The Common Sense Informatic Situation: Towards an Android Linguistics

Evan Donahue

University of Tokyo, Tokyo Japan, evan.donahue@duke.edu

Following World War II, the proliferation of sensor and servo-mechanical technologies lent early theorists of machine intelligence a medium through which to conceptualize machines as similar to simple biological organisms. Both machines and organisms, such as insects and rodents, processed and acted on information from their environment. The discipline of artificial intelligence emerged in this moment as a response to cybernetics, fuelled by the emergence of digital computation. These new and more powerful information processing machines were capable of processing information at speeds that made imaginable a more provocative parallel–that between machines human brains. However, with the move from animal to human, researchers found themselves contending not only with vision and locomotion, but also with that most human of traits, language. In this talk, I consider the ways in which language complicates information processor analogy between humans and machines and how a closer consideration of the informatic qualities of language can offer inspiration for the design of intelligent human-computer interfaces such as that of the Insight Engine.

Early AI pioneer John McCarthy was centrally involved with the break between cybernetics and what would become the discipline of artificial intelligence in the late 1950s. Central to McCarthy's dissatisfaction with cybernetics was the way in which it, in that moment, overlooked questions of language so central to human intelligence. Nevertheless, he also cautioned later in his career against relying too heavily on the cognitive properties of the human form as a blueprint for intelligent machines. He often referred to what he called the "common sense informatic situation" that he argued obtains among humans, animals, machines, Martians, or any other agents seeking to communicate (McCarthy 1989). Intelligence, he argued, was to be sought not in the cognitive patterns of the individual actors, but in the semiotic potentials in their interactions, regardless of how or even whether individual actors understood their interactions. He felt that the project of machine intelligence lay in understanding what it was necessary and possible to communicate and that this was a more tractable project than that of understanding individual cognition, although the precise boundary between the two remained blurry. Perhaps ironically, this research tradition in AI brought it into close alignment with the work of cyberneticists such as Gordon Pask despite the fact that each group's work was nominally a rejection of the other's, which in turn suggests a convergent intuition regarding the design of language technologies.

Such questions ultimately led McCarthy and others in the 1970s and 1980s to a deep engagement with the speech act theory of J.L. Austin and a reflection on the relationship between language, context, and meaning. In its moment, this work illuminated how language routinely subverts its own literal denotation through metaphor, ellipsis, and implication. Moreover, it helped to clarify how in practical terms a machine might be made to engage with such dimensions of language using symbolic and inference-based approaches. Although the subsequent statistical revolution greatly increased the scope of what was possible with natural language technologies, it also brought with it conventions for understanding the informatic content of language that obscured what had previously been uncovered. By tracing this history and offering some preliminary technical investigations into reviving some of these earlier methods, this talk aims to offer inspiration for the design of natural language interfaces.

References

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