: All the high-quality content from the book Personalized study plan based on exam date 800 questions and answers with rationales--study by topic to identify your strengths and weaknesses Lessons and flashcards on key information and abbreviations Discussion board to connect with nursing exam-prep community Games to make studying fun This open access book discusses how the involvement of citizens into scientific endeavors is expected to contribute to solve the big challenges of our time, such as climate change and the loss of biodiversity, growing inequalities within and between societies, and the sustainability turn. The field of citizen science has been growing in recent decades. Many different stakeholders from scientists to citizens and from policy makers to environmental organisations have been involved in its practice. In addition, many scientists also study citizen science as a research approach and as a way for science and society to interact and collaborate. This book provides a representation of the practices as well as scientific and societal outcomes in different disciplines. It reflects the contribution of citizen science to societal development, education, or innovation and provides an overview of the field of actors as well as on tools and guidelines. It serves as an introduction for anyone who wants to get involved in and learn more about the science of citizen science. This book is open access under a CC-BY licence. Part of the AHRC/British Library Academic Book of the Future Project, this book interrogates current and emerging contexts of academic books from the perspectives of thirteen expert voices from the connected communities of publishing, academia, libraries, and bookselling. This book explores – at the macro, meso and micro levels and in terms of qualitative as well as quantitative studies – theories, policies and practices about the contributions of artistic research and innovations towards defining new forms of knowledge, knowledge production, as well as knowledge diffusion, absorption and use. Artistic research, artistic innovations and arts-based innovations have been major transformers, as well as disruptors, of the ways in which societies, economies, and political

systems perform. Ramifications here refer to the epistemic socio-economic, socio-political and socio-technical base and aesthetic considerations on the one hand, as well as to strategies, policies, and practices on the other, including sustainable enterprise excellence, considerations in the context of knowledge economies, societies and democracies. Creativity in general, and the arts in particular, are increasingly recognized as drivers of cultural, economic, political, social, and scientific innovation and development. This book examines how one could derive and develop insights in these areas from the four vantage points of Arts, Research, Innovation and Society. Among the principal questions that are examined include: - Could and should artists be researchers? - How are the systems of the Arts and Sciences connected and/or disconnected? - What is the impact of the arts in societal development? - How are the Arts interrelated with the mechanisms of generating social, scientific and economic innovation? As the inaugural book in the Arts, Research, Innovation and Society series, this book uses a thematically wide spectrum that serves as a general frame of reference for the entire series of books to come. During the past decade there has been an explosion in computation and information technology. With it have come vast amounts of data in a variety of fields such as medicine, biology, finance, and marketing. The challenge of understanding these data has led to the development of new tools in the field of statistics, and spawned new areas such as data mining, machine learning, and bioinformatics. Many of these tools have common underpinnings but are often expressed with different terminology. This book describes the important ideas in these areas in a common conceptual framework. While the approach is statistical, the emphasis is on concepts rather than mathematics. Many examples are given, with a liberal use of color graphics. It should be a valuable resource for statisticians and anyone interested in data mining in science or industry. The book's coverage is broad, from supervised learning (prediction) to unsupervised learning. The many topics include neural networks, support vector machines, classification trees and boosting---the first comprehensive treatment of this topic in any book. This major new edition features many topics not covered in the original, including graphical models, random forests, ensemble methods, least angle regression & path algorithms for the lasso, non-negative matrix factorization, and spectral clustering. There is also a chapter on methods for "wide" data (p bigger than n), including multiple testing and false discovery rates. Trevor Hastie, Robert Tibshirani, and Jerome Friedman are professors of statistics at Stanford University. They are prominent researchers in this area: Hastie and Tibshirani developed generalized additive models and wrote a popular book of that title. Hastie co-developed much of the statistical modeling software and environment in R/S-PLUS and invented principal curves and surfaces. Tibshirani proposed the lasso and is co-author of the very successful *An Introduction to the Bootstrap*. Friedman is the co-inventor of many data-mining tools including CART, MARS, projection pursuit and gradient boosting. This book provides an authoritative insight on the Loss and Damage discourse by highlighting state-of-the-art research and policy linked to this discourse and articulating its multiple concepts, principles and methods. Written by leading researchers and practitioners, it identifies practical and evidence-based policy options to inform the discourse and climate negotiations. With climate-related risks on the rise and impacts being felt around the globe has come the recognition that climate mitigation and adaptation may not be enough to manage the effects from anthropogenic climate change. This recognition led to the creation of the Warsaw International Mechanism on Loss and Damage in 2013, a climate policy mechanism dedicated to dealing with climate-related effects in highly vulnerable countries that face severe constraints and limits to adaptation. Endorsed in 2015 by the Paris Agreement and effectively considered a third pillar of international climate policy, debate and research on Loss and Damage continues to gain enormous traction. Yet, concepts, methods and tools as well as directions for policy and implementation have remained contested and vague. Suitable for researchers, policy-advisors, practitioners and the interested public, the book furthermore:

- discusses the political, legal, economic and institutional dimensions of the issue
- highlights normative questions central to the discourse
- provides a focus on climate risks and climate risk management.
