1. Record Nr. UNINA9910643366203321 Autore Brown Barclay R. **Titolo** Engineering intelligent systems: systems engineering and design with artificial intelligence, visual modeling, and systems thinking / / Barclay Hoboken, New Jersey:,: John Wiley & Sons, Incorporated,, [2022] Pubbl/distr/stampa ©2022 **ISBN** 1-119-66564-7 1-119-66561-2 Descrizione fisica 1 online resource (387 pages) Disciplina 620.001171 Soggetti Systems engineering Artificial intelligence Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Includes index. Note generali Cover -- Title Page -- Copyright -- Contents -- Acknowledgments --Nota di contenuto

Introduction -- Part I Systems and Artificial Intelligence -- Chapter 1 Artificial Intelligence, Science Fiction, and Fear -- 1.1 The Danger of Al -- 1.2 The Human Analogy -- 1.3 The Systems Analogy -- 1.4 Killer Robots -- 1.5 Watching the Watchers -- 1.6 Cybersecurity in a World of Fallible Humans -- 1.7 Imagining Failure -- 1.8 The New Role of Data: The Green School Bus Problem -- 1.9 Data Requirements -- 1.9.1 Diversity -- 1.9.2 Augmentation -- 1.9.3 Distribution -- 1.9.4 Synthesis -- 1.10 The Data Lifecycle -- 1.11 Al Systems and People Systems -- 1.12 Making an AI as Safe as a Human -- References --Chapter 2 We Live in a World of Systems -- 2.1 What Is a System? --2.2 Natural Systems -- 2.3 Engineered Systems -- 2.4 Human Activity Systems -- 2.5 Systems as a Profession -- 2.5.1 Systems Engineering -- 2.5.2 Systems Science -- 2.5.3 Systems Thinking -- 2.6 A Biological Analogy -- 2.7 Emergent Behavior: What Makes a System, a System --2.8 Hierarchy in Systems -- 2.9 Systems Engineering -- Chapter 3 The Intelligence in the System: How Artificial Intelligence Really Works --3.1 What Is Artificial Intelligence? -- 3.1.1 Myth 1: AI Systems Work Just Like the Brain Does -- 3.1.2 Myth 2: As Neural Networks Grow in Size and Speed, They Get Smarter -- 3.1.3 Myth 3: Solving a Hard or

