Opinion

On the Other Hand …

Drawing the Line

Patrick Hayes and Kenneth Ford

One of the best things about conferences, as we all know, is the opportunity they afford to consolidate old friendships and make new contacts. Clusters of conversation provide a more valuable way to spend ones time than attending sessions. At the last national meeting we escaped from the celebrations of the recent victory of Deep Blue over the dreaded Kasparov, to find just such a group, already engaged in an animated discussion:

A: We need to draw a line.

B: What line?

A: Between a program that has some intelligence in it and one that doesn't. All Deep Blue does is brute-force search. That hardly counts as AI.

B: I didn't know you were at IBM.

C: Well, Kasparov seemed pretty brutish to me. Deep Blue didn't lose its temper and stomp   off like an angry goat.

D: And searching has always been considered to be an AI technique, surely.

E: That was before connectionism.

A: You know what I mean. Deep Blue is an engineering triumph, but there's no new science in it. Brute-force search is what you do when you don't have any good ideas. It's the antithesis of intelligence. We have to draw the line somewhere cleverer than that.

C: How about learning? Imagine a version that learned to improve its own game. I'd say that was on the intelligent side of the line.

E: Connectionists would agree with that.

B: But learning is often done by searching, at a higher level: searching through version spaces, for example. So if you exclude search, you would have to put many learning algorithms on the wrong side of the line.

E: A connectionist wouldn't think so.

D: Never mind what about what connectionists think.

D: Suppose it learned without searching …

E: …using back-propagation …

D: …yes, using back-propagation, say. That would put it on the intelligent side of the line for me.

A: I'd draw a line between programs that have knowledge and those that don't. Deep Blue doesn't really know anything about chess.

B: There's a lot of chess knowledge wrapped up in its evaluation function. Your line seems to be drawn between programs that have explicit knowledge rather than information encoded in some more ingenious way. The chess knowledge in Kasparov's brain is probably pretty opaquely encoded as well.

C: Look, you said that you wanted a criterion for a program having intelligence in it. But look at a brain …

E: … a brain is a connectionist network…

C: … and ask the analogous question, what is the criterion for its having intelligence in it? That seems like a strange question to ask.

D: If someone had built a world-class chess-player back in the late 1950s or early 1960s, AI would have boasted of a huge success, and rightly so. Those methods work now. Rather than reject them, we ought to be happy we were right. So what if it took some hardware development? Should we only use 40-year-old hardware? That seems like a bad line to draw.

F: What do you all mean by a line, exactly?

A,B,C,D and E (in unison):
What?

F: Do you mean a boundary, a limit of a stripe, or the locus of a point, or what?

A: Are you sure you are at the right conference?

F: I'm an ontologist.

E (aside):
One of my uncles is a surgeon.

A: Well, I draw the line at philosophy.

C: Yes, we need to find a scientific territory somewhere between philosophy and engineering.

F: Thanks to AI, philosophy and engineering overlap these days. That's why I can get military funding to do metaphysics. This is a great time for a philosopher to be alive.

B: So the lines seem to get crossed somewhere.

(pause)

F: Lines are fascinating. Aristotle said …

E: …but wasn't that before connectionism?

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