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In silico evolution

Can consciousness be explained by artificial life? Watch this space

OVER the past half-century, our efforts to create machines in our own image have been stymied by three things: life, consciousness and intelligence.

We may labour under the comforting illusion that we understand these concepts. In reality, no one can agree on precisely what they mean.

It is no surprise, then, that the “top down” approach to creating artificial intelligence, life and consciousness has failed. If we can’t define what intelligence really is, attempts at AI are doomed. Ditto the rest.

But there is an alternative – evolving digital life from the “bottom up”. At long last, this approach seems to be living up to its extraordinary potential.

As we report this week (see page 6), digital evolution has advanced in leaps and bounds since the idea

first inspired computing pioneers, such as John von Neumann in the 1940s and then John Holland, the father of genetic algorithms.

Two decades ago, Tom Ray did some of the earliest work with self-replicating programs. Like DNA, his “Tierra” programming language could mutate. He also

Digital pets have evolved with rudimentary memory and symmetrically organised brains like ours

added natural selection, enabling more successful organisms to monopolise resources.

Then Chris Adami of Caltech pushed for software that could be used for the systematic study of evolutionary processes. In this way the computer world Avida was born. Now, crawling around

inside Charles Ofria’s computers at Michigan State University, East Lansing, are digital microbes, known as Avidians. They consume computing time as “food”, have equations for genetic codes, self-replicate, mutate and evolve into new, more intelligent artificial life forms.

In other experiments, digital pets have evolved to have rudimentary memory, and symmetrical brains. Ofria’s team has also created organisms with altruistic traits, who will sacrifice themselves for their kin.

Evolving life inside a computer lays the groundwork for understanding the selective pressures that led to life, consciousness and intelligence the first time around. A new chapter in our understanding will open when we get evolution to do it all over again. ■

Hope for fat-fighters

GOOD news. In many rich nations, the recent rise in overweight and obese children has levelled off (see page 8).

We don’t yet know whether this stabilisation indicates a turning point or is merely a plateau before children become fatter still, because there is no clear explanation for it.

Some claim that campaign

messages to eat less junk and to exercise more are getting through. Cynics, or those who dislike nannyism, may say we have reached a calorific “saturation point” and that kids can barely get any bigger – although there are good reasons to think otherwise. Or perhaps it’s a transgenerational effect, and the steadying waistlines

reflect restraint among parents, or even grandparents.

Whatever the explanation, the levelling off is welcome. Yet it still leaves more overweight people than in recorded history. In the US and Italy, for example, a third of children are overweight or obese, and obesity is rising in China and India.

The ultimate challenge, of course, is to reverse the trend. Unexpectedly, there is now some hope that this is possible. ■

In defence of mind-reading

THERE is something sinister about market-researchers using neuroscience. Nobody likes being manipulated, so the idea of having our minds tapped in order to be sold to even harder feels like

a violation. This is one reason why we did our own neuromarketing experiment (see page 32).

What we found was both fascinating and comforting. The company we worked with is built on sound research, but what they do can never render us powerless in the face of marketing messages – human

minds are too complex for that.

Neuromarketing fits the agenda of our consumer society – an attempt to give us products that better fulfil our needs and desires. Neuromarketing also fits the agenda of a magazine that believes, above all else, in science and in taking a rational look at life. Thanks for choosing us. ■