Dear Stephen,

thank you for your so far unending patience in that discussion. --> =ttp://www.xkcd.com/386/

>> I agree, and yet only a subset of animals can use symbols for =ommunication.
>
> communication and intelligence are not the same thing (think about =ees etc)
>
>> Of these, only a small subset can make use of negation, conjunctions =nd disjunctions in symbolic communication (for instance, Irene =epperberg's famous grey parrots). It appears that only humans can learn =ich grammatical language, and I suspect that this is the primary =nabler of our superior problem solving capabilities.
>
> I disagree. Einstein claimed that his greatest discoveries came from =ental imagery, and he later converted those thoughts to verbal =xpressions only with great difficulty. I think AI has vastly =nderestimated the role of "mental simulation/emulation" in thinking and =easoning.

Nonverbal thinking is primary, and is poorly understood, and it has been =eglected by what we now often call "classic AI". (But if we look at the =riginal ideas, that was probably not intentional. Logic based systems =ere low hanging fruit. Once you have a paradigm and a community, you =nd up with a methodology that is bound to stay, unfortunately.)

But nonverbal thinking is something that I suspect is quite similarly =owerful in other primates. I think that the most interesting difference =etween chimps and humans is how we can use grammatical language to =program" and organize our thought processes, and how we can use it to =uggest, transmit, create and manipulate new categories.

I am on your side insofar as I think that the important research needs =o be done in mental imagery (or more accurately: on mental =epresentations and operations that facilitate mental imagery, among =ther things). But I think that human intelligence is shaped by the =dditions of grammars, which happen to be relatively easy to implement =hen you look at them in isolation. Only grammar on its own cannot do =hat Einstein did.

>>
>>> --]]]]]]]]]]]]]]]]] So.. what would be wrong with building a machine =hat could do well on IQ tests?
>>
>> Nothing is wrong with building a machine that excels at playing chess =r cooking coffee or scoring that the Raven test.
>
> The Raven would be a bad idea -- way too easy. The WAIS has some 11 =ubtests, which cover a wide range of underlying abilities (and are much =ore challenging)

Lets look at them (I have to admit that I am no expert on this, and it =s quite some time ago that I looked at IQ testing):
- The processing speed tests are probably trivial for computers
- The working memory tests are likewise rather simple engineering =roblems
- Perceptual reasoning is somewhat similar to the Raven (maybe I =nderestimate them?)
- Verbal comprehension:

- similarities and vocabulary tests are classical AI and =omputational linguistics
- information is close to IBM's Watson (recognition and =nference)

The only thing that looks interesting to me in the WAIS is the =omprehension test, because I don't see a straightforward approach to =heat on them with narrow AI. I would like to expand exactly this =omain: making sense of the world.

We don't have advanced problem solving ("these are the rules for chess. =ow would you try to beat a beginner level player, a medium player, a =op player most quickly?"). We don't have constructive abilities. We =on't have verbal creativity etc.

Please tell me if my take on the WAIS is wrong!

> How do you know for sure what the "basics" are?

While the literal understanding of the Turing Test leads nowhere (or, =ell, to the Loebner prize), I think that he had the right idea. =ntelligence is reflected in the ability to participate in meaningful =iscourse, which includes interpreting and creatively structuring the =orld. Many of the things that the WAIS measures, like recognizing and =ategorizing shapes, are prerequisites for that. Others might be =cquired tastes that emerge on more basic functionality, like mental =rithmetic. But a toolbox is not an architecture. A collection of tubes, =ires, pedals and spokes is not a bicycle.

Some of the basics stem directly from the requirements of producing =dequate representations of perceptual and abstracted content (hybrid =ierarchical representations that can do associations, compositional =tuff, grammatical systematicity, learning and categorization, =nheritance etc.). Others come from the needs to get the processes of =ottom-up/top-down perception, reflection, memory retrieval, inference, =nalogy building etc. to work. And some have to do with the requirements =f translating between Mentalese (in Pinker's sense, not in Fodor's) and =atural language.

I may delude myself in thinking that I know what the basics are. In =act, it is extremely likely that I do (every computer science problem =eems to be misconceptualized until it has been properly implemented). =ut I would start with mental representation, perceptual processing and =otivational relevance, and then go for language, while revisiting those =reas that turn out to fall short.

> Forget about the Raven; it's a non-verbal test of fluid intelligence =which in fact turns out to have, by accident not design, two different =ypes of items -- solved by spatial vs. analytic strategies). The Raven =oes not even begin to characterize all of what is captured by the WAIS

It might well be that I totally misunderestimate the WAIS requirements; = will look at them.

>> I agree. But I am not convinced that proper emotions are absolutely =ecessary for Intelligence (motivation might suffice to drive some kind =f non-emotional, serene Buddha intelligence). I am nevertheless =nterested in understanding and modeling them.
>
> I think Antonio Damasio and his successors have made a very good case =hat emotion plays a key role in reasoning. (Not just motivation, actual =motion.)

Most of what I would say against that has been better expressed by Aaron =loman. For instance, if my computer is prone to swapping memory content =o hard drive and back, and I kill the part of the OS that coordinates =he swapping, my computer is likely to malfunction. But from this I =annot infer that computers cannot work without swapping. Damasio's argument does not convince me because he does not elucidate a =unctional role that would emotion an absolute requirement for an =rtificial mind. Lesion studies amount to shutting down parts of an =perating system that has been designed to cope with very specific =equirements. I believe that in humans, emotions structure social =nteraction, support communication, prime memory and cognitive =rocessing, and most importantly, allocate the scarce resources of our =ind according to the current situation. None of this is necessary if I =emove the resource constraints.

But again, perhaps there are better arguments now than in the original =omatic marker hypothesis?

Please do not misunderstand me; I am making a merely philosophical point =ere, with respect to the basic requirements for Intelligence. I think =hat emotion is highly interesting, that Damasio is quite correct with =espect to what emotion does, and that it makes a lot of sense (and is =un) to equip AIs with emotion, mood, affect and emotional dispositions. =ut strictly necessary? No.

> Are you involved in BICA? That seems like a natural community for you!

The way I understand it, there are at least four very similar groups =ow: cognitive modeling (that is where John Anderson goes), AGI (started =y Ben Goertzel as an attempt to revive the original AI), BICA (a =emnant from the failed DARPA proposal of the same name, and later =icked up by Alexei Samsonovich as an alternative to AGI, I suspect =ecause he does not get along with Ben), and Cognitive Systems (Pat =angley et al.). I basically like them all, and think that they should =oin forces, while simultaneously raising the bars against narrow AI and =cience fiction. Many members of the audience already belong to two or =ven three of the groups. Alas, politics, mutual accusations of =cruffiness and stuffiness, and so on...

Personally, I have not been to one of the BICA conferences (only a =ouple planning workshops), and I am on their roster of reviewers.

Cheers,

Joscha

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