

Sentiment Analysis And Deep Learning A Survey

Deep Learning and Neural Networks: Concepts, Methodologies, Tools, and Applications
Deep Learning Machine Learning and Deep Learning in Real-Time Applications
Understanding Deep Learning
Deep Learning By Example
Hands-On Deep Learning for Games
Hands-On Deep Learning Architectures with Python
Introduction to Deep Learning and Neural Networks with Python
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Siddhartha Bhattacharyya Mahrishi, Mehul Simon J.D. Prince Ahmed Menshawy Micheal Lanham Yuxi (Hayden) Liu Ahmed Fawzy Gad Giancarlo Zacccone Pat Nakamoto Uday Shankar Shanthamallu Gilberto Rivera Abdussalam Elhanashi Jenny Benois-Pineau Shashidhar Soppin Bharatendra Rai Dipanjan Sarkar Ian Goodfellow Vincenzo Piuri Iddo Drori
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due to the growing use of web applications and communication devices the use of data has increased throughout various industries it is necessary

to develop new techniques for managing data in order to ensure adequate usage deep learning a subset of artificial intelligence and machine learning has been recognized in various real world applications such as computer vision image processing and pattern recognition the deep learning approach has opened new opportunities that can make such real life applications and tasks easier and more efficient deep learning and neural networks concepts methodologies tools and applications is a vital reference source that trends in data analytics and potential technologies that will facilitate insight in various domains of science industry business and consumer applications it also explores the latest concepts algorithms and techniques of deep learning and data mining and analysis highlighting a range of topics such as natural language processing predictive analytics and deep neural networks this multi volume book is ideally designed for computer engineers software developers it professionals academicians researchers and upper level students seeking current research on the latest trends in the field of deep learning

this book focuses on the fundamentals of deep learning along with reporting on the current state of art research on deep learning in addition it provides an insight of deep neural networks in action with illustrative coding examples deep learning is a new area of machine learning research which has been introduced with the objective of moving ml closer to one of its original goals i e artificial intelligence deep learning was developed as an ml approach to deal with complex input output mappings while traditional methods successfully solve problems where final value is a simple function of input data deep learning techniques are able to capture composite relations between non immediately related fields for example between air pressure recordings and english words millions of pixels and textual description brand related news and future stock prices and almost all real world problems deep learning is a class of nature inspired machine learning algorithms that uses a cascade of multiple layers of nonlinear processing units for feature extraction and transformation each successive layer uses the output from the previous layer as input the learning may be supervised e g classification and or unsupervised e g pattern analysis manners these algorithms learn multiple levels of representations that correspond to different levels of abstraction by resorting to some form of gradient descent for training via backpropagation layers that have been used in deep learning include hidden layers of an artificial neural network and sets of propositional formulas they may also include latent variables organized layer wise in deep generative models such as the nodes in deep belief networks and deep boltzmann machines deep learning is part of state of the art systems in various disciplines particularly computer vision automatic speech recognition asr and human action recognition

artificial intelligence and its various components are rapidly engulfing almost every professional industry specific features of ai that have proven to be vital solutions to numerous real world issues are machine learning and deep learning these intelligent agents unlock higher levels of

performance and efficiency creating a wide span of industrial applications however there is a lack of research on the specific uses of machine deep learning in the professional realm machine learning and deep learning in real time applications provides emerging research exploring the theoretical and practical aspects of machine learning and deep learning and their implementations as well as their ability to solve real world problems within several professional disciplines including healthcare business and computer science featuring coverage on a broad range of topics such as image processing medical improvements and smart grids this book is ideally designed for researchers academicians scientists industry experts scholars it professionals engineers and students seeking current research on the multifaceted uses and implementations of machine learning and deep learning across the globe

an authoritative accessible and up to date treatment of deep learning that strikes a pragmatic middle ground between theory and practice deep learning is a fast moving field with sweeping relevance in today's increasingly digital world understanding deep learning provides an authoritative accessible and up to date treatment of the subject covering all the key topics along with recent advances and cutting edge concepts many deep learning texts are crowded with technical details that obscure fundamentals but simon prince ruthlessly curates only the most important ideas to provide a high density of critical information in an intuitive and digestible form from machine learning basics to advanced models each concept is presented in lay terms and then detailed precisely in mathematical form and illustrated visually the result is a lucid self contained textbook suitable for anyone with a basic background in applied mathematics up to date treatment of deep learning covers cutting edge topics not found in existing texts such as transformers and diffusion models short focused chapters progress in complexity easing students into difficult concepts pragmatic approach straddling theory and practice gives readers the level of detail required to implement naive versions of models streamlined presentation separates critical ideas from background context and extraneous detail minimal mathematical prerequisites extensive illustrations and practice problems make challenging material widely accessible programming exercises offered in accompanying python notebooks

