## Contents

Prologue: Terrified	3
Part I: Background	
1. The Roots of Artificial Intelligence	17
2. Neural Networks and the Ascent of Machine Learning	35
3. Al Spring	43
Part II: Looking and Seeing	
4. Who, What, When, Where, Why	67
5. ConvNets and ImageNet	81
6. A Closer Look at Machines That Learn	96
7. On Trustworthy and Ethical Al	117
Part III: Learning to Play	
8. Rewards for Robots	133
9. Game On	145
10. Beyond Games	165
Part IV: Artificial Intelligence Meets Natural Lan	guage
11. Words, and the Company They Keep	177
12. Translation as Encoding and Decoding	197
13. Ask Me Anything	213
Part V: The Barrier of Meaning	
14. On Understanding	235
15. Knowledge, Abstraction, and Analogy in Artificial Intelligence	247
16. Questions, Answers, and Speculations	266
Notes 281	

Index 305