

A Living Game of Chess

When we play chess, we put ourselves in the position of a general commanding his troupes. We plan, direct our forces, incur losses, perhaps sacrifice some of our men, all to gain a victory over the enemy. We control the game - or at least our side of it - but we aren't really part of it. We are the *supervising intelligence*, and the chessmen have to do as we think best, with blind, mindless obedience.

But suppose there weren't any supervising intelligence, and the pieces had to act of their own accord, like in some fairy tale or animated cartoon. The rules of the game would still apply, of course, like our laws of physics; but within those bounds, each is free to act according to its own nature.

However, it is up to us to decide what their nature should be, and to equip them for the battle.

So the problem is:

Can we devise a system, a society of chessmen, that can win a game without any kind of supervising intelligence?

To build such a system, we can equip our chessmen with 4 kinds of *features*:

1. *Senses*, to gather information to act on.
2. *Motivation*, to make them act at all.
3. Some sort of *communication*.
4. Some form of *memory*.

These features are needed anyway, to ensure that the rules of the game are observed. Senses are required to prevent our pieces from making illegal moves, like moving past the borders of the board, or to a square already occupied by a piece of the same colour. Motivation and communication are necessary to make sure that exactly one piece moves at any time. And memory is indispensable to determine if castling or en passant capture are allowed.

But we can turn these necessities into assets, by putting them to strategic and tactical uses. The senses can provide strategic and tactical information, both of one's own position and the adversary's. Communication can be used to exchange this information. Motivations can prevent too rash or too timid play - or bring about bold or careful play when required. And memory can be used for learning, transferring experience even from one game to the next, if desired.

However, our system is subject to four very strict constraints:

1. The rules of the game must be strictly observed.
The object is not to invent a new game, nor to design an entertaining fantasy, but to investigate a different approach to chess.
2. No single piece can have complete information on the current position.
After all, we don't want to reintroduce our supervising intelligence by having all information converge upon the king, for instance, and letting him take all the decisions.
3. There can be no computing ahead.
Another road block to reintroducing a supervising intelligence. But there is more. Traditionally, computers play chess by employing most of their computing power to "think ahead"; while people are thought to base their play more upon their insight into the strategic and tactical strengths and weaknesses of the current positions. By restricting

ourselves to the current position *only*, we can see how far positional insight alone will get us.

4. The system must be programmable on a computer.

This is to enforce complete and unambiguous specification of our system. Also, it should ensure that it can actually be built (or simulated). And it will prevent us from appealing to vague mechanisms such as ESP as a "sense organ" for our chess pieces.

These are severe restrictions that may cripple our system to the point of hopelessly losing every game. So why not write an "ordinary" chess program, guaranteed to play a decent game? In short, because we may gain an entire new perspective on chess. If we call the human way to play the *Natural Intelligence (NI) approach*, and traditional computer chess the *Artificial Intelligence (AI) approach*, we can term this the *Artificial Life (AL) approach* to chess.

It seems worthwhile to try and find out what can we accomplish in this respect.