- presents salient case studies from around the world.

This open access book not only describes the challenges of climate disruption, but also presents solutions. The challenges described include air pollution, climate change, extreme weather, and related health impacts that range from heat stress, vector-borne diseases, food and water insecurity and chronic diseases to malnutrition and mental well-being. The influence of humans on climate change has been established through extensive published evidence and reports. However, the connections between climate change, the health of the planet and the impact on human health have not received the same level of attention. Therefore, the global focus on the public health impacts of climate change is a relatively recent area of interest. This focus is timely since scientists have concluded that changes in climate have led to new weather extremes such as floods, storms, heat waves, droughts and fires, in turn leading to more than 600,000 deaths and the displacement of nearly 4 billion people in the last 20 years. Previous work on the health impacts of climate change was limited mostly to epidemiologic approaches and outcomes and focused less on multidisciplinary, multi-faceted collaborations between physical scientists, public health researchers and policy makers. Further, there was little attention paid to faith-based and ethical approaches to the problem. The solutions and actions we explore in this book engage diverse sectors of civil society, faith leadership, and political leadership, all oriented by ethics, advocacy, and policy with a special focus on poor and vulnerable populations. The book highlights areas we think will resonate broadly with the public, faith leaders, researchers and students across disciplines including the humanities, and policy makers. This open access book marks the first historical overview of the autism rights branch of the neurodiversity movement, describing the activities and rationales of key leaders in their own words since it organized into a unique community in 1992. Sandwiched by editorial chapters that include critical analysis, the book contains 19 chapters by 21 authors about the forming of the autistic community and neurodiversity movement, progress in their influence on the broader autism community and field, and their possible threshold of the advocacy establishment. The actions covered are legendary in the autistic community, including manifestos such as "Don't Mourn for Us", mailing lists, websites or webpages, conferences, issue campaigns, academic project and journal, a book, and advisory roles. These actions have shifted the landscape toward viewing autism in social terms of human rights and identity to accept, rather than as a medical collection of deficits and symptoms to cure. *An Introduction to Statistical Learning* provides an accessible overview of the field of statistical learning, an essential toolset for making sense of the vast and complex data sets that have emerged in fields ranging from biology to finance to marketing to astrophysics in the past twenty years. This book presents some of the most important modeling and prediction techniques, along with relevant applications. Topics include linear regression, classification, resampling methods, shrinkage approaches, tree-based methods, support vector machines, clustering, and more. Color graphics and real-world examples are used to illustrate the methods presented. Since the goal of this textbook is to facilitate the use of these statistical learning techniques by practitioners in science, industry, and other fields, each chapter contains a tutorial on implementing the analyses and methods presented in R, an extremely popular open source statistical software platform. Two of the authors co-wrote *The Elements of Statistical Learning* (Hastie, Tibshirani and Friedman, 2nd edition 2009), a popular reference book for statistics and machine learning researchers. *An Introduction to Statistical Learning* covers many of the same topics, but at a level accessible to a much broader audience. This book is targeted at statisticians and non-statisticians alike who wish to use cutting-edge statistical learning techniques to analyze their data. The text assumes only a previous course in linear regression and no knowledge of matrix algebra. This Open Access book is about the development of a common understanding of environmental citizenship. It conceptualizes and frames environmental citizenship taking an educational perspective. Organized in four complementary parts, the book first explains the political, economic and societal dimensions of the concept. Next, it examines environmental citizenship as a psychological concept with a specific focus on knowledge, values, beliefs and attitudes. It then explores environmental citizenship within the context of environmental education and education for sustainability. It elaborates responsible environmental behaviour, youth activism and education for sustainability through the lens of environmental citizenship. Finally, it discusses the concept within the context of different educational levels, such as primary and secondary education in formal and non-formal settings. Environmental citizenship is a key factor in sustainability, green and cycle economy, and low-carbon society, and an important aspect in addressing global environmental problems. It has been an influential concept in many different arenas such as economy, policy, philosophy, and organizational marketing. In the field of education, the concept could be better exploited and established, however. Education and, especially, environmental discourses in science education have a great deal to contribute to the adoption and promotion of environmental citizenship. This book describes how man-made litter, primarily plastic, has spread into the remotest parts of the oceans and covers all aspects of this pollution problem from the impacts on wildlife and human health to socio-economic and