grasp the fundamental concepts of deep learning using tensorflow in a hands on manner key features get a first hand experience of the deep learning concepts and techniques with this easy to follow guide train different types of neural networks using tensorflow for real world problems in language processing computer vision transfer learning and more designed for those who believe in the concept of learn by doing this book is a perfect blend of theory and code examples book description deep learning is a popular subset of machine learning and it allows you to build complex models that are faster and give more accurate predictions this book is your companion to take your first steps into the world of deep learning with hands on examples to boost your understanding of the topic this book starts with a quick overview of the essential concepts of data

science and machine learning which are required to get started with deep learning it introduces you to tensorflow the most widely used machine learning library for training deep learning models you will then work on your first deep learning problem by training a deep feed forward neural network for digit classification and move on to tackle other real world problems in computer vision language processing sentiment analysis and more advanced deep learning models such as generative adversarial networks and their applications are also covered in this book by the end of this book you will have a solid understanding of all the essential concepts in deep learning with the help of the examples and code provided in this book you will be equipped to train your own deep learning models with more confidence what you will learn understand the fundamentals of deep learning and how it is different from machine learning get familiarized with tensorflow one of the most popular libraries for advanced machine learning increase the predictive power of your model using feature engineering understand the basics of deep learning by solving a digit classification problem of mnist demonstrate face generation based on the celeba database a promising application of generative models apply deep learning to other domains like language modeling sentiment analysis and machine translation who this book is for this book targets data scientists and machine learning developers who wish to get started with deep learning if you know what deep learning is but are not quite sure of how to use it this book will help you as well an understanding of statistics and data science concepts is required some familiarity with python programming will also be beneficial

understand the core concepts of deep learning and deep reinforcement learning by applying them to develop games key features apply the power of deep learning to complex reasoning tasks by building a game ai exploit the most recent developments in machine learning and ai for building smart games implement deep learning models and neural networks with python book description the number of applications of deep learning and neural networks has multiplied in the last couple of years neural nets has enabled significant breakthroughs in everything from computer vision voice generation voice recognition and self driving cars game development is also a key area where these techniques are being applied this book will give an in depth view of the potential of deep learning and neural networks in game development we will take a look at the foundations of multi layer perceptrons to using convolutional and recurrent networks in applications from gans that create music or textures to self driving cars and chatbots then we introduce deep reinforcement learning through the multi armed bandit problem and other openai gym environments as we progress through the book we will gain insights about drl techniques such as motivated reinforcement learning with curiosity and curriculum learning we also take a closer look at deep reinforcement learning and in particular the unity ml agents toolkit by the end of the book we will look at how to apply drl and the ml agents toolkit to enhance test and automate your games or simulations finally we will cover your possible next steps and possible areas for future learning what you will learn learn the foundations of neural networks and deep learning use advanced neural network

architectures in applications to create music textures self driving cars and chatbots understand the basics of reinforcement and drl and how to apply it to solve a variety of problems working with unity ml agents toolkit and how to install setup and run the kit understand core concepts of drl and the differences between discrete and continuous action environments use several advanced forms of learning in various scenarios from developing agents to testing games who this book is for this books is for game developers who wish to create highly interactive games by leveraging the power of machine and deep learning no prior knowledge of machine learning deep learning or neural networks is required this book will teach those concepts from scratch a good understanding of python is required

