

CSC416 Foundations of Artificial Intelligence

Beyond AI Study/Discussion Guide

Chapter Title: Cybernetics

Top Ten Salient Sentence Blocks

1. “You have one problem: your shell, even though they travel at an average of better than one thousand mph, still take twenty seconds to reach the altitude of the airplanes, and the planes are moving at three hundred mph themselves. By the time your bullet gets there, the plane is more than a mile and a half from where it was when you fired.” (p. 45)
2. “It became clear to Wiener and Rosenblueth that there were some compelling parallels between the mechanisms of prediction, communication, and control in the mechanical gun-steering systems and the ones in the human body. The most important process was feedback.” (p. 46-47)
3. “It’s publication arguably marked the first firm footsteps on the shore of a new territory that has come to be called the *computational theory of mind*. The seventeenth-century philosopher Gottfried Leibniz had spied its mountaintops from afar, but Wiener and company landed and planted a flag.” (p. 47)
4. “He had, for example, made a proposal to US science czar Vannevar Bush in 1940 that, had it been followed, would have resulted in the development of the computer about five years before it actually happened.” (p. 50)
5. “The American electrical engineer and mathematician Claude Shannon’s information theory came out of, among other things, and association with Wiener.” (p. 51)
6. “The basic insight is taken for granted today, but it was an astounding paradigm shift in the 1940s. It is that, in any process one wants to control, one can characterize the results of measurements as a message, and then design control systems that process these messages with feedback to act purposefully. And what’s more, natural control systems such as brains and nerves can be analyzed the same way.” (p. 51)
7. “Serious cybernetics no longer flourishes, at least under that name, but a remarkable number of modern fields of study can trace their roots to it or through it.” (p. 55)
8. “We moderns are so used to digitizing everything we measure or transmit that we find it difficult to realize what a radical departure it was to break smooth, continuous measurements, such as the rapidly varying pressure of the air that is sound, into a finite string of fixed symbols, like the bits that make up an MP3 file.” (p. 56)
9. “They were seen from the start as part of the cybernetics vision of the science of thought, and the popular use of the term, and particularly the prefix *cyber-* (as in cyberspace, cyberpunk, cybercafe, and cybercrime), continues to reflect that sense today.” (p. 58)
10. “What we lost was time, and the knowledge that half a century’s work would have given us.” (p. 60)