political issues. Marine litter is a prime threat to marine wildlife, habitats and food webs worldwide. The book illustrates how advanced technologies from deep-sea research, microbiology and mathematic modelling as well as classic beach litter counts by volunteers contributed to the broad awareness of marine litter as a problem of global significance. The authors summarise more than five decades of marine litter research, which receives growing attention after the recent discovery of great oceanic garbage patches and the ubiquity of microscopic plastic particles in marine organisms and habitats. In 16 chapters, authors from all over the world have created a universal view on the diverse field of marine litter pollution, the biological impacts, dedicated research activities, and the various national and international legislative efforts to combat this environmental problem. They recommend future research directions necessary for a comprehensive understanding of this environmental issue and the development of efficient management strategies. This book addresses scientists, and it provides a solid knowledge base for policy makers, NGOs, and the broader public. What is the impact of information and communication technologies (ICTs) on the human condition? In order to address this question, in 2012 the European Commission organized a research project entitled The Onlife Initiative: concept reengineering for rethinking societal concerns in the digital transition. This volume collects the work of the Onlife Initiative. It explores how the development and widespread use of ICTs have a radical impact on the human condition. ICTs are not mere tools but rather social forces that are increasingly affecting our self-conception (who we are), our mutual interactions (how we socialise); our conception of reality (our metaphysics); and our interactions with reality (our agency). In each case, ICTs have a huge ethical, legal, and political significance, yet one with which we have begun to come to terms only recently. The impact exercised by ICTs is due to at least four major transformations: the blurring of the distinction between reality and virtuality; the blurring of the distinction between human, machine and nature; the reversal from information scarcity to information abundance; and the shift from the primacy of stand-alone things, properties, and binary relations, to the primacy of interactions, processes and networks. Such transformations are testing the foundations of our conceptual frameworks. Our current conceptual toolbox is no longer fitted to address new ICT-related challenges. This is not only a problem in itself. It is also a risk, because the lack of a clear understanding of our present time may easily lead to negative projections about the future. The goal of The Manifesto, and of the whole book that contextualises, is therefore that of contributing to the update of our philosophy. It is a constructive goal. The book is meant to be a positive contribution to rethinking the philosophy on which policies are built in a hyperconnected world, so that we may have a better chance of understanding our ICT-related problems and solving them satisfactorily. The Manifesto launches an open debate on the impacts of ICTs on public spaces, politics and societal expectations toward policymaking in the Digital Agenda for Europe's remit. More broadly, it helps start a reflection on the way in which a hyperconnected world calls for rethinking the referential frameworks on which policies are built. This open access book presents the first comprehensive overview of general methods in Automated Machine Learning (AutoML), collects descriptions of existing systems based on these methods, and discusses the first series of international challenges of AutoML systems. The recent success of commercial ML applications and the rapid growth of the field has created a high demand for off-the-shelf ML methods that can be used easily and without expert knowledge. However, many of the recent machine learning successes crucially rely on human experts, who manually select appropriate ML architectures (deep learning architectures or more traditional ML workflows) and their hyperparameters. To overcome this problem, the field of AutoML targets a progressive automation of machine learning, based on principles from optimization and machine learning itself. This book serves as a point of entry into this quickly-developing field for researchers and advanced students alike, as well as providing a reference for practitioners aiming to use AutoML in their work. This open access book consists of essays written by Kishore Mahbubani to explore the challenges and dilemmas faced by the West and Asia in an increasingly interdependent world village and intensifying geopolitical competition. The contents cover four parts: Part One The End of the Era of Western Domination. The major strategic error that the West is now making is to refuse to accept this reality. The West needs to learn how to act strategically in a world where they are no longer the number 1. Part Two The Return of Asia. From the years 1 to 1820, the largest economies in the world were Asian. After 1820 and the rise of the West, however, great Asian civilizations like China and India were dominated and humiliated. The twenty-first century will see the return of Asia to the center of the world stage. Part Three The Peaceful Rise of China. The shift in the balance of power to the East has been most pronounced in the rise of China. While this rise has been peaceful, many in the West have responded with considerable concern over the influence China will have on the world order. Part Four Globalization, Multilateralism and Cooperation. Many