concepts tools and techniques to explore deep learning architectures and methodologies key features explore advanced deep learning architectures using various datasets and frameworks implement deep architectures for neural network models such as cnn rnn gan and many more discover design patterns and different challenges for various deep learning architectures book description deep learning architectures are composed of multilevel nonlinear operations that represent high level abstractions this allows you to learn useful feature representations from the data this book will help you learn and implement deep learning architectures to resolve various deep learning research problems hands on deep learning architectures with python explains the essential learning algorithms used for deep and shallow architectures packed with practical implementations and ideas to help you build efficient artificial intelligence systems ai this book will help you learn how neural networks play a major role in building deep architectures you will understand various deep learning architectures such as alexnet vgg net googlenet with easy to follow code and diagrams in addition to this the book will also guide you in building and training various deep architectures such as the boltzmann mechanism autoencoders convolutional neural networks cnns recurrent neural networks rnns natural language processing nlp gan and more all with practical implementations by the end of this book you will be able to construct deep models using popular frameworks and datasets with the required design patterns for each architecture you will be ready to explore the potential of deep architectures in today s world what you will learn implement cnns rnns and other commonly used architectures with python explore architectures such as vggnet alexnet and googlenet build deep learning architectures for ai applications such as face and image recognition fraud detection and many more understand the architectures and applications of boltzmann machines and autoencoders with concrete examples master artificial intelligence and neural network concepts and apply them to your architecture understand deep learning architectures for mobile and embedded systems who this book is for if you re a data scientist machine learning developer engineer or deep learning practitioner or are curious about ai and want to upgrade your knowledge of various deep learning architectures this book will appeal to you you are expected to have some knowledge of statistics and machine learning algorithms to get the best out of this book

introduction to deep learning and neural networks with python this a practical guide is an intensive step by step guide for neuroscientists to fully understand practice and build neural networks providing math and python code examples to clarify neural network calculations by book's end readers will fully understand how neural networks work starting from the simplest model $y = x$ and building from scratch details and explanations are provided on how a generic gradient descent algorithm works based on mathematical and python examples teaching you how to use the gradient descent algorithm to manually perform all calculations in both the forward and backward passes of training a neural network examines the practical side of deep learning and neural networks provides a problem based approach to building artificial neural networks using real data describes python functions and features for neuroscientists uses a careful tutorial approach to describe implementation of neural networks in python features math and code examples via companion website with helpful instructions for easy implementation

delve into neural networks implement deep learning algorithms and explore layers of data abstraction with the help of tensorflow key features learn how to implement advanced techniques in deep learning with google's brainchild tensorflow explore deep neural networks and layers of data abstraction with the help of this comprehensive guide gain real world contextualization through some deep learning problems concerning research and application book description deep learning is a branch of machine learning algorithms based on learning multiple levels of abstraction neural networks which are at the core of deep learning are being used in predictive analytics computer vision natural language processing time series forecasting and to perform a myriad of other complex tasks this book is conceived for developers data analysts machine learning practitioners and deep learning enthusiasts who want to build powerful robust and accurate predictive models with the power of tensorflow combined with other open source python libraries throughout the book you'll learn how to develop deep learning applications for machine learning systems using feedforward neural networks convolutional neural networks recurrent neural networks autoencoders and factorization machines discover how to attain deep learning programming on gpu in a distributed way you'll come away with an in depth knowledge of machine learning techniques and the skills to apply them to real world projects what you will learn apply deep machine intelligence and gpu computing with tensorflow access public datasets and use tensorflow to load process and transform the data discover how to use the high level tensorflow api to build more powerful applications use deep learning for scalable object detection and mobile computing train machines quickly to learn from data by exploring reinforcement learning techniques explore active areas of deep learning research and applications who this book is for the book is for people interested in machine learning and machine intelligence a rudimentary level of programming in one language is assumed as is a basic familiarity with computer science techniques and technologies including a basic awareness of computer hardware and algorithms some competence in mathematics is needed to the level of elementary linear algebra and calculus

ready to crank up a neural network to get your self driving car pick up the kids from school want to add deep learning to your linkedin profile well hold on there before you embark on your epic journey into the world of deep learning there is basic theory to march through first take a step by step journey through the basics of neural networks and deep learning made so simple that even your granny could understand it what you will gain from this book a deep understanding of how a neural network and deep learning work a basics comprehension on how to build a deep neural network from scratch who this book is for beginners who want to approach the topic but are too afraid of complex math to start what's inside a brief introduction to machine learning two main types of machine learning algorithms a practical example of unsupervised learning what are neural networks mcculloch pitts s neuron types of activation function types of network architectures learning processes advantages and disadvantages let us give a memory to our neural network the example of book writing software deep learning the ability of learning to learn how does deep learning work main architectures and algorithms main types of dnn available frameworks and libraries convolutional neural networks tunnel vision convolution the right architecture for a neural network test your neural network a general overview of deep learning what are the limits of deep learning deep learning the basics layers learning paradigms training validation main architectures and algorithms models for deep learning probabilistic graphic models restricted boltzmann machines deep belief networks available frameworks and libraries tensorflow hit download now

