GENERAL

algorithms to live by the computer science of human decisions

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Algorithms to Live By: The Computer Science of Human Decisions

When we think of algorithms, images of code, data structures, and computational efficiency often come to mind. Yet the same logical frameworks that power our favorite search engines and recommendation systems also govern the choices we make every day—from deciding which restaurant to visit to choosing a life partner. **Algorithms to live by**are the distilled principles that translate complex decision making into simple, actionable steps. This article explores how computer science informs the way humans decide, and how you can harness these insights to improve your everyday life.

Understanding the Intersection of Computer Science and Human Decision-Making

Human decisions are rarely random; they are influenced by context, past experience, and a host of cognitive biases. In computational terms, we can model these processes as *optimization problems*. The goal is to maximize utility—whether that means finding the best job offer, buying the right product, or simply spending time with the people who matter most. By treating decision points as algorithmic challenges, we can apply proven strategies from computer science to reduce uncertainty and increase satisfaction.

Key Algorithms that Mirror Human Behavior

1. Optimal Stopping: The 37% Rule

Optimal stopping problems ask: when should you stop searching to secure the best available option? In the classic "secretary problem," you interview candidates sequentially and can only hire the one you interview last. The solution is to observe the first 37% of candidates without hiring and then choose the next one who outperforms all previous ones. This **37% rule**has been applied to real-life scenarios such as choosing a partner, buying a house, or even selecting a job offer.

2. The Secretary Problem Revisited

While the secretary problem is a theoretical construct, its practical adaptations help in choosing among many alternatives. For instance, if you're deciding on a new smartphone, you might set aside the first 30% of options to gather data, then commit to the next device that surpasses your benchmark.

3. The 50% Decision Threshold

When faced with a binary choice—accept or reject—the **50% threshold**suggests that if you can predict a probability higher than 0.5 that an option is better than your current situation, you should proceed. This simple rule helps in everyday decisions like whether to take a new route to work or keep the usual one.

4. The Pareto Principle (80/20 Rule)

Originating in economics, the **Pareto Principle**states that roughly 80% of results come from 20% of causes. In decision-making, focus on the critical 20% of factors that drive outcomes—such as the key features that truly

matter when buying a car—rather than getting lost in trivial details.

5. The Sunk Cost Algorithm

Computers do not consider past costs when making new decisions. Human behavior, however, often does, leading to the **sunk cost fallacy**. Recognizing this algorithmic bias allows you to treat each decision as a fresh start, improving long-term outcomes.

6. Decision Trees

Decision trees are visual representations of choices and outcomes. They help map complex decisions into a series of binary or multiple-choice nodes, allowing you to evaluate each branch's probability and payoff. This method is especially useful for risk assessment, such as deciding whether to invest in a new venture.

7. Bayesian Updating

Bayesian algorithms update beliefs based on new evidence. In everyday life, this translates to adjusting your expectations after each experience. For example, if a restaurant's service was slow once, Bayesian updating helps you decide whether to try it again based on subsequent experiences and reviews.

8. Multi-Armed Bandit Algorithms

The **multi-armed bandit problem**balances exploration (trying new options) with exploitation (choosing known good options). In practice, it guides decisions like testing different marketing strategies or experimenting with new hobbies while still enjoying proven pleasures.

9. Heuristic Search

Humans often use heuristics—mental shortcuts—to simplify complex searches. Algorithms like A* or greedy search mirror these shortcuts, enabling efficient navigation through large decision spaces. For instance, when planning a vacation, a heuristic might prioritize destinations that combine cost, climate, and cultural appeal.

10. Reinforcement Learning

Reinforcement learning (RL) models how agents learn optimal behavior through rewards and penalties. Applying RL to personal growth involves setting goals, receiving feedback, and adjusting strategies over time—much like a video game that improves your skills with each level.

Applying Algorithmic Thinking to Everyday Life

Career Decisions

1. Define your objective function: What matters most—salary, work-life balance, growth opportunities?
2. Collect data: Research companies, interview experiences, and industry trends.
3. Apply the 37% rule: Sample the first 37% of job offers; then accept the next one that surpasses your benchmark.
4. Use Bayesian updating: Adjust your preferences after each interview based on new information.

Relationships

- Set clear criteria for compatibility.
- Use decision trees to weigh pros and cons of continuing or ending a relationship.
- Apply the Pareto Principle: focus on the 20% of actions that strengthen the bond.
- Recognize sunk costs—don't stay in a relationship solely because of past investments.

Health Choices

When deciding on diet, exercise, or medical treatment, treat each option as a node in a decision tree. Use Bayesian updating to incorporate new research findings or personal experiences, and apply the multi-armed bandit approach to experiment with different routines while maintaining core healthy habits.

Financial Planning

Investing can benefit from reinforcement learning: set small, achievable goals, monitor returns, and adjust your portfolio based on performance. The 80/20 rule helps identify the few investments that generate most of your returns, allowing you to focus resources effectively.

Practical Tips for Implementing Algorithmic Thinking

1. Start with Clear Objectives

Define what success looks like before you begin. Use SMART criteria—Specific, Measurable, Achievable, Relevant, Time-bound—to guide your objective function.

2. Gather Reliable Data

Collect quantitative and qualitative data. In business, this might be market research; in personal life, it could be journaling or tracking habits.

3. Choose the Right Algorithm

Match the problem type to the algorithm: use optimal stopping for selection problems, Bayesian updating for evolving beliefs, or decision trees for multi-factor decisions.

4. Test and Iterate

Run simulations or small experiments to validate assumptions. Reinforcement learning thrives on feedback loops; adjust strategies based on results.

5. Be Mindful of Cognitive Biases

Common biases—confirmation bias, anchoring, overconfidence—can distort algorithmic reasoning. Explicitly counter them by setting objective thresholds and seeking diverse perspectives.

6. Leverage Technology

Use tools like decision making apps, spreadsheet models, or machine learning platforms to automate calculations and visualize outcomes.

Ethical Considerations

Algorithmic decision-making can perpetuate bias if underlying data is flawed. Transparency, fairness, and accountability should guide the design and application of these models. When applying these concepts to personal or professional decisions, ensure that they respect privacy, consent, and diversity.

The Future of Algorithmic Decision-Making

As artificial intelligence and human-computer interaction evolve, we're moving toward hybrid systems where humans and algorithms collaborate. Future tools may offer real-time decision support, adapting to changing preferences and contextual factors. Understanding the fundamentals of algorithmic decision-making now prepares you to navigate this emerging landscape confidently.

Conclusion

By viewing our daily choices through the lens of computer science, we gain a powerful toolkit for navigating uncertainty. From the 37% rule that guides job offers to Bayesian updating that refines our beliefs, these algorithms provide structure without stifling creativity. Embrace algorithmic thinking not as a rigid rulebook but as a flexible framework—one that turns complex decisions into manageable, data driven steps. The next time you face a dilemma, remember that the same logic that powers your favorite search engine can help you make smarter, more satisfying choices.

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