of the world's pressing issues, such as COVID-19 and climate change, are global issues and will require global cooperation to deal with. In short, human beings now live in a global village. States must work with each other, and we need a world order that enables and facilitates cooperation in our global village. This Open Access book highlights the ethical issues and dilemmas that arise in the practice of public health. It is also a tool to support instruction, debate, and dialogue regarding public health ethics. Although the practice of public health has always included consideration of ethical issues, the field of public health ethics as a discipline is a relatively new and emerging area. There are few practical training resources for public health practitioners, especially resources which include discussion of realistic cases which are likely to arise in the practice of public health. This work discusses these issues on a case to case basis and helps create awareness and understanding of the ethics of public health care. The main audience for the casebook is public health practitioners, including front-line workers, field epidemiology trainers and trainees, managers, planners, and decision makers who have an interest in learning about how to integrate ethical analysis into their day to day public health practice. The casebook is also useful to schools of public health and public health students as well as to academic ethicists who can use the book to teach public health ethics and distinguish it from clinical and research ethics. This open access book looks at how a democracy can devolve into a post-factual state. The media is being flooded by populist narratives, fake news, conspiracy theories and make-believe. Misinformation is turning into a challenge for all of us, whether politicians, journalists, or citizens. In the age of information, attention is a prime asset and may be converted into money, power, and influence – sometimes at the cost of facts. The point is to obtain exposure on the air and in print media, and to generate traffic on social media platforms. With information in abundance and attention scarce, the competition is ever fiercer with truth all too often becoming the first victim. Reality Lost: Markets of Attention, Misinformation and Manipulation is an analysis by philosophers Vincent F. Hendricks and Mads Vestergaard of the nuts and bolts of the information market, the attention economy and media eco-system which may pave way to postfactual democracy. Here misleading narratives become the basis for political opinion formation, debate, and legislation. To curb this development and the threat it poses to democratic deliberation, political self-determination and freedom, it is necessary that we first grasp the mechanisms and structural conditions that cause it. Learn how to accelerate C++ programs using data parallelism. This open access book enables C++ programmers to be at the forefront of this exciting and important new development that is helping to push computing to new levels. It is full of practical advice, detailed explanations, and code examples to illustrate key topics. Data parallelism in C++ enables access to parallel resources in a modern heterogeneous system, freeing you from being locked into any particular computing device. Now a single C++ application can use any combination of devices—including GPUs, CPUs, FPGAs and AI ASICs—that are suitable to the problems at hand. This book begins by introducing data parallelism and foundational topics for effective use of the SYCL standard from the Khronos Group and Data Parallel C++ (DPC++), the open source compiler used in this book. Later chapters cover advanced topics including error handling, hardware-specific programming, communication and synchronization, and memory model considerations. Data Parallel C++ provides you with everything needed to use SYCL for programming heterogeneous systems. What You'll Learn Accelerate C++ programs using data-parallel programming Target multiple device types (e.g. CPU, GPU, FPGA) Use SYCL and SYCL compilers Connect with computing's heterogeneous future via Intel's oneAPI initiative Who This Book Is For Those new data-parallel programming and computer programmers interested in data-parallel programming using C++. This open access book offers an initial introduction to programming for scientific and computational applications using the Python programming language. The presentation style is compact and example-based, making it suitable for students and researchers with little or no prior experience in programming. The book uses relevant examples from mathematics and the natural sciences to present programming as a practical toolbox that can quickly enable readers to write their own programs for data processing and mathematical modeling. These tools include file reading, plotting, simple text analysis, and using NumPy for numerical computations, which are fundamental building blocks of all programs in data science and computational science. At the same time,