this book introduces basic machine learning concepts and applications for a broad audience that includes students faculty and industry practitioners we begin by describing how machine learning provides capabilities to computers and embedded systems to learn from data a typical machine learning algorithm involves training and generally the performance of a machine learning model improves with more training data deep learning is a sub area of machine learning that involves extensive use of layers of artificial neural networks typically trained on massive amounts of data machine and deep learning methods are often used in contemporary data science tasks to address the growing data sets and detect cluster and classify data patterns although machine learning commercial interest has grown relatively recently the roots of machine learning go back to decades ago we note that nearly all organizations including industry government defense and health are using machine learning to address a variety of needs and applications the machine learning paradigms presented can be broadly divided into the following three categories supervised learning unsupervised learning and semi supervised learning supervised learning algorithms focus on learning a mapping function and they are trained with supervision on labeled data supervised learning is further sub divided into classification and regression algorithms unsupervised learning typically does not have access to ground truth and often the goal is to learn or uncover the hidden pattern in the data through semi supervised learning one can effectively utilize a large volume of unlabeled data and a limited amount of labeled data to improve machine learning

model performances deep learning and neural networks are also covered in this book deep neural networks have attracted a lot of interest during the last ten years due to the availability of graphics processing units gpu computational power big data and new software platforms they have strong capabilities in terms of learning complex mapping functions for different types of data we organize the book as follows the book starts by introducing concepts in supervised unsupervised and semi supervised learning several algorithms and their inner workings are presented within these three categories we then continue with a brief introduction to artificial neural network algorithms and their properties in addition we cover an array of applications and provide extensive bibliography the book ends with a summary of the key machine learning concepts

in recent years significant progress has been made in achieving artificial intelligence ai with an impact on students managers scientists health personnel technical roles investors teachers and leaders this book presents numerous successful applications of ai in various contexts the innovative implications covered fall under the general field of machine learning ml including deep learning decision making forecasting pattern recognition information retrieval and interpretable ai decision makers and entrepreneurs will find numerous successful applications in health care sustainability risk management human activity recognition logistics and industry 4 0 this book is an essential resource for anyone interested in challenges opportunities and the latest developments and real world applications of ml whether you are a student researcher practitioner or simply curious about ai this book provides valuable insights and inspiration for your work and learning

artificial intelligence technology has entered an extraordinary phase of fast development and wide application the techniques developed in traditional ai research areas such as computer vision and object recognition have found many innovative applications in an array of real world settings the general methodological contributions from ai such as a variety of recently developed deep learning algorithms have also been applied to a wide spectrum of fields such as surveillance applications real time processing iot devices and health care systems the state of the art and deep learning models have wider applicability and are highly efficient deep learning in action image and video processing for practical use provides a comprehensive and accessible resource for both intermediate to advanced readers seeking to harness the power of deep learning in the domains of video and image processing the book bridges the gap between theoretical concepts and practical implementation by emphasizing lightweight approaches enabling readers to efficiently apply deep learning techniques to real world scenarios it focuses on resource efficient methods making it particularly relevant in contexts where computational constraints are a concern provides step by step guidance on implementing deep learning techniques specifically for video and image processing tasks in real world scenarios emphasizes lightweight and efficient approaches to deep learning ensuring that readers learn techniques that are suited to resource constrained environments covers a wide

range of real world applications such as object detection image segmentation video classification offers a comprehensive understanding of how deep learning can be leveraged across various domains encourages hands on experience that can be applied to the concepts to existing projects

this book covers a large set of methods in the field of artificial intelligence deep learning applied to real world problems the fundamentals of the deep learning approach and different types of deep neural networks dnns are first summarized in this book which offers a comprehensive preamble for further problem oriented chapters the most interesting and open problems of machine learning in the framework of deep learning are discussed in this book and solutions are proposed this book illustrates how to implement the zero shot learning with deep neural network classifiers which require a large amount of training data the lack of annotated training data naturally pushes the researchers to implement low supervision algorithms metric learning is a long term research but in the framework of deep learning approaches it gets freshness and originality fine grained classification with a low inter class variability is a difficult problem for any classification tasks this book presents how it is solved by using different modalities and attention mechanisms in 3d convolutional networks researchers focused on machine learning deep learning multimedia and computer vision will want to buy this book advanced level students studying computer science within these topic areas will also find this book useful

