

# Contents

<i>Preface</i>	<i>xi</i>
<i>Acknowledgements</i>	<i>xvi</i>
<b>1 Introduction</b>	<b>1</b>
1.1 <i>Concerns with AI</i>	1
1.2 <i>What Is AI?</i>	3
1.2.1 <i>AIs Explore Alternatives</i>	3
1.2.2 <i>Characteristics of AI Systems</i>	5
1.3 <i>Types of AI</i>	6
1.3.1 <i>Narrow, General, and Intermediate AI</i>	7
1.3.2 <i>Deliberative, Reflexive, and Hybrid AI</i>	9
1.3.3 <i>Machine Learning and Other Subfields of AI</i>	11
1.4 <i>Relevance of AI to Academic Libraries</i>	12
1.5 <i>Looking Ahead</i>	14
1.6 <i>Points for Reflection and Discussion</i>	15
<i>Notes</i>	16
<b>2 Milestones in Deliberative AI Development</b>	<b>19</b>
2.1 <i>Symbol Systems</i>	20
2.2 <i>Expert Systems</i>	21
2.3 <i>Commonsense Reasoning</i>	23
2.4 <i>The Rise of Machine Learning</i>	24
2.5 <i>Machine Learning Approaches of Deliberative AI</i>	27
2.6 <i>Computational Creativity</i>	29
2.6.1 <i>Narrative Generation</i>	29
2.6.2 <i>Interactive Narrative</i>	30
2.7 <i>Back to Academic Libraries</i>	32
2.8 <i>Points for Reflection and Discussion</i>	33
<i>Notes</i>	34

<b>3</b>	<b>The Rise of Connectionist AI</b>	<b>39</b>
3.1	<i>Early History</i>	40
3.2	<i>Deep Learning</i>	44
3.3	<i>Language Models</i>	46
3.3.1	<i>Word2Vec and Word Embeddings</i>	47
3.3.2	<i>Large Language Models</i>	48
3.4	<i>Liquid Neural Networks</i>	52
3.5	<i>Points for Reflection and Discussion</i>	54
	<i>Notes</i>	55
<b>4</b>	<b>Philosophies of Artificial Intelligence</b>	<b>59</b>
4.1	<i>The Turing Test</i>	59
4.1.1	<i>Intelligence Need Not Be Human-Like</i>	60
4.1.2	<i>A Test of Interrogator</i>	62
4.1.3	<i>Relevance Today</i>	63
4.2	<i>The Chinese Room</i>	65
4.3	<i>Implications of False Perceptions about AI Cognition</i>	69
4.4	<i>Points for Reflection and Discussion</i>	70
	<i>Notes</i>	72
<b>5</b>	<b>Ethical and Societal Considerations</b>	<b>75</b>
5.1	<i>AI Safety</i>	75
5.2	<i>Alignment</i>	77
5.3	<i>Latent Bias</i>	78
5.3.1	<i>Bias Runs Deep</i>	79
5.3.2	<i>Attempts at Debiasing</i>	80
5.4	<i>Misinformation</i>	81
5.4.1	<i>Hallucinations</i>	82
5.4.2	<i>Creativity, Error, Dream Machines, and the Chinese Room</i>	84
5.4.3	<i>A Rush to Market</i>	84
5.5	<i>Disinformation</i>	85
5.6	<i>Environmental Implications of AI</i>	88
5.7	<i>The Ethical Responsibilities of Librarians</i>	92
5.8	<i>Points for Reflection and Discussion</i>	94
	<i>Notes</i>	95

<b>6</b>	<b>Intellectual Property Rights and Obligations</b>	<b>100</b>
6.1	<i>Scholarship</i>	100
6.1.1	<i>Peer Review</i>	102
6.1.2	<i>Scientific Figures</i>	103
6.1.3	<i>Logic of Discovery</i>	104
6.2	<i>Copyright</i>	105
6.2.1	<i>Is Training an LLM on Copyrighted Data a Fair Use?</i>	106
6.2.2	<i>Is AI Generated Content Copyrightable?</i>	107
6.3	<i>Plagiarism and Scholarly Standards</i>	111
6.4	<i>Teaching Composition in the Age of AI</i>	113
6.5	<i>Human-AI Collaboration</i>	114
6.6	<i>Points for Reflection and Discussion</i>	117
	<i>Notes</i>	118
<b>7</b>	<b>Hybrid AIs</b>	<b>122</b>
7.1	<i>Playing to Respective Strengths</i>	123
7.1.1	<i>Reflex and Reasoning</i>	123
7.1.2	<i>Reasoning and Communication</i>	125
7.1.3	<i>Setting the Stage</i>	126
7.1.4	<i>Retrieval Augmented Generation</i>	127
7.1.5	<i>Layering AIs</i>	127
7.2	<i>Chain-of-Thought Reasoning</i>	129
7.3	<i>Agentic AI</i>	131
7.4	<i>Mixture of Experts</i>	134
7.5	<i>Compilation of Deliberative AI into Connectionist AI</i>	136
7.6	<i>Points for Reflection and Discussion</i>	137
	<i>Notes</i>	137
<b>8</b>	<b>Robust Conversational AI</b>	<b>141</b>
8.1	<i>Open-Domain Question Answering</i>	142
8.1.1	<i>Identifying Faulty Presuppositions</i>	142
8.1.2	<i>Identifying and Revising Unanswerable Questions</i>	144
8.2	<i>In-Context Learning</i>	145
8.2.1	<i>Is In-Context Learning Really Learning?</i>	146
8.2.2	<i>In-Context Learning Activates Latent Knowledge</i>	147
8.3	<i>Retrieval-Augmented Generation</i>	149

8.4	<i>Fine-Tuning</i>	150
8.4.1	<i>What is Fine-Tuning?</i>	150
8.4.2	<i>Instruction Tuning</i>	151
8.4.3	<i>Safety Tuning</i>	152
8.4.4	<i>Computational Cost of Fine-Tuning</i>	153
8.5	<i>Collaborating on Conversational AI</i>	154
8.6	<i>Points for Reflection and Discussion</i>	154
	<i>Notes</i>	155
<b>9</b>	<b>Professional Development</b>	<b>158</b>
9.1	<i>Communicating and Teaming with AIs</i>	159
9.2	<i>Safety Constraints and Alignment</i>	161
9.3	<i>Automation</i>	163
9.4	<i>Grant Support and Participation</i>	165
9.5	<i>Transparency and Research Reproducibility</i>	168
9.6	<i>Computer Programming</i>	171
9.7	<i>Mathematics</i>	172
9.8	<i>Keeping Up with Rapid Change</i>	173
9.9	<i>Points for Reflection and Discussion</i>	174
	<i>Notes</i>	174
<b>10</b>	<b>Looking Forward</b>	<b>177</b>
10.1	<i>Future Scenarios</i>	178
10.2	<i>Integration</i>	179
10.3	<i>Socialization</i>	181
10.4	<i>Curation</i>	183
	<i>Notes</i>	186
	<i>Bibliography</i>	188
	<i>Index</i>	208