

DEEP CONVOLUTIONAL NEURAL NETWORK BASED APPROACH FOR

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ABSTRACT THIS ARTICLE DELVES INTO A DEEP CONVOLUTIONAL NEURAL NETWORK CNN BASED APPROACH FOR INSERT SPECIFIC TASKAPPLICATION WE EXPLORE THE RATIONALE BEHIND USING CNNs FOR THIS TASK OUTLINING THEIR KEY STRENGTHS AND HOW THEY EFFECTIVELY ADDRESS THE UNIQUE CHALLENGES PRESENTED THE ARTICLE THEN DETAILS THE ARCHITECTURE OF OUR PROPOSED CNN MODEL INCLUDING ITS LAYERS ACTIVATION FUNCTIONS AND TRAINING STRATEGIES WE PRESENT EXPERIMENTAL RESULTS DEMONSTRATING THE MODELS PERFORMANCE ON INSERT RELEVANT DATASET AND COMPARE IT AGAINST OTHER EXISTING METHODS HIGHLIGHTING ITS ADVANTAGES AND LIMITATIONS FINALLY WE DISCUSS FUTURE RESEARCH DIRECTIONS TO FURTHER ENHANCE THE MODEL AND EXPAND ITS APPLICATIONS

1 INSERT SPECIFIC TASKAPPLICATION IS A CHALLENGING TASK THAT HAS TRADITIONALLY RELIED ON MENTION EXISTING METHODSAPPROACHES HOWEVER THESE METHODS OFTEN FACE LIMITATIONS IN TERMS OF HIGHLIGHT LIMITATIONS OF EXISTING METHODS THIS HAS MOTIVATED THE EXPLORATION OF NOVEL APPROACHES PARTICULARLY THOSE LEVERAGING THE POWER OF DEEP LEARNING DEEP CONVOLUTIONAL NEURAL NETWORKS CNNs HAVE EMERGED AS A POWERFUL TOOL FOR A WIDE RANGE OF TASKS INVOLVING IMAGE AUDIO AND TEXT DATA THEIR ABILITY TO AUTOMATICALLY LEARN HIERARCHICAL FEATURES FROM RAW DATA COMBINED WITH THEIR INHERENT ABILITY TO HANDLE COMPLEX PATTERNS MAKES THEM A PROMISING CANDIDATE FOR INSERT SPECIFIC TASKAPPLICATION

2 DEEP CONVOLUTIONAL NEURAL NETWORKS FOR INSERT SPECIFIC TASKAPPLICATION

2.1 RATIONALE FOR CNNs FEATURE EXTRACTION CNNs EXCEL AT AUTOMATICALLY LEARNING HIERARCHICAL FEATURES FROM INPUT DATA THIS IS PARTICULARLY VALUABLE FOR EXPLAIN HOW FEATURE LEARNING IS RELEVANT TO THE TASK ENABLING THE MODEL TO EXTRACT MEANINGFUL PATTERNS FROM MENTION TYPE OF DATA USED SPATIAL INVARIANCE THE CONVOLUTIONAL FILTERS IN CNNs ARE DESIGNED TO CAPTURE LOCAL PATTERNS MAKING THEM ROBUST TO VARIATIONS IN OBJECT POSITION AND SCALE WHICH ARE CRUCIAL FOR EXPLAIN

2.2 HOW SPATIAL INVARIANCE IS BENEFICIAL FOR THE TASK DATA REDUCTION POOLING LAYERS IN CNNs PROGRESSIVELY REDUCE THE DIMENSIONALITY OF THE FEATURE MAPS ENABLING THE MODEL TO FOCUS ON THE MOST INFORMATIVE FEATURES THEREBY REDUCING COMPUTATIONAL COMPLEXITY AND IMPROVING EFFICIENCY

2.2.1 PROPOSED CNN ARCHITECTURE THE PROPOSED CNN ARCHITECTURE FOR INSERT SPECIFIC TASKAPPLICATION CONSISTS OF NUMBER CONVOLUTIONAL LAYERS FOLLOWED BY NUMBER FULLY CONNECTED LAYERS EACH CONVOLUTIONAL LAYER EMPLOYS SPECIFY TYPE OF CONVOLUTIONAL FILTER EG 3x3 KERNEL 5x5 KERNEL FILTERS WITH A SPECIFY STRIDE SIZE STRIDE THE ACTIVATION FUNCTION USED IN ALL CONVOLUTIONAL LAYERS IS SPECIFY ACTIVATION FUNCTION EG RELU LEAKY RELU EXPLAIN THE PURPOSE AND FUNCTIONALITY OF EACH LAYER IN THE MODEL THIS COULD INCLUDE CONVOLUTIONAL LAYERS RESPONSIBLE FOR FEATURE EXTRACTION CAPTURING PATTERNS AND RELATIONSHIPS WITHIN THE INPUT DATA POOLING LAYERS PERFORM DOWNSAMPLING TO REDUCE DIMENSIONALITY AND IMPROVE ROBUSTNESS TO SMALL VARIATIONS IN INPUT DATA FULLY CONNECTED LAYERS COMBINE AND INTEGRATE THE EXTRACTED FEATURES TO MAKE FINAL PREDICTIONS FOR INSERT SPECIFIC TASKAPPLICATION

2.3 TRAINING STRATEGY THE CNN MODEL IS TRAINED USING SPECIFY OPTIMIZATION ALGORITHM EG ADAM SGD WITH A SPECIFY LOSS FUNCTION EG CROSSENTROPY LOSS MEAN SQUARED ERROR LOSS FUNCTION THE MODEL IS TRAINED ON SPECIFY DATASET AND VALIDATED ON SPECIFY VALIDATION SET WE USE SPECIFY REGULARIZATION TECHNIQUES IF ANY EG DROPOUT BATCH NORMALIZATION TO PREVENT OVERFITTING

3 EXPERIMENTAL RESULTS AND ANALYSIS WE EVALUATED THE PROPOSED CNN MODEL ON SPECIFY DATASET COMPARING ITS PERFORMANCE TO MENTION EXISTING METHODSBASELINES THE EVALUATION METRICS INCLUDE SPECIFY EVALUATION METRICS EG ACCURACY PRECISION RECALL F1SCORE INCLUDE A TABLE SUMMARIZING THE EXPERIMENTAL RESULTS FOR DIFFERENT METHODSBASELINES VISUALIZE THE RESULTS WITH GRAPHS OR FIGURES IF POSSIBLE

3.1 DISCUSSION OF RESULTS THE RESULTS SHOW THAT THE PROPOSED CNN MODEL ACHIEVES MENTION ACHIEVED PERFORMANCEIMPROVEMENT COMPARED TO EXISTING METHODS THIS INDICATES THAT EXPLAIN THE IMPLICATIONS OF THE PERFORMANCE ACHIEVED THE MODELS SUPERIOR PERFORMANCE CAN BE

3.2 ATTRIBUTED TO EXPLAIN THE FACTORS CONTRIBUTING TO THE MODELS PERFORMANCE EG ABILITY TO LEARN COMPLEX FEATURES ROBUST TO NOISE AND VARIATIONS

3.2.1 LIMITATIONS THE PROPOSED MODEL ALSO HAS SOME LIMITATIONS DISCUSS THE LIMITATIONS OF THE MODEL EG COMPUTATIONAL COMPLEXITY PERFORMANCE ON SPECIFIC SCENARIOS

4 FUTURE WORK AND CONCLUSION THIS RESEARCH PRESENTS A PROMISING DEEP CONVOLUTIONAL NEURAL NETWORK BASED APPROACH FOR INSERT SPECIFIC TASKAPPLICATION HOWEVER THERE ARE SEVERAL AVENUES FOR FUTURE RESEARCH TO FURTHER ENHANCE THE MODEL AND EXPAND ITS APPLICATIONS EXPLORING DIFFERENT ARCHITECTURES INVESTIGATING ALTERNATIVE CNN ARCHITECTURES INCLUDING DEEPER NETWORKS OR INCORPORATING RESIDUAL CONNECTIONS COULD POTENTIALLY FURTHER IMPROVE PERFORMANCE INVESTIGATING DATA AUGMENTATION TECHNIQUES EXPLORING DATA AUGMENTATION TECHNIQUES TO ENHANCE THE DATASET DIVERSITY AND IMPROVE THE MODELS ROBUSTNESS FINETUNING FOR SPECIFIC APPLICATIONS ADAPTING THE MODEL TO SPECIFIC SUBTASKS OR DOMAINS WITHIN INSERT SPECIFIC TASKAPPLICATION COULD LEAD TO EVEN MORE SPECIALIZED AND EFFICIENT SOLUTIONS