readers are introduced to the fundamental concepts of programming, including variables, functions, loops, classes, and object-oriented programming. Accordingly, the book provides a sound basis for further computer science and programming studies. This book is open access under a CC BY 4.0 license. This volume focuses on microscopic plastic debris, also referred to as microplastics, which have been detected in aquatic environments around the globe and have accordingly raised serious concerns. The book explores whether microplastics represent emerging contaminants in freshwater systems, an area that remains underrepresented to date. Given the complexity of the issue, the book covers the current state-of-research on microplastics in rivers and lakes, including analytical aspects, environmental concentrations and sources, modelling approaches, interactions with biota, and ecological implications. To provide a broader perspective, the book also discusses lessons learned from nanomaterials and the implications of plastic debris for regulation, politics, economy, and society. In a research field that is rapidly evolving, it offers a solid overview for environmental chemists, engineers, and toxicologists, as well as water managers and policy-makers. Applied Predictive Modeling covers the overall predictive modeling process, beginning with the crucial steps of data preprocessing, data splitting and foundations of model tuning. The text then provides intuitive explanations of numerous common and modern regression and classification techniques, always with an emphasis on illustrating and solving real data problems. The text illustrates all parts of the modeling process through many hands-on, real-life examples, and every chapter contains extensive R code for each step of the process. This multi-purpose text can be used as an introduction to predictive models and the overall modeling process, a practitioner's reference handbook, or as a text for advanced undergraduate or graduate level predictive modeling courses. To that end, each chapter contains problem sets to help solidify the covered concepts and uses data available in the book's R package. This text is intended for a broad audience as both an introduction to predictive models as well as a guide to applying them. Non-mathematical readers will appreciate the intuitive explanations of the techniques while an emphasis on problem-solving with real data across a wide variety of applications will aid practitioners who wish to extend their expertise. Readers should have knowledge of basic statistical ideas, such as correlation and linear regression analysis. While the text is biased against complex equations, a mathematical background is needed for advanced topics. As explored in this open access book, higher education in STEM fields is influenced by many factors, including education research, government and school policies, financial considerations, technology limitations, and acceptance of innovations by faculty and students. In 2018, Drs. Ryoo and Winkelmann explored the opportunities, challenges, and future research initiatives of innovative learning environments (ILEs) in higher education STEM disciplines in their pioneering project: eXploring the Future of Innovative Learning Environments (X-FILES). Workshop participants evaluated four main ILE categories: personalized and adaptive learning, multimodal learning formats, cross/extended reality (XR), and artificial intelligence (AI) and machine learning (ML). This open access book gathers the perspectives expressed during the X-FILES workshop and its follow-up activities. It is designed to help inform education policy makers, researchers, developers, and practitioners about the adoption and implementation of ILEs in higher education. This is the first book on ranaviruses. Ranaviruses are double-stranded DNA viruses that cause hemorrhagic disease in amphibians, reptiles, and fish. They have caused mass die-offs of ectothermic vertebrates in wild and captive populations around the globe. There is evidence that this pathogen is emerging and responsible for population declines in certain locations. Considering that amphibians and freshwater turtles are suitable hosts and the most imperiled vertebrate taxa in the world, ranaviruses can have significant impacts on biodiversity and ecosystem function. Additionally, many fish that are raised in aquaculture facilities and traded internationally are suitable hosts; thus, the potential economic impact of ranaviruses is significant. Ranaviruses also serve as a model for replication and gene function of large double-stranded DNA viruses. There is an urgent need to assemble the contemporary information on ranaviruses and provide guidance on how to assess their threats in populations. Through the Global Ranavirus Consortium, 24 experts from six countries were organized to write this volume, the first book on ranaviruses. The book begins with a discussion on the global extent of ranaviruses, case histories of infection and disease in ectothermic vertebrates, and current phylogeny. Basic principles of ranavirus ecology and evolution are covered next, with a focus on host-pathogen interactions and how the virus emerges in its environment. There are two chapters that will discuss the molecular biology of ranaviruses, host response to infection, and the genes responsible for immune system evasion. One chapter establishes standards for testing for infection and diagnosing ranaviral disease. The book ends by providing guidance on how to design ranavirus surveillance studies and analyze data to determine risk, and discussing the role of the Global Ranavirus Consortium in organizing research and outreach activities. "Variations in seismic Q are sensitive to a much greater extent than are seismic velocity variations on factors such as temperature, fluid content, and the movement of solid state defects in the earth. For that reason an understanding of Q and its variation with position in the earth and with time should provide information on earth's tectonic evolution, as well as on aspects of its internal structure. Papers of this volume present new information on Q in the earth from several perspectives: methodology, results from global and regional observations of both body and surface waves, laboratory measurements, and theoretical understanding. The editors believe that the present volume reaches a new threshold in Q studies and that advances in data quality and methodology will spur increased interest in this difficult, but interesting field."--BOOK JACKET. Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

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