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**From:** jeffrey E. <jeevacation@gmail.com>  
**Sent:** Monday, March 6, 2017 10:50 PM  
**To:** Joscha Bach  
**Subject:** Re:

watch the octopus, find its prey, is it creative? is it intelligent? are virus creative? finding new methods to infect the host. . hackers=C2 finding new methods to

On Mon, Mar 6, 2017 at 6:47 PM, Joscha Bach <[REDACTED]> wrote:

It seems that much of what we call intelligence could be described as detecting causal structure in a domain. Causality means that you have a model that tells you how change of a condition will influence the distribution of outcomes. Of course, crabs do that too, to an extent.

When I was in Munich, a patent lawyer challenged me to come up with a definition of creativity from a machine learning perspective. He has to judge the originality of inventions, and something that a domain expert can come up with "naturally" does not count as an invention, even if it has never been done before.

Learning systems tend to move along gradients, and the "natural solution" of the domain expert can be seen as an extrapolation of the solution space along the known gradients, until an optimum is found. Creativity seems to involve crossing discontinuities in the problem space, i.e. do more than follow the gradients. It is not magic, of course; you can use evolutionary methods/Monte Carlo etc., but you find that many domain experts are capable without being creative.

Can we measure the ability of different animals for creativity?

<iv>

Am Mar 6, 2017 um 3:23 PM schrieb jeffrey E. <[REDACTED]>  
<mailto:jeevacation@gmail.com> > wrote:

So you don't think that practical intelligence is the ability to build arbitrary prosthetics?

I agree that humans share an important similarity with cells, i.e. they have mechanisms that suppress individual competition when it conflicts too much with group selection. Without such mechanisms, group selection fails, because within each group, defectors have a local advantage.

The simplest mechanism to enforce cooperation is reputation, but it works only when others are looking, and manage to keep tallies. To do better than that, evolution has to breed a virtual next level regulator into the individual, which may be your missing "top down for humans". A system of norms and taboos, for instance a religion or ideology that people pick up from their environment.

</iv>

Individuals can decide, but in social contexts, the utility of decisions is given by how well we understand the constraints under which we operate.

Am Mar 6, 2017 um 10:50 AM schrieb Jeffrey E. <jeevacation@gmail.com>  
<mailto:jeevacation@gmail.com> >:

no, i disagree, the spaceship is only an advanced prosthetic. . . not interesting at all.  
. =C2 interesting is we have no idea what the top down for humans is. =A0 . collective . group behavior, I don't see  
any difference =C2 between humans and cells, just a different layer of the same. . regulatory systems. actions  
feedbacks and "learning", all with no goal. the goals are illusions. . that the individual thinks they decide. like the  
soldier ant that is recapitulated to a garbage ant if the garbage ants are wiped out. =C2 the soldier ant thinks it made  
the decision. . =A0

On Mon, Mar 6, 2017 at 11:25 AM, Joscha Bach <[REDACTED]> wrote:

Exactly! Sensors like that are often one of these solutions that get you 80% of the  
way with 20% of the effort. Except that minds that take 15 years to train are so dramatically more expensive that almost  
no species can afford them (but they end up getting you to the moon, which no prosthesis can).

Am Mar 6, 2017 um 7:08 AM schrieb Jeffrey E. <jeevacation@gmail.com>  
<mailto:jeevacation@gmail.com> >:

they may have physical prosthetics =C2 like cat whiskers. to enable it to  
measure width of hole. =C2

On Sun, Mar 5, 2017 at 8:03 PM, Joscha Bach <[REDACTED]> wrote:

Most animals don't have a self model, probably because they don't have  
complex enough brains or long enough training phases (childhoods) to do meta-regulation.

> On Mar 5, 2017, at 16:48, Jeffrey E. <jeevacation@gmail.com>  
<mailto:jeevacation@gmail.com> > wrote:

>

> Law of large numbers is all that is needed

> On Sun, Mar 5, 2017 at 5:46 PM Joscha Bach <[REDACTED]>

> wrote:

>

> I am not sure how to relate that to game theory; you may be able to get that  
without evolutionary competition. However, game theory is probably the way to explain how we evolve submission to  
norms beyond indirect reciprocity.

>

>

>> On Mar 5, 2017, at 12:12, jeffrey E. <jeevacation@gmail.com  
<mailto:jeevac=tion@gmail.com> > wrote:

>>

>> i wonder in game theory what advantage it gives. .

wrote:

>> On Sun, Mar 5, 2017 at 12:11 PM, Joscha Bach [REDACTED]

>> absolutely. so are truth and meaning

>>

<mailto:j=evacation@gmail.com> >:

>> Am 05.03.2017 um 11:52 schrieb jeffrey E. <jeevacation@gmail.com

>>

>>> i is a mental construct that gives an evolutionary adva=tage , .

>>>

wrote:

>>> On Sun, Mar 5, 2017 at 11:29 AM, Joscha Bach [REDACTED]

>>> I believe that I think, but am "I" the agent of thi=king?

>>>

>>>

>>>

>>>

>>>

>>>> On Mar 5, 2017, at 08:34, jeffrey E. <jeevacation@gmail.com> w=ote:

>>>>

am "

>>>> I sugggest the expression really shoul= be "I think, therefore I believe I

>>>>

>>>>

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