IN CONCLUSION THIS RESEARCH DEMONSTRATES THE EFFECTIVENESS OF DEEP CONVOLUTIONAL NEURAL NETWORKS FOR INSERT SPECIFIC TASKAPPLICATION THE PROPOSED MODEL SHOWS SIGNIFICANT PERFORMANCE IMPROVEMENTS OVER EXISTING

METHODS AND PROVIDES A FOUNDATION FOR FURTHER RESEARCH AND DEVELOPMENT IN THIS FIELD REFERENCES INSERT RELEVANT ACADEMIC REFERENCES HERE PLEASE NOTE THIS IS A GENERAL TEMPLATE YOU NEED TO FILL IN THE SPECIFIC DETAILS RELATED TO YOUR CHOSEN TASKAPPLICATION AND DATASET TO COMPLETE THE ARTICLE MAKE SURE TO ADAPT THE LANGUAGE AND CONTENT TO MATCH YOUR SPECIFIC RESEARCH AREA AND FINDINGS

CONVOLUTIONAL NEURAL NETWORKS IN PYTHONA GUIDE TO CONVOLUTIONAL NEURAL NETWORKS FOR COMPUTER VISIONCONVOLUTIONAL NEURAL NETWORKS IN VISUAL COMPUTINGCONVOLUTIONAL NEURAL NETWORKS FOR MEDICAL IMAGE PROCESSING APPLICATIONSTREE-BASED CONVOLUTIONAL NEURAL NETWORKSHANDS-ON CONVOLUTIONAL NEURAL NETWORKS WITH TENSORFLOWGUIDE TO CONVOLUTIONAL NEURAL NETWORKSDEEP LEARNING WITH PYTORCHCONVOLUTIONAL NEURAL NETWORK IN CLASSIFYING SCANNED DOCUMENTSDEEP LEARNINGHANDS-ON DEEP LEARNING ARCHITECTURES WITH PYTHONIoT-ENABLED CONVOLUTIONAL NEURAL NETWORKS: TECHNIQUES AND APPLICATIONSADVANCED APPLIED DEEP LEARNINGPRACTICAL CONVOLUTIONAL NEURAL NETWORKSDEEP LEARNING AND NEURAL NETWORKS: CONCEPTS, METHODOLOGIES, TOOLS, AND APPLICATIONSELEMENTS OF DEEP LEARNING FOR COMPUTER VISIONDEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS FOR MEDICAL IMAGING AND CLINICAL INFORMATICSDEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS FOR MEDICAL IMAGE COMPUTINGPRACTICAL COMPUTER VISION APPLICATIONS USING DEEP LEARNING WITH CNNsNEURAL NETWORKS WITH KERAS COOKBOOK FRANK MILLSTEIN SALMAN KHAN RAGAV VENKATESAN SABAN OZTURK LILI MOU IFFAT ZAFAR HAMED HABIBI AGHDAM VISHNU SUBRAMANIAN TAI DOAN FRANK MILLSTEIN YUXI (HAYDEN) LIU MOHD NAVED UMBERTO MICHELUCCI MOHIT SEWAK MANAGEMENT ASSOCIATION, INFORMATION RESOURCES BHARAT SIKKA LE LU LE LU AHMED FAWZY GAD V KISHORE AYYADEVARA CONVOLUTIONAL NEURAL NETWORKS IN PYTHON A GUIDE TO CONVOLUTIONAL NEURAL NETWORKS FOR COMPUTER VISION CONVOLUTIONAL NEURAL NETWORKS IN VISUAL COMPUTING CONVOLUTIONAL NEURAL NETWORKS FOR MEDICAL IMAGE PROCESSING APPLICATIONS TREE-BASED CONVOLUTIONAL NEURAL NETWORKS HANDS-ON CONVOLUTIONAL NEURAL NETWORKS WITH TENSORFLOW GUIDE TO CONVOLUTIONAL NEURAL NETWORKS DEEP LEARNING WITH PYTORCH CONVOLUTIONAL NEURAL NETWORK IN CLASSIFYING SCANNED DOCUMENTS DEEP LEARNING HANDS-ON DEEP LEARNING ARCHITECTURES WITH PYTHON IoT-ENABLED CONVOLUTIONAL NEURAL NETWORKS: TECHNIQUES AND APPLICATIONS ADVANCED APPLIED DEEP LEARNING PRACTICAL CONVOLUTIONAL NEURAL NETWORKS DEEP LEARNING AND NEURAL NETWORKS: CONCEPTS, METHODOLOGIES, TOOLS, AND APPLICATIONS ELEMENTS OF DEEP LEARNING FOR COMPUTER VISION DEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS FOR MEDICAL IMAGING AND CLINICAL INFORMATICS DEEP LEARNING AND CONVOLUTIONAL NEURAL NETWORKS FOR MEDICAL IMAGE COMPUTING PRACTICAL COMPUTER VISION APPLICATIONS USING DEEP LEARNING WITH CNNs NEURAL NETWORKS WITH KERAS COOKBOOK *FRANK MILLSTEIN SALMAN KHAN RAGAV VENKATESAN SABAN OZTURK LILI MOU IFFAT ZAFAR HAMED HABIBI AGHDAM VISHNU SUBRAMANIAN TAI DOAN FRANK MILLSTEIN YUXI (HAYDEN) LIU MOHD NAVED UMBERTO MICHELUCCI MOHIT SEWAK MANAGEMENT ASSOCIATION, INFORMATION RESOURCES BHARAT SIKKA LE LU LE LU AHMED FAWZY GAD V KISHORE AYYADEVARA*

CONVOLUTIONAL NEURAL NETWORKS IN PYTHON THIS BOOK COVERS THE BASICS BEHIND CONVOLUTIONAL NEURAL NETWORKS BY INTRODUCING YOU TO THIS COMPLEX WORLD OF DEEP LEARNING AND ARTIFICIAL NEURAL NETWORKS IN A SIMPLE AND EASY TO UNDERSTAND WAY IT IS PERFECT FOR ANY BEGINNER OUT THERE LOOKING FORWARD TO LEARNING MORE ABOUT THIS MACHINE LEARNING FIELD THIS BOOK IS ALL ABOUT HOW TO USE CONVOLUTIONAL NEURAL NETWORKS FOR VARIOUS IMAGE OBJECT AND OTHER COMMON CLASSIFICATION PROBLEMS IN PYTHON HERE WE ALSO TAKE A DEEPER LOOK INTO VARIOUS KERAS LAYER USED FOR BUILDING CNNs WE TAKE A LOOK AT DIFFERENT ACTIVATION FUNCTIONS AND MUCH MORE WHICH WILL EVENTUALLY LEAD YOU TO CREATING HIGHLY ACCURATE MODELS ABLE OF PERFORMING GREAT TASK RESULTS ON VARIOUS IMAGE CLASSIFICATION OBJECT CLASSIFICATION AND OTHER PROBLEMS THEREFORE AT THE END OF THE BOOK YOU WILL HAVE A BETTER INSIGHT INTO THIS WORLD THUS YOU WILL BE MORE THAN PREPARED TO DEAL WITH MORE COMPLEX AND CHALLENGING TASKS ON YOUR OWN HERE IS A PREVIEW OF WHAT YOU LL LEARN IN THIS BOOK CONVOLUTIONAL NEURAL NETWORKS STRUCTURE HOW CONVOLUTIONAL NEURAL NETWORKS ACTUALLY WORK CONVOLUTIONAL NEURAL NETWORKS APPLICATIONS THE IMPORTANCE OF CONVOLUTION OPERATOR DIFFERENT CONVOLUTIONAL NEURAL NETWORKS LAYERS AND THEIR IMPORTANCE ARRANGEMENT OF SPATIAL PARAMETERS HOW AND WHEN TO USE STRIDE AND ZERO PADDING METHOD OF PARAMETER SHARING MATRIX MULTIPLICATION AND ITS IMPORTANCE POOLING AND DENSE LAYERS INTRODUCING NON LINEARITY RELU ACTIVATION FUNCTION HOW TO TRAIN YOUR CONVOLUTIONAL NEURAL NETWORK MODELS USING BACKPROPAGATION HOW AND WHY TO APPLY DROPOUT CNN MODEL TRAINING PROCESS HOW TO BUILD A CONVOLUTIONAL NEURAL NETWORK GENERATING PREDICTIONS AND CALCULATING LOSS FUNCTIONS HOW TO TRAIN AND EVALUATE YOUR MNIST CLASSIFIER HOW TO BUILD A SIMPLE IMAGE CLASSIFICATION CNN AND MUCH MUCH MORE GET THIS BOOK NOW AND LEARN MORE ABOUT CONVOLUTIONAL NEURAL NETWORKS IN PYTHON

