

THE

REVOLUTION

IN NETWORKING,
CYBERSECURITY,
AND EMERGING

TECHNOLOGIES



THE AI REVOLUTION IN NETWORKING, CYBERSECURITY, AND EMERGING TECHNOLOGIES

The Al Revolution in Networking, Cybersecurity, and Emerging Technologies

Table of Contents

Cover

Half Title

Title Page

Copyright Page

Contents

Preface

1 Introducing the Age of AI: Emergence, Growth, and Impact on Technology

The End of Human Civilization

Significant Milestones in Al Development (This Book Is Already Obsolete)

The Al Black Box Problem and Explainable Al

Whats the Difference Between Todays Large Language Models and Traditional Machine Learning?

Hugging Face Hub: A Game-Changer in Collaborative Machine Learning

Als Expansion Across Different Industries: Networking, Cloud Computing, Security, Collaboration, and IoT

Als Impacts on the Job Market

Als Impacts on Security, Ethics, and Privacy

Prompt Injection Attacks

Insecure Output Handling

Training Data Poisoning.

Model Denial of Service



Supply Chain Vulnerabilities

Sensitive Information Disclosure

Insecure Plugin Design

Excessive Agency

Overreliance

Model Theft

Model Inversion and Extraction

Backdoor Attacks

MITRE ATLAS Framework

Al and Ethics

Al and Privacy

Summary

References

2 Connected Intelligence: AI in Computer Networking

The Role of AI in Computer Networking

Al for Network Management

Automating Network Planning

Automating Network Configuration

Automating Network Assurance

Al for Network Optimization

Routing Optimization

Radio Resource Management

Energy Optimization

Al for Network Security

Access Control

Anti-malware Systems

Firewalls

Behavioral Analytics

Software and Application Security



Al for Network Traffic Analysis

Al in Network Digital Twins.

Summary

References

3 Securing the Digital Frontier: Als Role in Cybersecurity

Al in Incident Response: Analyzing Potential Indicators to Determine the Type of Attack

Predictive Analytics

Sentiment Analysis and Potential Threat Intelligence

Text-Based Anomaly Detection

Enhancing Human Expertise in the Security Operations Center Through Al Integration with Other Models

Al in Vulnerability Management and Vulnerability Prioritization

Al in Security Governance, Policies, Processes, and Procedures

Using AI to Create Secure Network Designs

Role of AI in Secure Network Design

Al and Security Implications of IoT, OT, Embedded, and Specialized Systems.

Al and Physical Security

How AI Is Transforming Physical Security

Security Co-pilots

Enhanced Access Control

Al in Security Assessments, Red Teaming, and Penetration Testing

Al in Identity and Account Management

Intelligent Authentication

Automated Account Provisioning and Deprovisioning

Dynamic Access Control

Using AI for Fraud Detection and Prevention



Al and Cryptography

Al-Driven Cryptanalysis

Dynamic Cryptographic Implementations

Integration with Quantum Cryptography

Al in Secure Application Development, Deployment, and Automation

Dynamic Analysis

Intelligent Threat Modeling

Secure Configuration Management

Intelligent Patch Management While Creating Code

Summary

References

4 Al and Collaboration: Building Bridges, Not Walls

Collaboration Tools and the Future of Work

Innovations in Multimedia and Collaboration

What Is Hybrid Work and Why Do We Need It?.

Al for Collaboration

Authentication, Verification, or Authorization Through Voice or Speech Recognition

Reducing Language Barriers with Real-Time Translation

Virtual Assistants

Task Management

Context and Intent Analysis

Workflow Automation

Prescriptive Analytics

Learning and Development

Physical Collaboration Spaces

Virtual Collaboration Spaces

Team Dynamics



Document Management

The Contact Center: A Bridge to Customers

Virtual Agents

Call Routing Optimization

24 × 7 × 365 Support

Multilanguage Support

Customer Sentiment

Quality Assurance and Agent Coaching.

Large Case Volume Handling

Predictive Analytics

Upgrading and Upselling

AR/VR: A Closer Look

Interactive Learning

Al-Assisted Real-Time Rendering

Content Generation

Personalization of Interaction

Virtual Assistant/Selling

NLP and NLU

Sentiments and Emotions

Affective Computing

Summary

References

5 AI in the Internet of Things (AIoT)

Understanding the IoT Landscape

Al for Data Analytics and Decision-Making

Data Processing

Anomaly Detection

Predictive Maintenance

Advanced Data Analytics



Al for IoT Resource Optimization

Al for IoT in Supply Chains

Al for IoT Security

Al and Threat Detection in IoT

Al and Vulnerability Detection in IoT Environments

Al and Authentication in IoT

Al and Physical Safety and Security

Al for IoT in Sustainability

Water Management and Preservation

Energy Management

Sustainable Waste Management and Recycling

Wildlife Conservation

Circular Economy

Summary

References

6 Revolutionizing Cloud Computing with Al

Understanding the Cloud Computing Environment

Virtualization

Application Mobility

Cloud Services

Deployment Models

Cloud Orchestration

Al in Cloud Infrastructure Management

Workload and VM Placement

Demand Prediction and Load-Balancing

Anomaly Detection

Al for Cloud Security

Vulnerabilities and Attacks



How Can Al Help?

Challenges for Al

Al for Cloud Optimization

Cloud Service Optimization

Cloud Infrastructure Optimization

Al and Machine Learning as a Service

Al Infrastructure Services

Al Developer Services: AutoML and Low-Code/No-Code Al

Al Software Services

Advantages of AlaaS

Challenges of AI and Machine Learning in the Cloud

What Lies Ahead

Summary

References

7 Impact of AI in Other Emerging Technologies

Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence

Al in Quantum Computing

Quantum Algorithm Development

Algorithmic Tuning and Automated Circuit Synthesis

Hyperparameter Optimization, Real-Time Adaptation, and Benchmarking for Performance Analysis

How AI Can Revolutionize Quantum Hardware Optimization

Control Operation and Resource Optimization

Data Analysis and Interpretation

Quantum Machine Learning: Leveraging Al Research to Uncover Quantum Advantages in ML Tasks.

Al in Blockchain Technologies



Automating the Execution of Smart Contracts with Al
Could We Optimize Blockchain Mining Through Al Algorithms?
Additional Use Cases in Healthcare, Supply Chain Management, Financial
Services

AI in Autonomous Vehicles and Drones

Al in Edge Computing

Extending the Cloud: Edge and Fog

Taking AI to the Edge

Lightweight AI and Tiny ML

Applications and Use Cases

Web 3.0

Summary

References

Index