Complex Problem Shows That an Al Is Nearing Human Intelligence --3.2 Training the Deep Neural Network -- 3.3 Testing the Neural Network -- 3.4 Annie Learns to Identify Dogs -- 3.5 How Does a Neural Network Work? -- 3.6 Features: Latent and Otherwise -- 3.7 Recommending Movies -- 3.8 The OnePage Deep Neural Network --Chapter 4 Intelligent Systems and the People they Love -- 4.1 Can Machines Think? -- 4.2 Human Intelligence vs. Computer Intelligence. 4.3 The Chinese Room: Understanding, Intentionality, and Consciousness -- 4.4 Objections to the Chinese Room Argument --4.4.1 The Systems Reply to the CRA -- 4.4.2 The Robot Reply -- 4.4.3 The Brain Simulator Reply -- 4.4.4 The Combination Reply -- 4.4.5 The Other Minds Reply -- 4.4.6 The Many Mansions Reply -- 4.5 Agreement on the CRA -- 4.5.1 Analyzing the Systems Reply: Can the Room Understand when Searle Does Not? -- 4.6 Implementation of the Chinese Room System -- 4.7 Is There a ChineseUnderstanding Mind in the Room? -- 4.7.1 Searle and Block on Whether the Chinese Room Can Understand -- 4.8 Chinese Room: Simulator or an Artificial Mind? --4.8.1 Searle on Strong Al Motivations -- 4.8.2 Understanding and Simulation -- 4.9 The Mind of the Programmer -- 4.10 Conclusion --References -- Part II Systems Engineering for Intelligent Systems --Chapter 5 Designing Systems by Drawing Pictures and Telling Stories -- 5.1 Requirements and Stories -- 5.2 Stories and Pictures: A Better Way -- 5.3 How Systems Come to Be -- 5.4 The Paradox of Cost Avoidance -- 5.5 Communication and Creativity in Engineering -- 5.6 Seeing the Real Needs -- 5.7 Telling Stories -- 5.8 Bringing a Movie to Life -- 5.9 Telling System Stories -- 5.10 The Combination Pitch --5.11 Stories in Time -- 5.12 Roles and Personas -- Chapter 6 Use Cases: The Superpower of Systems Engineering -- 6.1 The Main Purpose of Systems Engineering -- 6.2 Getting the Requirements Right: A Parable -- 6.2.1 A Parable of Systems Engineering -- 6.3 Building a Home: A Journey of Requirements and Design -- 6.4 Where Requirements Come From and a Koan -- 6.4.1 A Requirements Koan --6.5 The Magic of Use Cases -- 6.6 The Essence of a Use Case -- 6.7 Use Case vs. Functions: A Parable -- 6.8 Identifying Actors -- 6.8.1 Actors Are Outside the System -- 6.8.2 Actors Interact with the System. 6.8.3 Actors Represent Roles -- 6.8.4 Finding the Real Actors -- 6.8.5 Identifying Nonhuman Actors -- 6.8.6 Do We Have ALL the Actors? --6.9 Identifying Use Cases -- 6.10 Use Case Flows of Events -- 6.10.1 Balancing Work UpFront with Speed -- 6.10.2 Use Case Flows and Scenarios -- 6.10.3 Writing Alternate Flows -- 6.10.4 Include and Extend with Use Cases -- 6.11 Examples of Use Cases -- 6.11.1 Example Use Case 1: Request Customer Service from Acme Library Support -- 6.11.2 Example Use Case 2: Ensure Network Stability --6.11.3 Example Use Case 3: Search for Boat in Inventory -- 6.12 Use Cases with Human Activity Systems -- 6.13 Use Cases as a Superpower -- References -- Chapter 7 Picturing Systems with Model Based Systems Engineering -- 7.1 How Humans Build Things -- 7.2 C: Context -- 7.2.1 Actors for the VX -- 7.2.2 Actors for the Home System -- 7.3 U: Usage -- 7.4 S: States and Modes -- 7.5 T: Timing -- 7.6 A: Architecture -- 7.7 R: Realization -- 7.8 D: Decomposition -- 7.9 Conclusion -- Chapter 8 A Time for Timeboxes and the Use of Usage Processes -- 8.1 Problems in Time Modeling: Concurrency, False Precision, and Uncertainty -- 8.1.1 Concurrency -- 8.1.2 False Precision -- 8.1.3 Uncertainty -- 8.2 Processes and Use Cases -- 8.3 Modeling: Two Paradigms -- 8.3.1 The Key Observation -- 8.3.2 Source of the Problem -- 8.4 Process and System Paradigms -- 8.5 A Closer Examination of Time -- 8.6 The Need for a New Approach --8.7 The Timebox -- 8.8 Timeboxes with Timelines -- 8.8.1 Thinking in

Timeboxes -- 8.9 The Usage Process -- 8.10 Pilot Project Examples --8.10.1 Pilot Project: The Hunt for Red October -- 8.10.2 Pilot Project: FAA -- 8.10.3 Pilot Project: IBM Agile Process -- 8.11 Summary: A New Paradigm Modeling Approach -- 8.11.1 The Impact of New Paradigm Models -- 8.11.2 The Future of New Paradigm Models -- References. Part III Systems Thinking for Intelligent Systems -- Chapter 9 Solving Hard Problems with Systems Thinking -- 9.1 Human Activity Systems and Systems Thinking -- 9.2 The Central Insight of Systems Thinking -- 9.3 Solving Problems with Systems Thinking -- 9.4 Identify a Problem -- 9.5 Find the Real Problem -- 9.6 Identify the System -- 9.7 Understanding the System -- 9.7.1 Rocks Are Hard -- 9.7.2 Heart and Soul -- 9.7.3 Confusing Cause and Effect -- 9.7.4 Logical Fallacies --9.8 System Archetypes -- 9.8.1 Tragedy of the Commons -- 9.8.2 The Rich Get Richer -- 9.9 Intervening in a System -- 9.10 Testing Implementing Intervention Incrementally -- 9.11 Systems Thinking and the World -- Chapter 10 People Systems: A New Way to Understand the World -- 10.1 Reviewing Types of Systems -- 10.2 People Systems --10.3 People Systems and Psychology -- 10.4 Endowment Effect -- 10.5 Anchoring -- 10.6 Functional Architecture of a Person -- 10.7 Example: The Problem of Pollution -- 10.8 Speech Acts -- 10.8.1 People System Archetypes -- 10.8.1.1 Demand Slowing -- 10.8.1.2 Customer Service -- 10.9 Seeking Quality -- 10.10 Job Hunting as a People System -- 10.10.1 Who Are You? -- 10.10.2 What Do You Want to Do? -- 10.10.3 For Whom? -- 10.10.4 Pick a Few -- 10.10.5 Go Straight to the Hiring Manager -- 10.10.6 Follow Through -- 10.10.7 Broaden Your View -- 10.10.8 Step Two -- 10.11 Shared Service Monopolies -- References -- Index -- EULA.