COMPUTER VISION HAS BECOME INCREASINGLY IMPORTANT AND EFFECTIVE IN RECENT YEARS DUE TO ITS WIDE RANGING APPLICATIONS IN AREAS AS DIVERSE AS SMART SURVEILLANCE AND MONITORING HEALTH AND MEDICINE SPORTS AND RECREATION ROBOTICS DRONES AND SELF DRIVING CARS VISUAL RECOGNITION TASKS SUCH AS IMAGE CLASSIFICATION LOCALIZATION AND DETECTION ARE THE CORE BUILDING BLOCKS OF MANY OF THESE APPLICATIONS AND RECENT DEVELOPMENTS IN CONVOLUTIONAL NEURAL NETWORKS CNNs HAVE LED TO OUTSTANDING PERFORMANCE IN THESE

STATE OF THE ART VISUAL RECOGNITION TASKS AND SYSTEMS AS A RESULT CNNs NOW FORM THE CRUX OF DEEP LEARNING ALGORITHMS IN COMPUTER VISION THIS SELF CONTAINED GUIDE WILL BENEFIT THOSE WHO SEEK TO BOTH UNDERSTAND THE THEORY BEHIND CNNs AND TO GAIN HANDS ON EXPERIENCE ON THE APPLICATION OF CNNs IN COMPUTER VISION IT PROVIDES A COMPREHENSIVE INTRODUCTION TO CNNs STARTING WITH THE ESSENTIAL CONCEPTS BEHIND NEURAL NETWORKS TRAINING REGULARIZATION AND OPTIMIZATION OF CNNs THE BOOK ALSO DISCUSSES A WIDE RANGE OF LOSS FUNCTIONS NETWORK LAYERS AND POPULAR CNN ARCHITECTURES REVIEWS THE DIFFERENT TECHNIQUES FOR THE EVALUATION OF CNNs AND PRESENTS SOME POPULAR CNN TOOLS AND LIBRARIES THAT ARE COMMONLY USED IN COMPUTER VISION FURTHER THIS TEXT DESCRIBES AND DISCUSSES CASE STUDIES THAT ARE RELATED TO THE APPLICATION OF CNN IN COMPUTER VISION INCLUDING IMAGE CLASSIFICATION OBJECT DETECTION SEMANTIC SEGMENTATION SCENE UNDERSTANDING AND IMAGE GENERATION THIS BOOK IS IDEAL FOR UNDERGRADUATE AND GRADUATE STUDENTS AS NO PRIOR BACKGROUND KNOWLEDGE IN THE FIELD IS REQUIRED TO FOLLOW THE MATERIAL AS WELL AS NEW RESEARCHERS DEVELOPERS ENGINEERS AND PRACTITIONERS WHO ARE INTERESTED IN GAINING A QUICK UNDERSTANDING OF CNN MODELS

THIS BOOK COVERS THE FUNDAMENTALS IN DESIGNING AND DEPLOYING TECHNIQUES USING DEEP ARCHITECTURES IT IS INTENDED TO SERVE AS A BEGINNER S GUIDE TO ENGINEERS OR STUDENTS WHO WANT TO HAVE A QUICK START ON LEARNING AND OR BUILDING DEEP LEARNING SYSTEMS THIS BOOK PROVIDES A GOOD THEORETICAL AND PRACTICAL UNDERSTANDING AND A COMPLETE TOOLKIT OF BASIC INFORMATION AND KNOWLEDGE REQUIRED TO UNDERSTAND AND BUILD CONVOLUTIONAL NEURAL NETWORKS CNN FROM SCRATCH THE BOOK FOCUSES EXPLICITLY ON CONVOLUTIONAL NEURAL NETWORKS FILTERING OUT OTHER MATERIAL THAT CO OCCUR IN MANY DEEP LEARNING BOOKS ON CNN TOPICS

THE RISE IN LIVING STANDARDS INCREASES THE EXPECTATION OF PEOPLE IN ALMOST EVERY FIELD AT THE FOREFRONT IS HEALTH OVER THE PAST FEW CENTURIES THERE HAVE BEEN MAJOR DEVELOPMENTS IN HEALTHCARE MEDICAL DEVICE TECHNOLOGY AND DEVELOPMENTS IN ARTIFICIAL INTELLIGENCE AI ARE AMONG THE MOST IMPORTANT ONES THE IMPROVING TECHNOLOGY AND OUR ABILITY TO HARNESS THE TECHNOLOGY EFFECTIVELY BY MEANS SUCH AS AI HAVE LED TO UNPRECEDENTED ADVANCES RESULTING IN EARLY DIAGNOSIS OF DISEASES AI ALGORITHMS ENABLE THE FAST AND EARLY EVALUATION OF IMAGES FROM MEDICAL DEVICES TO MAXIMIZE THE BENEFITS WHILE DEVELOPMENTS IN THE FIELD OF AI WERE QUICKLY ADAPTED TO THE FIELD OF HEALTH IN SOME CASES THIS CONTRIBUTED TO THE FORMATION OF INNOVATIVE ARTIFICIAL INTELLIGENCE ALGORITHMS TODAY THE MOST EFFECTIVE ARTIFICIAL INTELLIGENCE METHOD IS ACCEPTED AS DEEP LEARNING CONVOLUTIONAL NEURAL NETWORK CNN ARCHITECTURES ARE DEEP LEARNING ALGORITHMS USED FOR IMAGE PROCESSING THIS BOOK CONTAINS APPLICATIONS OF CNN METHODS THE CONTENT IS QUITE EXTENSIVE INCLUDING THE APPLICATION OF DIFFERENT CNN METHODS TO VARIOUS MEDICAL IMAGE PROCESSING PROBLEMS READERS WILL BE ABLE TO ANALYZE THE EFFECTS OF CNN METHODS PRESENTED IN THE BOOK IN MEDICAL APPLICATIONS

THIS BOOK PROPOSES A NOVEL NEURAL ARCHITECTURE TREE BASED CONVOLUTIONAL NEURAL NETWORKS TBCNNs FOR PROCESSING TREE STRUCTURED DATA TBCNNs ARE RELATED TO EXISTING CONVOLUTIONAL NEURAL NETWORKS CNNs AND RECURSIVE NEURAL NETWORKS RNNs BUT THEY COMBINE THE MERITS OF BOTH THANKS TO THEIR SHORT PROPAGATION PATH THEY ARE AS EFFICIENT IN LEARNING AS CNNs YET THEY ARE ALSO AS STRUCTURE SENSITIVE AS RNNs IN THIS BOOK READERS WILL ALSO FIND A COMPREHENSIVE LITERATURE REVIEW OF RELATED WORK DETAILED DESCRIPTIONS OF TBCNNs AND THEIR VARIANTS AND EXPERIMENTS APPLIED TO PROGRAM ANALYSIS AND NATURAL LANGUAGE PROCESSING TASKS IT IS ALSO AN ENJOYABLE READ FOR ALL THOSE WITH A GENERAL INTEREST IN DEEP LEARNING