drives next generation path with latest design techniques and methods in the fields of ai and deep learning key features extensive examples of machine learning and deep learning principles includes graphical demonstrations and visual tutorials for various libraries configurations and settings numerous use cases with the code snippets and examples are presented description essentials of deep learning and ai curates the essential knowledge of working on deep neural network techniques and advanced machine learning concepts this book is for those who want to know more about how deep neural networks work and advanced machine learning principles including real world examples this book includes implemented code snippets and step by step instructions for how to use them you'll be amazed at how scikit learn keras and tensorflow are used in ai applications to speed up the learning process and produce superior results with the help of detailed examples and code templates you'll be running your scripts in no time you will practice constructing models and optimise performance while working in an ai environment readers will be able to start writing their programmes with confidence and ease experts and newcomers alike will have access to advanced methodologies for easier reading concept explanations are presented straightforwardly with all relevant facts included what you will learn learn feature engineering using a variety of autoencoders cnns and lstms get to explore time series computer vision and nlp models with insightful examples dive deeper into activation and loss functions with various scenarios get the experience of deep learning and ai across iot telecom and health care build a

strong foundation around ai ml and deep learning principles and key concepts who this book is for this book targets machine learning engineers data scientists data engineers business intelligence analysts and software developers who wish to gain a firm grasp on the fundamentals of deep learning and artificial intelligence readers should have a working knowledge of computer programming concepts table of contents 1 introduction 2 supervised machine learning 3 system analysis with machine learning un supervised learning 4 feature engineering 5 classification clustering association rules and regression 6 time series analysis 7 data cleanup characteristics and feature selection 8 ensemble model development 9 design with deep learning 10 design with multi layered perceptron mlp 11 long short term memory networks 12 autoencoders 13 applications of machine learning and deep learning 14 emerging and future technologies

discover best practices for choosing building training and improving deep learning models using keras r and tensorflow r libraries key featuresimplement deep learning algorithms to build ai models with the help of tips and tricksunderstand how deep learning models operate using expert techniquesapply reinforcement learning computer vision gans and nlp using a range of datasetsbook description deep learning is a branch of machine learning based on a set of algorithms that attempt to model high level abstractions in data advanced deep learning with r will help you understand popular deep learning architectures and their variants in r along with providing real life examples for them this deep learning book starts by covering the essential deep learning techniques and concepts for prediction and classification you will learn about neural networks deep learning architectures and the fundamentals for implementing deep learning with r the book will also take you through using important deep learning libraries such as keras r and tensorflow r to implement deep learning algorithms within applications you will get up to speed with artificial neural networks recurrent neural networks convolutional neural networks long short term memory networks and more using advanced examples later you ll discover how to apply generative adversarial networks gans to generate new images autoencoder neural networks for image dimension reduction image de noising and image correction and transfer learning to prepare define train and model a deep neural network by the end of this book you will be ready to implement your knowledge and newly acquired skills for applying deep learning algorithms in r through real world examples what you will learnlearn how to create binary and multi class deep neural network modelsimplement gans for generating new imagescreate autoencoder neural networks for image dimension reduction image de noising and image correctionimplement deep neural networks for performing efficient text classificationlearn to define a recurrent convolutional network model for classification in kerasexplore best practices and tips for performance optimization of various deep learning modelswho this book is for this book is for data scientists machine learning practitioners deep learning researchers and ai enthusiasts who want to develop their skills and knowledge to implement deep learning techniques and algorithms using the power of r a solid understanding of machine learning and working knowledge of the r programming language

