

Genetic algorithms and robotic folly

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A computer programmer and an engineer programmed a computer to produce ‘virtual robots’ (that is, that operated inside the computer) that moved along a surface.¹ They then constructed some of the virtual robots from plastics and pistons, etc. with electronic controls to operate the pistons.

Some of the popular media have waxed lyrical about this development, probably because funny little robots make for an interesting story, but also supposedly because it shows that ‘evolution works’.

Are these computer exercises relevant to biological evolution? Scientists and engineers have used computers to optimize structures and equations for many years, by getting the computer to change the values of some coefficients slightly and then test to see if the result is closer to the desired outcome. If it is, then the coefficients are changed again and the outcome is tested again. If not, then go back and try varying the coefficients in a different direction and test again. Many thousands of such cycles can produce the desired outcome that would be too time-consuming and tedious to find by manual techniques. These are known as ‘iterative’ methods, where the best values of the coefficients are determined.

Nothing new?

In recent times it has become fashionable to invoke ‘evolution’ everywhere (even to justify infidelity, rape and the like). In keeping with this fashion, the iterative procedures used for many years in engineering have been recast as ‘evolutionary computation’. The variation in the coefficients has been likened to mutations, and the testing of the outcome as ‘survival of the fittest’. The only variation is basically that, with genetic

algorithms, a number of models are generated in parallel and tested, with a proportion of the best being selected (likened to natural selection) for further iterations. A traditional optimization technique works in serial mode, looking for one best solution, testing one model at a time, whereas a genetic algorithm works in parallel, possibly generating a number of different ‘solutions’. The success of genetic algorithms in solving some problems has then been used as evidence that ‘evolution works’.

Atheist Richard Dawkins popularized the idea of computer simulations of ‘evolution’, using highly unrealistic programs to indoctrinate naive readers with his materialistic views — for example, his ‘methinks its like a weasel’ exercise in *The Blind Watchmaker*.^{2,3}

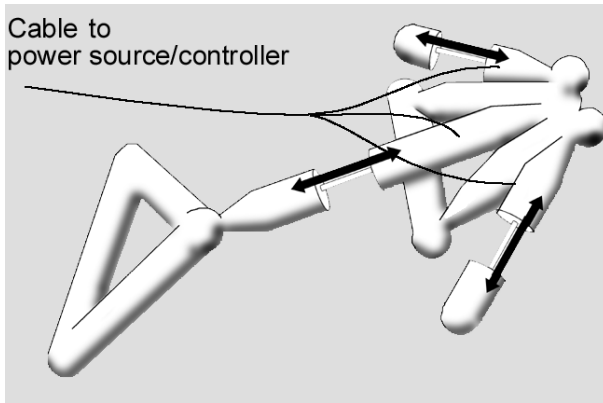
Problems with computer simulations

There are a number of reasons why these computer exercises are not relevant to biological evolution:

1. Such computer simulations are strictly confined to a limited number of components. For example, in the current example, the maximum number of components seems to be about 13. The number of critical components — that is, those necessary for the robot to function — is only about 4 or 5 parts. Real organisms have many thousands of different components.
2. The components are ‘given’ by the programmer. In this case the program has available rods (‘bars’) and pistons (‘actuators’) — only two possible types of components. The rods and pistons are joined or not joined at their ends by ball-joints. The lengths are varied one at a time in small increments. The ‘neural network’ that ‘evolved’ is also very simple in effect: operate the piston, or if there is more than one, the choices are to operate them synchronously or asynchronously. In other words, there is

a very limited set of options for ‘mutations’ to occur. Dawkins used this trick also in his ‘methinks it’s like a weasel’ con. In the real world, even the simplest bacterium has hundreds of thousands of sites where mutations can occur. Computer programmers have to strictly limit their ‘mutations’, otherwise they know that error catastrophe will result — where the program gets lost and cannot arrive at any solution. This is a fundamental problem with the evolutionary story for living things — mutations cause the destruction of the genetic information (and consequently they are known by the thousands of diseases they cause), not its creation.

3. The ‘selection’ is only for one trait — movement. In the real world of living organisms, selection must be for hundreds of different traits at once. Mutations are not confined to one part of the organism’s program (DNA), and therefore to one trait. For every mutation that might affect a trait such as movement, hundreds of mutations will affect other traits, such as reproduction, metabolism of sugars, etc., so they all have to be selected for. And to complicate things further, a given trait can be affected by mutations in different parts of an organism’s DNA, a single mutation can affect more than one trait, and many traits involve the co-ordinated action of more than one gene. Inclusion of many traits in the computer program would render the procedure unworkable (it is very difficult to get iterative processes to work with more than one goal).
4. The programmer has pre-programmed the computer for a specific goal. ‘Evolution’ can have no specific goals, such as locomotion, as it is purposeless, being driven by chance, not intelligence.
5. The computer exercise did not start with *nothing* — it started with a program generated by intelligent scientists that specified the way



A stylised sketch of the robot nicknamed 'the arrow'. Double headed arrows denote pistons which extend and retract alternately, providing motion.

- in which the robots could be constructed.
6. Given the components (pistons, rods, etc.) programmed into the computer, it is no great achievement to have achieved movement in the robots — all that is required is to lift one end of a piston off the ground and have it expand and contract.
 7. In spite of the *chutzpah* (such as calling the robots 'lifeforms'), the robots cannot reproduce themselves. They are dependent on their human creators to manufacture them. They are not 'lifeforms' in any meaningful sense of the word. The simplest of living things can gather the raw materials and energy to manufacture the components to reproduce themselves.
 8. The robots produced by the program contrast with living things in that they look 'jerry-built' (the one illustrated above is about the most regular looking robot produced and it looks more regular in our drawing than in 3-D). Even atheists like Richard Dawkins admit that living things look like they are beautifully designed — they look like an intelligent creator cleverly designed them (and then he uses evolutionary story-telling to try to explain how they actually made themselves by mutations and natural selection). However, the robots 'evolved' in the computer do not look like they were cleverly designed — they look like they

were thrown together. The most complex virtual robot illustrated on the *Nature* website, dubbed the 'arrow', can be seen at:

<http://www.nature.com/nature/journal/v406/n6799/extref/406974ai1.mpeg>

The model made of it can be seen at:

<http://www.nature.com/nature/journal/v406/n6799/extref/406974ai2.mpeg>

It is clear that the parts of it that look like they were the result of intelligent design are the components specified in the original computer program (pistons, joints and rods). The arrangement of the parts **looks like** the result of a haphazard process. Living things do not look like they came about by a haphazard (random) process. They look like they were designed.

9. 'Genetic algorithms' use completely unrealistic 'genome' sizes (very small), mutation rates (extremely high) and selection coefficients (very high).⁴ They also do not take into account non-viability — that is, an organism would not be viable at all (and therefore evolution could not proceed!) until the system that is supposedly evolving in the computer actually worked. Real-world organisms need to

be viable and maintain viability. ReMine addresses the problems of mutation rates and selection coefficients for the evolutionary story, showing that the neo-Darwinian mechanism just cannot explain the amount of information in genomes.^{5,6}

Conclusion

These are some of the reasons that 'evolution' simulations in computers — such as this latest one given a 'beat up' — have no relevance to the materialists' belief in molecules-to-man evolution. In fact the severe limitations on such procedures, even with fast, powerful modern computers, shows how real-world (biological) evolution is impossible, even if there were the eons of time claimed by evolutionists.

References

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