LEARN HOW TO APPLY TENSORFLOW TO A WIDE RANGE OF DEEP LEARNING AND MACHINE LEARNING PROBLEMS WITH THIS PRACTICAL GUIDE ON TRAINING CNNs FOR IMAGE CLASSIFICATION IMAGE RECOGNITION OBJECT DETECTION AND MANY COMPUTER VISION CHALLENGES KEY FEATURES LEARN THE FUNDAMENTALS OF CONVOLUTIONAL NEURAL NETWORKS HARNESS PYTHON AND TENSORFLOW TO TRAIN CNNs BUILD SCALABLE DEEP LEARNING MODELS THAT CAN PROCESS MILLIONS OF ITEMS BOOK DESCRIPTION CONVOLUTIONAL NEURAL NETWORKS CNN ARE ONE OF THE MOST POPULAR ARCHITECTURES USED IN COMPUTER VISION APPS THIS BOOK IS AN INTRODUCTION TO CNNs THROUGH SOLVING REAL WORLD PROBLEMS IN DEEP LEARNING WHILE TEACHING YOU THEIR IMPLEMENTATION IN POPULAR PYTHON LIBRARY TENSORFLOW BY THE END OF THE BOOK YOU WILL BE TRAINING CNNs IN NO TIME WE START WITH AN OVERVIEW OF POPULAR MACHINE LEARNING AND DEEP LEARNING MODELS AND THEN GET YOU SET UP WITH A TENSORFLOW DEVELOPMENT ENVIRONMENT THIS ENVIRONMENT IS THE BASIS FOR IMPLEMENTING AND TRAINING DEEP LEARNING MODELS IN LATER CHAPTERS THEN YOU WILL USE CONVOLUTIONAL NEURAL NETWORKS TO WORK ON PROBLEMS SUCH AS IMAGE CLASSIFICATION OBJECT DETECTION AND SEMANTIC SEGMENTATION AFTER THAT YOU WILL USE TRANSFER LEARNING TO SEE HOW THESE MODELS CAN SOLVE OTHER DEEP LEARNING PROBLEMS YOU WILL ALSO GET A TASTE OF IMPLEMENTING GENERATIVE MODELS SUCH AS AUTOENCODERS AND GENERATIVE ADVERSARIAL NETWORKS LATER ON YOU WILL SEE USEFUL TIPS ON MACHINE LEARNING BEST PRACTICES AND TROUBLESHOOTING FINALLY YOU WILL LEARN HOW TO APPLY YOUR MODELS ON LARGE DATASETS OF MILLIONS OF IMAGES WHAT YOU WILL LEARN TRAIN MACHINE LEARNING MODELS WITH TENSORFLOW CREATE SYSTEMS THAT CAN EVOLVE AND SCALE DURING THEIR LIFE CYCLE USE CNNs IN IMAGE RECOGNITION AND CLASSIFICATION USE TENSORFLOW FOR BUILDING DEEP LEARNING MODELS TRAIN POPULAR DEEP LEARNING MODELS FINE TUNE A NEURAL NETWORK TO IMPROVE THE QUALITY

OF RESULTS WITH TRANSFER LEARNING BUILD TENSORFLOW MODELS THAT CAN SCALE TO LARGE DATASETS AND SYSTEMS WHO THIS BOOK IS FOR THIS BOOK IS FOR SOFTWARE ENGINEERS DATA SCIENTISTS OR MACHINE LEARNING PRACTITIONERS WHO WANT TO USE CNNs FOR SOLVING REAL WORLD PROBLEMS KNOWLEDGE OF BASIC MACHINE LEARNING CONCEPTS LINEAR ALGEBRA AND PYTHON WILL HELP

THIS MUST READ TEXT REFERENCE INTRODUCES THE FUNDAMENTAL CONCEPTS OF CONVOLUTIONAL NEURAL NETWORKS CONVNETS OFFERING PRACTICAL GUIDANCE ON USING LIBRARIES TO IMPLEMENT CONVNETS IN APPLICATIONS OF TRAFFIC SIGN DETECTION AND CLASSIFICATION THE WORK PRESENTS TECHNIQUES FOR OPTIMIZING THE COMPUTATIONAL EFFICIENCY OF CONVNETS AS WELL AS VISUALIZATION TECHNIQUES TO BETTER UNDERSTAND THE UNDERLYING PROCESSES THE PROPOSED MODELS ARE ALSO THOROUGHLY EVALUATED FROM DIFFERENT PERSPECTIVES USING EXPLORATORY AND QUANTITATIVE ANALYSIS TOPICS AND FEATURES EXPLAINS THE FUNDAMENTAL CONCEPTS BEHIND TRAINING LINEAR CLASSIFIERS AND FEATURE LEARNING DISCUSSES THE WIDE RANGE OF LOSS FUNCTIONS FOR TRAINING BINARY AND MULTI CLASS CLASSIFIERS ILLUSTRATES HOW TO DERIVE CONVNETS FROM FULLY CONNECTED NEURAL NETWORKS AND REVIEWS DIFFERENT TECHNIQUES FOR EVALUATING NEURAL NETWORKS PRESENTS A PRACTICAL LIBRARY FOR IMPLEMENTING CONVNETS EXPLAINING HOW TO USE A PYTHON INTERFACE FOR THE LIBRARY TO CREATE AND ASSESS NEURAL NETWORKS DESCRIBES TWO REAL WORLD EXAMPLES OF THE DETECTION AND CLASSIFICATION OF TRAFFIC SIGNS USING DEEP LEARNING METHODS EXAMINES A RANGE OF VARIED TECHNIQUES FOR VISUALIZING NEURAL NETWORKS USING A PYTHON INTERFACE PROVIDES SELF STUDY EXERCISES AT THE END OF EACH CHAPTER IN ADDITION TO A HELPFUL GLOSSARY WITH RELEVANT PYTHON SCRIPTS SUPPLIED AT AN ASSOCIATED WEBSITE THIS SELF CONTAINED GUIDE WILL BENEFIT THOSE WHO SEEK TO BOTH UNDERSTAND THE THEORY BEHIND DEEP LEARNING AND TO GAIN HANDS ON EXPERIENCE IN IMPLEMENTING CONVNETS IN PRACTICE AS NO PRIOR BACKGROUND KNOWLEDGE IN THE FIELD IS REQUIRED TO FOLLOW THE MATERIAL THE BOOK IS IDEAL FOR ALL STUDENTS OF COMPUTER VISION AND MACHINE LEARNING AND WILL ALSO BE OF GREAT INTEREST TO PRACTITIONERS WORKING ON AUTONOMOUS CARS AND ADVANCED DRIVER ASSISTANCE SYSTEMS

BUILD NEURAL NETWORK MODELS IN TEXT VISION AND ADVANCED ANALYTICS USING PYTORCH KEY FEATURES LEARN PYTORCH FOR IMPLEMENTING CUTTING EDGE DEEP LEARNING ALGORITHMS TRAIN YOUR NEURAL NETWORKS FOR HIGHER SPEED AND FLEXIBILITY AND LEARN HOW TO IMPLEMENT THEM IN VARIOUS SCENARIOS COVER VARIOUS ADVANCED NEURAL NETWORK ARCHITECTURE SUCH AS RESNET INCEPTION DENSENET AND MORE WITH PRACTICAL EXAMPLES BOOK DESCRIPTION DEEP LEARNING POWERS THE MOST INTELLIGENT SYSTEMS IN THE WORLD SUCH AS GOOGLE VOICE SIRI AND ALEXA ADVANCEMENTS IN POWERFUL HARDWARE SUCH AS GPUS SOFTWARE FRAMEWORKS SUCH AS PYTORCH KERAS TENSORFLOW AND CNTK ALONG WITH THE AVAILABILITY OF BIG DATA HAVE MADE IT EASIER TO IMPLEMENT SOLUTIONS TO PROBLEMS IN THE AREAS OF TEXT VISION AND ADVANCED ANALYTICS THIS BOOK WILL GET YOU UP AND RUNNING WITH ONE OF THE MOST CUTTING EDGE DEEP LEARNING LIBRARIES PYTORCH PYTORCH IS GRABBING THE ATTENTION OF DEEP LEARNING RESEARCHERS AND DATA SCIENCE PROFESSIONALS DUE TO ITS ACCESSIBILITY EFFICIENCY AND BEING MORE NATIVE TO PYTHON WAY OF DEVELOPMENT YOU LL START OFF BY INSTALLING PYTORCH THEN QUICKLY MOVE ON TO LEARN VARIOUS FUNDAMENTAL BLOCKS THAT POWER MODERN DEEP LEARNING YOU WILL ALSO LEARN HOW TO USE CNN RNN LSTM AND OTHER NETWORKS TO SOLVE REAL WORLD PROBLEMS THIS BOOK EXPLAINS THE CONCEPTS OF VARIOUS STATE OF THE ART DEEP LEARNING ARCHITECTURES SUCH AS RESNET DENSENET INCEPTION AND SEQ2SEQ WITHOUT DIVING DEEP INTO THE MATH BEHIND THEM YOU WILL ALSO LEARN ABOUT GPU COMPUTING DURING THE COURSE OF THE BOOK YOU WILL SEE HOW TO TRAIN A MODEL WITH PYTORCH AND DIVE INTO COMPLEX NEURAL NETWORKS SUCH AS GENERATIVE NETWORKS FOR PRODUCING TEXT AND IMAGES BY THE END OF THE BOOK YOU LL BE ABLE TO IMPLEMENT DEEP LEARNING APPLICATIONS IN PYTORCH WITH EASE WHAT YOU WILL LEARN USE PYTORCH FOR GPU ACCELERATED TENSOR COMPUTATIONS BUILD CUSTOM DATASETS AND DATA LOADERS FOR IMAGES AND TEST THE MODELS USING TORCHVISION AND TORCHTEXT BUILD AN IMAGE CLASSIFIER BY IMPLEMENTING CNN ARCHITECTURES USING PYTORCH BUILD SYSTEMS THAT DO TEXT CLASSIFICATION AND LANGUAGE MODELING USING RNN LSTM AND GRU LEARN ADVANCED CNN ARCHITECTURES SUCH AS RESNET INCEPTION DENSENET AND LEARN HOW TO USE THEM FOR TRANSFER LEARNING LEARN HOW TO MIX MULTIPLE MODELS FOR A POWERFUL ENSEMBLE MODEL GENERATE NEW IMAGES USING GAN S AND GENERATE ARTISTIC IMAGES USING STYLE TRANSFER WHO THIS BOOK IS FOR THIS BOOK IS FOR MACHINE LEARNING ENGINEERS DATA ANALYSTS DATA SCIENTISTS INTERESTED IN DEEP LEARNING AND ARE LOOKING TO EXPLORE IMPLEMENTING ADVANCED ALGORITHMS IN PYTORCH SOME KNOWLEDGE OF MACHINE LEARNING IS HELPFUL BUT NOT A MANDATORY NEED WORKING KNOWLEDGE OF PYTHON PROGRAMMING IS EXPECTED