are required

deep learning simplified by taking supervised unsupervised and reinforcement learning to the next level using the python ecosystem key features build deep learning models with transfer learning principles in python implement transfer learning to solve real world research problems perform complex operations such as image captioning neural style transfer book description transfer learning is a machine learning ml technique where knowledge gained during training a set of problems can be used to solve other similar problems the purpose of this book is two fold firstly we focus on detailed coverage of deep learning dl and transfer learning comparing and contrasting the two with easy to follow concepts and examples the second area of focus is real world examples and research problems using tensorflow keras and the python ecosystem with hands on examples the book starts with the key essential concepts of ml and dl followed by depiction and coverage of important dl architectures such as convolutional neural networks cnns deep neural networks dnns recurrent neural networks rnns long short term memory lstm and capsule networks our focus then shifts to transfer learning concepts such as model freezing fine tuning pre trained models including vgg inception resnet and how these systems perform better than dl models with practical examples in the concluding chapters we will focus on a multitude of real world case studies and problems associated with areas such as computer vision audio analysis and natural language processing nlp by the end of this book you will be able to implement both dl and transfer learning principles in your own systems what you will learn set up your own dl environment with graphics processing unit gpu and cloud support delve into transfer learning principles with ml and dl models explore various dl architectures including cnn lstm and capsule networks learn about data and network representation and loss functions get to grips with models and strategies in transfer learning walk through potential challenges in building complex transfer learning models from scratch explore real world research problems related to computer vision and audio analysis understand how transfer learning can be leveraged in nlp who this book is for hands on transfer learning with python is for data scientists machine learning engineers analysts and developers with an interest in data and applying state of the art transfer learning methodologies to solve tough real world problems basic proficiency in machine learning and python is required

an introduction to a broad range of topics in deep learning covering mathematical and conceptual background deep learning techniques used in industry and research perspectives written by three experts in the field deep learning is the only comprehensive book on the subject elon musk cochair of openai cofounder and ceo of tesla and spacex deep learning is a form of machine learning that enables computers to learn from experience and understand the world in terms of a hierarchy of concepts because the computer gathers knowledge from experience there is no

need for a human computer operator to formally specify all the knowledge that the computer needs the hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones a graph of these hierarchies would be many layers deep this book introduces a broad range of topics in deep learning the text offers mathematical and conceptual background covering relevant concepts in linear algebra probability theory and information theory numerical computation and machine learning it describes deep learning techniques used by practitioners in industry including deep feedforward networks regularization optimization algorithms convolutional networks sequence modeling and practical methodology and it surveys such applications as natural language processing speech recognition computer vision online recommendation systems bioinformatics and videogames finally the book offers research perspectives covering such theoretical topics as linear factor models autoencoders representation learning structured probabilistic models monte carlo methods the partition function approximate inference and deep generative models deep learning can be used by undergraduate or graduate students planning careers in either industry or research and by software engineers who want to begin using deep learning in their products or platforms a website offers supplementary material for both readers and instructors

trends in deep learning methodologies algorithms applications and systems covers deep learning approaches such as neural networks deep belief networks recurrent neural networks convolutional neural networks deep auto encoder and deep generative networks which have emerged as powerful computational models chapters elaborate on these models which have shown significant success in dealing with massive data for a large number of applications given their capacity to extract complex hidden features and learn efficient representation in unsupervised settings chapters investigate deep learning based algorithms in a variety of application including biomedical and health informatics computer vision image processing and more in recent years many powerful algorithms have been developed for matching patterns in data and making predictions about future events the major advantage of deep learning is to process big data analytics for better analysis and self adaptive algorithms to handle more data deep learning methods can deal with multiple levels of representation in which the system learns to abstract higher level representations of raw data earlier it was a common requirement to have a domain expert to develop a specific model for each specific application however recent advancements in representation learning algorithms allow researchers across various subject domains to automatically learn the patterns and representation of the given data for the development of specific models provides insights into the theory algorithms implementation and the application of deep learning techniques covers a wide range of applications of deep learning across smart healthcare and smart engineering investigates the development of new models and how they can be exploited to find appropriate solutions

the science of deep learning emerged from courses taught by the author that have provided thousands of students with training and experience for their academic studies and prepared them for careers in deep learning machine learning and artificial intelligence in top companies in industry and academia the book begins by covering the foundations of deep learning followed by key deep learning architectures subsequent parts on generative models and reinforcement learning may be used as part of a deep learning course or as part of a course on each topic the book includes state of the art topics such as transformers graph neural networks variational autoencoders and deep reinforcement learning with a broad range of applications the appendices provide equations for computing gradients in backpropagation and optimization and best practices in scientific writing and reviewing the text presents an up to date guide to the field built upon clear visualizations using a unified notation and equations lowering the barrier to entry for the reader the accompanying website provides complementary code and hundreds of exercises with solutions

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