Using Argumentation Analysis to Examine History and Status of a Major Debate in Cognitive Science

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Problem

Issues of importance have a long history that furnishes the matrix in which we think our best thoughts. Yet, it gets increasingly harder to keep up with one's own field of scholarship, let alone with the "big questions" in other fields. Students, scholars and interested laypeople wonder to themselves, "What is the detailed status of the debate on the question in cognitive science theory as to whether computers can or will ever be able to think like humans?" and other pivotal questions. They almost immediately give up in despair. It is hard to get a quick, understandable answer.

- There is no place they can -- even with persistence and resources -- get a map and an up-to-date briefing of the major issues.
- It is even harder to try to obtain all of the obscure journals in which the argument actually is taking place, so that particular positions can be inspected in depth.
- There is no easy way of linking positions to rebuttals (so that proposed refutations of data and positions can be easily compared).
- There is no rapid visual way of navigating through the argument -- no way of inspecting its structure and direction.

The Project

The project has been actively engaged in designing techniques that would address these problems. We began with a method of argumentation analysis developed by Stephen Toulmin (1958). This has involved the refining of methods to summarize briefly each "move" in the argument, such as claims and counterclaims, and the development of way of linking claims to rebuttals, so positions can easily be compared. We have worked on methods of visual display of debates so that navigating through the arguments to discover structure and direction is possible. Then, we have focused on using the methodology to map the debates on the question: "Can Computers Think (or will they every be able to)?" A team of four has been developing six large wall charts, each of which contains a "map" of the principal claims and rebuttals in the debate, now totaling almost 600 and are derived from approximately 300 sources world-wide.

Results

The "mapping" approach described has wide applicability and the capability of handling complex argumentation. The approach so far has shown how major issues can better be "seen" as a whole. Observers easily track how the debates have developed historically. They can see where the leading edge of a debate is. Participants in the debate can shape their next moves from the weaknesses of certain arguments in the debates.

New Tools for Teaching

Preliminary use of our approach by professors and students found that, even in their preliminary and incomplete stage, they have many advantages, allowing students to engage issues in ways not possible with current methods. The project team continues to be inspired by Lewis Thomas's observations:

"College students, and for that matter high school students, should be exposed very early, perhaps at the outset, to the big arguments currently going on among scientists. Big arguments stimulate their interest, and with luck engage their absorbed attention... But the young students are told very little about the major disagreements of the day; they may be taught something about the arguments between Darwinians and their opponents a century ago, but they do not realize that similar disputes about other matters, many of them touching profound issues for our understanding of nature, are still going on, and, indeed are an essential feature of the scientific process." (Thomas, 1981, 49)

References

Thomas, L.1981) "Debating the Unknowable" *Atlantic Monthly*, July 1981, 49-50

Toulmin, S. (1958) *The Uses of Argument*, Cambridge, Cambridge Univ. Press