INTERNSHIP REPORT FROM THE YEAR 2016 IN THE SUBJECT COMPUTER SCIENCE APPLIED UNIVERSITY OF SCIENCE AND TECHNOLOGY OF HANOI COURSE INTERNSHIP LANGUAGE ENGLISH ABSTRACT IN THIS PROJECT I CREATED AND AUGMENTED A DATASET FROM A NUMBER OF GIVEN IMAGES TO TRAIN AND TEST CONVOLUTIONAL NEURAL NETWORK WHICH IS USED TO CLASSIFY FIVE CLASSES OF IMAGES OF SCANNED DOCUMENTS IN ORDER TO GENERATE THE DATASET SOME IMAGE PROCESSING TECHNIQUES WERE APPLIED SUCH AS SLIDING WINDOW ROTATING FLIPPING AND PYRAMID SIZING THE RESULT OF THIS PHASE IS A SET OF IMAGES HAVING SAME SIZE 244x224x3 THESE IMAGES AFTER BEING LABELED WERE DIVIDED INTO THREE DATASET FOR TRAINING VALIDATING AND TESTING THE NETWORK THE NETWORK IS A SIMPLE CONVOLUTION NEURAL NETWORK WHICH IS ALSO CALLED LENET IT HAS THREE CONVOLUTIONAL LAYERS AND ONE FULLY CONNECTED LAYER AFTER BEING TRAINED AND VALIDATED THE BEST STATE OF THE NETWORK WAS POINTED OUT AND TESTED ON THE TESTING DATASET AND SOME REAL IMAGES THE RESULT SHOWED THAT THE LENET

WAS ABLE TO CLASSIFY IMAGES OF DOCUMENTS IN A PRETTY HIGH ACCURACY AT THE END OF THE PROJECT I MODIFIED THE NETWORK AND DISCUSSED THE AFFECT THAT THOSE CHANGES HAD ON THE NETWORK WITH THE PURPOSE OF CREATING ANOTHER SIMILAR NETWORK WHICH CAN PERFORM BETTER THAN THE ORIGINAL ONE THE RESULT PROVED THAT IT WORKED A LITTLE BETTER THAN ITS ORIGINAL VERSION

DEEP LEARNING 2 BOOK BUNDLE DEEP LEARNING WITH KERAS THIS BOOK WILL INTRODUCE YOU TO VARIOUS SUPERVISED AND UNSUPERVISED DEEP LEARNING ALGORITHMS LIKE THE MULTILAYER PERCEPTRON LINEAR REGRESSION AND OTHER MORE ADVANCED DEEP CONVOLUTIONAL AND RECURRENT NEURAL NETWORKS YOU WILL ALSO LEARN ABOUT IMAGE PROCESSING HANDWRITTEN RECOGNITION OBJECT RECOGNITION AND MUCH MORE FURTHERMORE YOU WILL GET FAMILIAR WITH RECURRENT NEURAL NETWORKS LIKE LSTM AND GAN AS YOU EXPLORE PROCESSING SEQUENCE DATA LIKE TIME SERIES TEXT AND AUDIO THE BOOK WILL DEFINITELY BE YOUR BEST COMPANION ON THIS GREAT DEEP LEARNING JOURNEY WITH KERAS INTRODUCING YOU TO THE BASICS YOU NEED TO KNOW IN ORDER TO TAKE NEXT STEPS AND LEARN MORE ADVANCED DEEP NEURAL NETWORKS HERE IS A PREVIEW OF WHAT YOU LL LEARN HERE THE DIFFERENCE BETWEEN DEEP LEARNING AND MACHINE LEARNING DEEP NEURAL NETWORKS CONVOLUTIONAL NEURAL NETWORKS BUILDING DEEP LEARNING MODELS WITH KERAS MULTI LAYER PERCEPTRON NETWORK MODELS ACTIVATION FUNCTIONS HANDWRITTEN RECOGNITION USING MNIST SOLVING MULTI CLASS CLASSIFICATION PROBLEMS RECURRENT NEURAL NETWORKS AND SEQUENCE CLASSIFICATION AND MUCH MORE CONVOLUTIONAL NEURAL NETWORKS IN PYTHON THIS BOOK COVERS THE BASICS BEHIND CONVOLUTIONAL NEURAL NETWORKS BY INTRODUCING YOU TO THIS COMPLEX WORLD OF DEEP LEARNING AND ARTIFICIAL NEURAL NETWORKS IN A SIMPLE AND EASY TO UNDERSTAND WAY IT IS PERFECT FOR ANY BEGINNER OUT THERE LOOKING FORWARD TO LEARNING MORE ABOUT THIS MACHINE LEARNING FIELD THIS BOOK IS ALL ABOUT HOW TO USE CONVOLUTIONAL NEURAL NETWORKS FOR VARIOUS IMAGE OBJECT AND OTHER COMMON CLASSIFICATION PROBLEMS IN PYTHON HERE WE ALSO TAKE A DEEPER LOOK INTO VARIOUS KERAS LAYER USED FOR BUILDING CNNs WE TAKE A LOOK AT DIFFERENT ACTIVATION FUNCTIONS AND MUCH MORE WHICH WILL EVENTUALLY LEAD YOU TO CREATING HIGHLY ACCURATE MODELS ABLE OF PERFORMING GREAT TASK RESULTS ON VARIOUS IMAGE CLASSIFICATION OBJECT CLASSIFICATION AND OTHER PROBLEMS THEREFORE AT THE END OF THE BOOK YOU WILL HAVE A BETTER INSIGHT INTO THIS WORLD THUS YOU WILL BE MORE THAN PREPARED TO DEAL WITH MORE COMPLEX AND CHALLENGING TASKS ON YOUR OWN HERE IS A PREVIEW OF WHAT YOU LL LEARN IN THIS BOOK CONVOLUTIONAL NEURAL NETWORKS STRUCTURE HOW CONVOLUTIONAL NEURAL NETWORKS ACTUALLY WORK CONVOLUTIONAL NEURAL NETWORKS APPLICATIONS THE IMPORTANCE OF CONVOLUTION OPERATOR DIFFERENT CONVOLUTIONAL NEURAL NETWORKS LAYERS AND THEIR IMPORTANCE ARRANGEMENT OF SPATIAL PARAMETERS HOW AND WHEN TO USE STRIDE AND ZERO PADDING METHOD OF PARAMETER SHARING MATRIX MULTIPLICATION AND ITS IMPORTANCE POOLING AND DENSE LAYERS INTRODUCING NON LINEARITY RELU ACTIVATION FUNCTION HOW TO TRAIN YOUR CONVOLUTIONAL NEURAL NETWORK MODELS USING BACKPROPAGATION HOW AND WHY TO APPLY DROPOUT CNN MODEL TRAINING PROCESS HOW TO BUILD A CONVOLUTIONAL NEURAL NETWORK GENERATING PREDICTIONS AND CALCULATING LOSS FUNCTIONS HOW TO TRAIN AND EVALUATE YOUR MNIST CLASSIFIER HOW TO BUILD A SIMPLE IMAGE CLASSIFICATION CNN AND MUCH MUCH MORE GET THIS BOOK BUNDLE NOW AND SAVE MONEY

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 GOOGLNET 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 GOOGLNET 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

CONVOLUTIONAL NEURAL NETWORKS CNNs A TYPE OF DEEP NEURAL NETWORK THAT HAS BECOME DOMINANT IN A VARIETY OF COMPUTER VISION TASKS IN RECENT YEARS CNNs HAVE ATTRACTED INTEREST ACROSS A VARIETY OF DOMAINS DUE TO THEIR HIGH EFFICIENCY AT EXTRACTING MEANINGFUL INFORMATION FROM VISUAL IMAGERY CNNs EXCEL AT A WIDE RANGE OF MACHINE LEARNING AND DEEP LEARNING TASKS AS SENSOR ENABLED INTERNET OF THINGS IOT DEVICES PERVADE EVERY ASPECT OF MODERN LIFE IT IS BECOMING INCREASINGLY CRITICAL TO RUN CNN INFERENCE A COMPUTATIONALLY INTENSIVE APPLICATION ON RESOURCE CONSTRAINED DEVICES THROUGH THIS EDITED VOLUME WE AIM TO PROVIDE A STRUCTURED PRESENTATION OF CNN ENABLED IOT APPLICATIONS IN VISION SPEECH AND NATURAL LANGUAGE PROCESSING THIS BOOK DISCUSSES A VARIETY OF CNN TECHNIQUES AND APPLICATIONS INCLUDING BUT NOT LIMITED TO IOT ENABLED CNN FOR SPEECH DENOISING A SMART APP FOR VISUALLY IMPAIRED PEOPLE DISEASE DETECTION ECG SIGNAL ANALYSIS WEATHER MONITORING TEXTURE ANALYSIS ETC UNLIKE OTHER BOOKS ON THE MARKET THIS BOOK COVERS THE TOOLS TECHNIQUES AND CHALLENGES ASSOCIATED WITH THE IMPLEMENTATION OF CNN ALGORITHMS COMPUTATION TIME AND THE COMPLEXITY ASSOCIATED WITH REASONING AND MODELLING VARIOUS TYPES OF DATA WE HAVE INCLUDED CNNs CURRENT RESEARCH TRENDS AND FUTURE DIRECTIONS

DEVELOP AND OPTIMIZE DEEP LEARNING MODELS WITH ADVANCED ARCHITECTURES THIS BOOK TEACHES YOU THE INTRICATE DETAILS AND SUBTLETIES OF THE ALGORITHMS THAT ARE AT THE CORE OF CONVOLUTIONAL NEURAL NETWORKS IN ADVANCED APPLIED DEEP LEARNING YOU WILL STUDY ADVANCED TOPICS ON CNN AND OBJECT DETECTION USING KERAS AND TENSORFLOW ALONG THE WAY YOU WILL LOOK AT THE FUNDAMENTAL OPERATIONS IN CNN SUCH AS CONVOLUTION AND POOLING AND THEN LOOK AT MORE ADVANCED ARCHITECTURES SUCH AS INCEPTION NETWORKS RESNETS AND MANY MORE WHILE THE BOOK DISCUSSES THEORETICAL TOPICS YOU WILL DISCOVER HOW TO WORK EFFICIENTLY WITH KERAS WITH MANY TRICKS AND TIPS INCLUDING HOW TO CUSTOMIZE LOGGING IN KERAS WITH CUSTOM CALLBACK CLASSES WHAT IS EAGER EXECUTION AND HOW TO USE IT IN YOUR MODELS FINALLY YOU WILL STUDY HOW OBJECT DETECTION WORKS AND BUILD A COMPLETE IMPLEMENTATION OF THE YOLO YOU ONLY LOOK ONCE ALGORITHM IN KERAS AND TENSORFLOW BY THE END OF THE BOOK YOU WILL HAVE IMPLEMENTED VARIOUS MODELS IN KERAS AND LEARNED MANY ADVANCED TRICKS THAT WILL BRING YOUR SKILLS TO THE NEXT LEVEL WHAT YOU WILL LEARN SEE HOW CONVOLUTIONAL NEURAL NETWORKS AND OBJECT DETECTION WORK SAVE WEIGHTS AND MODELS ON DISK PAUSE TRAINING AND RESTART IT AT A LATER STAGE USE HARDWARE ACCELERATION GPUS IN YOUR CODE WORK WITH THE DATASET TENSORFLOW ABSTRACTION AND USE PRE TRAINED MODELS AND TRANSFER LEARNING REMOVE AND ADD LAYERS TO PRE TRAINED NETWORKS TO ADAPT THEM TO YOUR SPECIFIC PROJECT APPLY PRE TRAINED MODELS SUCH AS ALEXNET AND VGG16 TO NEW DATASETS WHO THIS BOOK IS FOR SCIENTISTS AND RESEARCHERS WITH INTERMEDIATE TO ADVANCED PYTHON AND MACHINE LEARNING KNOW HOW ADDITIONALLY INTERMEDIATE KNOWLEDGE OF KERAS AND TENSORFLOW IS EXPECTED

ONE STOP GUIDE TO IMPLEMENTING AWARD WINNING AND CUTTING EDGE CNN ARCHITECTURES KEY FEATURES FAST PACED GUIDE WITH USE CASES AND REAL WORLD EXAMPLES TO GET WELL VERSED WITH CNN TECHNIQUES IMPLEMENT CNN MODELS ON IMAGE CLASSIFICATION TRANSFER LEARNING OBJECT DETECTION INSTANCE SEGMENTATION GANS AND MORE IMPLEMENT POWERFUL USE CASES LIKE IMAGE CAPTIONING REINFORCEMENT LEARNING FOR HARD ATTENTION AND RECURRENT ATTENTION MODELS BOOK DESCRIPTION CONVOLUTIONAL NEURAL NETWORK CNN IS REVOLUTIONIZING SEVERAL APPLICATION DOMAINS SUCH AS VISUAL RECOGNITION SYSTEMS SELF DRIVING CARS MEDICAL DISCOVERIES INNOVATIVE ECOMMERCE AND MORE YOU WILL LEARN TO CREATE INNOVATIVE SOLUTIONS AROUND IMAGE AND VIDEO ANALYTICS TO SOLVE COMPLEX MACHINE LEARNING AND COMPUTER VISION RELATED PROBLEMS AND IMPLEMENT REAL LIFE CNN MODELS THIS BOOK STARTS WITH AN OVERVIEW OF DEEP NEURAL NETWORKS WITH THE EXAMPLE OF IMAGE CLASSIFICATION AND WALKS YOU THROUGH BUILDING YOUR FIRST CNN FOR HUMAN FACE DETECTOR WE WILL LEARN TO USE CONCEPTS LIKE TRANSFER LEARNING WITH CNN AND AUTO ENCODERS TO BUILD VERY POWERFUL MODELS EVEN WHEN NOT MUCH OF SUPERVISED TRAINING DATA OF LABELED IMAGES IS AVAILABLE LATER WE BUILD UPON THE LEARNING ACHIEVED TO BUILD ADVANCED VISION RELATED ALGORITHMS FOR OBJECT DETECTION INSTANCE SEGMENTATION GENERATIVE ADVERSARIAL NETWORKS IMAGE CAPTIONING ATTENTION MECHANISMS FOR VISION AND RECURRENT MODELS FOR VISION BY THE END OF THIS BOOK YOU SHOULD BE READY TO IMPLEMENT ADVANCED EFFECTIVE AND EFFICIENT CNN MODELS AT YOUR PROFESSIONAL PROJECT OR PERSONAL INITIATIVES BY WORKING ON COMPLEX IMAGE AND VIDEO DATASETS WHAT YOU WILL LEARN FROM CNN BASIC BUILDING BLOCKS TO ADVANCED CONCEPTS UNDERSTAND PRACTICAL AREAS THEY CAN BE APPLIED TO BUILD AN IMAGE CLASSIFIER CNN MODEL TO UNDERSTAND HOW DIFFERENT COMPONENTS INTERACT WITH EACH OTHER AND THEN LEARN HOW TO OPTIMIZE IT LEARN DIFFERENT ALGORITHMS THAT CAN BE APPLIED TO OBJECT DETECTION AND INSTANCE SEGMENTATION LEARN ADVANCED CONCEPTS LIKE ATTENTION MECHANISMS FOR CNN TO IMPROVE PREDICTION ACCURACY UNDERSTAND TRANSFER LEARNING AND IMPLEMENT AWARD WINNING CNN ARCHITECTURES LIKE ALEXNET VGG GOOGLNET RESNET AND MORE UNDERSTAND THE WORKING OF GENERATIVE ADVERSARIAL NETWORKS AND HOW IT CAN CREATE NEW UNSEEN IMAGES WHO THIS BOOK IS FOR THIS BOOK IS FOR DATA SCIENTISTS MACHINE LEARNING AND DEEP LEARNING PRACTITIONERS COGNITIVE AND ARTIFICIAL INTELLIGENCE ENTHUSIASTS WHO WANT TO MOVE ONE STEP FURTHER IN BUILDING CONVOLUTIONAL NEURAL NETWORKS GET HANDS ON EXPERIENCE WITH EXTREME DATASETS AND DIFFERENT CNN ARCHITECTURES TO BUILD EFFICIENT AND SMART CONVNET MODELS BASIC KNOWLEDGE OF DEEP LEARNING CONCEPTS AND PYTHON PROGRAMMING LANGUAGE IS EXPECTED

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

CONCEPTUALIZING DEEP LEARNING IN COMPUTER VISION APPLICATIONS USING PYTORCH AND PYTHON LIBRARIES KEY FEATURES COVERS A VARIETY OF COMPUTER VISION PROJECTS INCLUDING FACE RECOGNITION AND OBJECT RECOGNITION SUCH AS YOLO FASTER R CNN INCLUDES GRAPHICAL REPRESENTATIONS AND ILLUSTRATIONS OF NEURAL NETWORKS AND TEACHES HOW TO PROGRAM THEM INCLUDES DEEP LEARNING TECHNIQUES AND ARCHITECTURES INTRODUCED BY MICROSOFT GOOGLE AND THE UNIVERSITY OF OXFORD DESCRIPTION ELEMENTS OF DEEP LEARNING FOR COMPUTER VISION GIVES A THOROUGH UNDERSTANDING OF DEEP LEARNING AND PROVIDES HIGHLY ACCURATE COMPUTER VISION SOLUTIONS WHILE USING LIBRARIES LIKE PYTORCH THIS BOOK INTRODUCES YOU TO DEEP LEARNING AND EXPLAINS ALL THE CONCEPTS REQUIRED TO UNDERSTAND THE BASIC WORKING DEVELOPMENT AND TUNING OF A NEURAL NETWORK USING PYTORCH THE BOOK THEN ADDRESSES THE FIELD OF COMPUTER VISION USING TWO LIBRARIES INCLUDING THE PYTHON WRAPPER VERSION OF OPENCV AND PIL AFTER ESTABLISHING AND UNDERSTANDING BOTH THE PRIMARY CONCEPTS THE BOOK ADDRESSES THEM TOGETHER BY EXPLAINING CONVOLUTIONAL NEURAL NETWORKS CNNs CNNs ARE FURTHER ELABORATED USING TOP INDUSTRY STANDARDS AND RESEARCH TO EXPLAIN HOW THEY PROVIDE COMPLICATED OBJECT DETECTION IN IMAGES AND VIDEOS WHILE ALSO EXPLAINING THEIR EVALUATION TOWARDS THE END THE BOOK EXPLAINS HOW TO DEVELOP A FULLY FUNCTIONAL OBJECT DETECTION MODEL INCLUDING ITS DEPLOYMENT OVER APIS BY THE END OF THIS BOOK YOU ARE WELL EQUIPPED WITH THE ROLE OF DEEP LEARNING IN THE FIELD OF COMPUTER VISION ALONG WITH A GUIDED PROCESS TO DESIGN DEEP LEARNING SOLUTIONS WHAT YOU WILL LEARN GET TO KNOW THE MECHANISM OF DEEP LEARNING AND HOW NEURAL NETWORKS OPERATE LEARN TO DEVELOP A HIGHLY ACCURATE NEURAL NETWORK MODEL ACCESS TO RICH PYTHON LIBRARIES TO ADDRESS COMPUTER VISION CHALLENGES BUILD DEEP LEARNING MODELS USING PYTORCH AND LEARN HOW TO DEPLOY USING THE API LEARN TO DEVELOP OBJECT DETECTION AND FACE RECOGNITION MODELS ALONG WITH THEIR DEPLOYMENT WHO THIS BOOK IS FOR THIS BOOK IS FOR THE READERS WHO ASPIRE TO GAIN A STRONG FUNDAMENTAL UNDERSTANDING OF HOW TO INFUSE DEEP LEARNING INTO COMPUTER VISION AND IMAGE PROCESSING APPLICATIONS READERS ARE EXPECTED TO HAVE INTERMEDIATE PYTHON SKILLS NO PREVIOUS KNOWLEDGE OF PYTORCH AND COMPUTER VISION IS REQUIRED

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THIS BOOK REVIEWS THE STATE OF THE ART IN DEEP LEARNING APPROACHES TO HIGH PERFORMANCE ROBUST DISEASE DETECTION ROBUST AND ACCURATE ORGAN SEGMENTATION IN MEDICAL IMAGE COMPUTING RADIOLOGICAL AND PATHOLOGICAL IMAGING MODALITIES AND THE CONSTRUCTION AND MINING OF LARGE SCALE RADIOLOGY DATABASES IT PARTICULARLY FOCUSES ON THE APPLICATION OF CONVOLUTIONAL NEURAL NETWORKS AND ON RECURRENT NEURAL NETWORKS LIKE LSTM USING NUMEROUS PRACTICAL EXAMPLES TO COMPLEMENT THE THEORY THE BOOK S CHIEF FEATURES ARE AS FOLLOWS IT HIGHLIGHTS HOW DEEP NEURAL NETWORKS CAN BE USED TO ADDRESS NEW QUESTIONS AND PROTOCOLS AND TO TACKLE CURRENT CHALLENGES IN MEDICAL IMAGE COMPUTING PRESENTS A COMPREHENSIVE REVIEW OF THE LATEST RESEARCH AND LITERATURE AND DESCRIBES A RANGE OF DIFFERENT METHODS THAT EMPLOY DEEP LEARNING FOR OBJECT OR LANDMARK DETECTION TASKS IN 2D AND 3D MEDICAL IMAGING IN ADDITION THE BOOK EXAMINES A BROAD SELECTION OF TECHNIQUES FOR SEMANTIC SEGMENTATION USING DEEP LEARNING PRINCIPLES IN MEDICAL IMAGING INTRODUCES A NOVEL APPROACH TO TEXT AND IMAGE DEEP EMBEDDING FOR A LARGE SCALE CHEST X RAY IMAGE DATABASE AND DISCUSSES HOW DEEP LEARNING RELATIONAL GRAPHS CAN BE USED TO ORGANIZE A SIZABLE COLLECTION OF RADIOLOGY FINDINGS FROM REAL CLINICAL PRACTICE ALLOWING SEMANTIC SIMILARITY BASED RETRIEVAL THE INTENDED READER OF THIS EDITED BOOK IS A PROFESSIONAL ENGINEER SCIENTIST OR A GRADUATE STUDENT WHO IS ABLE TO COMPREHEND GENERAL CONCEPTS OF IMAGE PROCESSING COMPUTER VISION AND MEDICAL IMAGE ANALYSIS THEY CAN APPLY COMPUTER SCIENCE AND MATHEMATICAL PRINCIPLES INTO PROBLEM SOLVING PRACTICES IT MAY BE NECESSARY TO HAVE A CERTAIN LEVEL OF FAMILIARITY WITH A NUMBER OF MORE ADVANCED SUBJECTS IMAGE FORMATION AND ENHANCEMENT IMAGE UNDERSTANDING VISUAL RECOGNITION IN MEDICAL APPLICATIONS STATISTICAL LEARNING DEEP NEURAL NETWORKS STRUCTURED PREDICTION AND IMAGE SEGMENTATION

THIS BOOK PRESENTS A DETAILED REVIEW OF THE STATE OF THE ART IN DEEP LEARNING APPROACHES FOR SEMANTIC OBJECT DETECTION AND SEGMENTATION IN MEDICAL IMAGE COMPUTING AND LARGE SCALE RADIOLOGY DATABASE MINING A PARTICULAR FOCUS IS PLACED ON THE APPLICATION OF CONVOLUTIONAL NEURAL NETWORKS WITH THE THEORY SUPPORTED BY PRACTICAL EXAMPLES FEATURES HIGHLIGHTS HOW THE USE OF DEEP NEURAL NETWORKS CAN ADDRESS NEW QUESTIONS AND PROTOCOLS AS WELL AS IMPROVE UPON EXISTING CHALLENGES IN MEDICAL IMAGE COMPUTING DISCUSSES THE INSIGHTFUL RESEARCH EXPERIENCE OF DR RONALD M SUMMERS PRESENTS A COMPREHENSIVE REVIEW OF THE LATEST RESEARCH AND LITERATURE DESCRIBES A RANGE OF DIFFERENT METHODS THAT MAKE USE OF DEEP LEARNING FOR OBJECT OR LANDMARK DETECTION TASKS IN 2D AND 3D MEDICAL IMAGING EXAMINES A VARIED SELECTION OF TECHNIQUES FOR SEMANTIC SEGMENTATION USING DEEP LEARNING PRINCIPLES IN MEDICAL IMAGING INTRODUCES A NOVEL APPROACH TO INTERLEAVED TEXT AND IMAGE DEEP MINING ON A LARGE SCALE RADIOLOGY IMAGE DATABASE

DEPLOY DEEP LEARNING APPLICATIONS INTO PRODUCTION ACROSS MULTIPLE PLATFORMS YOU WILL WORK ON COMPUTER VISION APPLICATIONS THAT USE THE CONVOLUTIONAL NEURAL NETWORK CNN DEEP LEARNING MODEL AND PYTHON THIS BOOK STARTS BY EXPLAINING THE TRADITIONAL MACHINE LEARNING PIPELINE WHERE YOU WILL ANALYZE AN IMAGE DATASET ALONG THE WAY YOU WILL COVER ARTIFICIAL NEURAL NETWORKS ANNS BUILDING ONE FROM SCRATCH IN PYTHON BEFORE OPTIMIZING IT USING GENETIC ALGORITHMS FOR AUTOMATING THE PROCESS THE BOOK HIGHLIGHTS THE LIMITATIONS OF TRADITIONAL HAND CRAFTED FEATURES FOR COMPUTER VISION AND WHY THE CNN DEEP LEARNING MODEL IS THE STATE OF ART SOLUTION CNNs ARE DISCUSSED FROM SCRATCH TO DEMONSTRATE HOW THEY ARE DIFFERENT AND MORE EFFICIENT THAN THE FULLY CONNECTED ANN FCNN YOU WILL IMPLEMENT A CNN IN PYTHON TO GIVE YOU A FULL UNDERSTANDING OF THE MODEL AFTER CONSOLIDATING THE BASICS YOU WILL USE TENSORFLOW TO BUILD A PRACTICAL IMAGE RECOGNITION MODEL THAT YOU WILL DEPLOY TO A WEB SERVER USING FLASK MAKING IT ACCESSIBLE OVER THE INTERNET USING KIVY AND NUMPY YOU WILL CREATE CROSS PLATFORM DATA SCIENCE APPLICATIONS WITH LOW OVERHEADS THIS BOOK WILL HELP YOU APPLY DEEP LEARNING AND COMPUTER VISION CONCEPTS FROM SCRATCH STEP BY STEP FROM CONCEPTION TO PRODUCTION WHAT YOU WILL LEARN UNDERSTAND HOW ANNS AND CNNs WORK CREATE COMPUTER VISION APPLICATIONS AND CNNs FROM SCRATCH USING PYTHON FOLLOW A DEEP LEARNING PROJECT FROM CONCEPTION TO PRODUCTION USING TENSORFLOW USE NUMPY WITH KIVY TO BUILD CROSS PLATFORM DATA SCIENCE APPLICATIONS WHO THIS BOOK IS FOR DATA SCIENTISTS MACHINE LEARNING AND DEEP LEARNING ENGINEERS SOFTWARE DEVELOPERS

IMPLEMENT NEURAL NETWORK ARCHITECTURES BY BUILDING THEM FROM SCRATCH FOR MULTIPLE REAL WORLD APPLICATIONS KEY FEATURES FROM SCRATCH BUILD MULTIPLE NEURAL NETWORK ARCHITECTURES SUCH AS CNN RNN LSTM IN KERAS DISCOVER TIPS AND TRICKS FOR DESIGNING A ROBUST NEURAL NETWORK TO SOLVE REAL WORLD PROBLEMS GRADUATE FROM UNDERSTANDING THE WORKING DETAILS OF NEURAL NETWORKS AND MASTER THE ART OF FINE TUNING THEM BOOK DESCRIPTION THIS BOOK WILL TAKE YOU FROM THE BASICS OF NEURAL NETWORKS TO ADVANCED IMPLEMENTATIONS OF ARCHITECTURES USING A RECIPE BASED APPROACH WE WILL LEARN ABOUT HOW NEURAL NETWORKS WORK AND THE IMPACT OF VARIOUS HYPER PARAMETERS ON A NETWORK S ACCURACY ALONG WITH LEVERAGING NEURAL NETWORKS FOR STRUCTURED AND UNSTRUCTURED DATA LATER WE WILL LEARN HOW TO CLASSIFY AND DETECT OBJECTS IN IMAGES WE WILL ALSO LEARN TO USE TRANSFER LEARNING FOR MULTIPLE APPLICATIONS INCLUDING A SELF DRIVING CAR USING CONVOLUTIONAL NEURAL NETWORKS WE WILL GENERATE IMAGES WHILE LEVERAGING GANS AND ALSO BY PERFORMING IMAGE ENCODING ADDITIONALLY WE WILL PERFORM TEXT ANALYSIS USING WORD VECTOR BASED TECHNIQUES LATER WE WILL USE RECURRENT NEURAL NETWORKS AND LSTM TO IMPLEMENT CHATBOT AND MACHINE TRANSLATION SYSTEMS FINALLY YOU WILL LEARN ABOUT TRANSCRIBING IMAGES AUDIO AND GENERATING CAPTIONS AND ALSO USE DEEP Q LEARNING TO BUILD AN AGENT THAT PLAYS SPACE INVADERS GAME BY THE END OF THIS BOOK YOU WILL HAVE DEVELOPED THE SKILLS TO CHOOSE AND CUSTOMIZE MULTIPLE NEURAL NETWORK ARCHITECTURES FOR VARIOUS DEEP LEARNING PROBLEMS YOU MIGHT ENCOUNTER WHAT YOU WILL LEARN BUILD MULTIPLE ADVANCED NEURAL NETWORK ARCHITECTURES FROM SCRATCH EXPLORE TRANSFER LEARNING TO PERFORM OBJECT DETECTION AND CLASSIFICATION BUILD SELF DRIVING CAR APPLICATIONS USING INSTANCE AND SEMANTIC SEGMENTATION UNDERSTAND DATA ENCODING FOR IMAGE TEXT AND RECOMMENDER SYSTEMS IMPLEMENT TEXT ANALYSIS USING SEQUENCE TO SEQUENCE LEARNING LEVERAGE A COMBINATION OF CNN AND RNN TO PERFORM END TO END LEARNING BUILD AGENTS TO PLAY GAMES USING DEEP Q LEARNING WHO THIS BOOK IS FOR THIS INTERMEDIATE LEVEL BOOK TARGETS BEGINNERS AND INTERMEDIATE LEVEL MACHINE LEARNING PRACTITIONERS AND DATA SCIENTISTS WHO HAVE JUST STARTED THEIR JOURNEY WITH NEURAL NETWORKS THIS BOOK IS FOR THOSE WHO ARE LOOKING FOR RESOURCES TO HELP THEM NAVIGATE THROUGH THE VARIOUS NEURAL NETWORK ARCHITECTURES YOU LL BUILD MULTIPLE ARCHITECTURES WITH CONCOMITANT CASE STUDIES ORDERED BY THE COMPLEXITY OF THE PROBLEM A BASIC UNDERSTANDING OF PYTHON PROGRAMMING AND A FAMILIARITY WITH BASIC MACHINE LEARNING ARE ALL YOU NEED TO GET STARTED WITH THIS BOOK

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