Technological Forecasting & Social Change 114 (2017) 27–34

Contents lists available at ScienceDirect

Technological Forecasting & Social Change

Let's interplay! Does co-evolution enable or constrain?

Evo Busseniers

Global Brain Institute, VUB Krijgskundestraat 33, 1160 Brussels, Belgium

ARTICLE INFO

Article history:
Received 2 November 2015
Received in revised form 11 July 2016
Accepted 12 July 2016
Available online 26 July 2016

Keywords:
Co-evolution
Constant opposition
Mathematical model
Rigidity

ABSTRACT

In various domains, there is an interplay at work: elements form and influence a structure, but this structure in turn influences the elements. By time, rigidity often turns in: the structure start to have its own goals, and cant be influenced anymore by the elements. How can one avoid this from happening? I propose two strategies: make sure there is enough diversity, and endorse a constant opposition. To illustrate this last countermeasure, I built a simulation. This showed that it is possible to avoid the emergence of the classical power-law distribution, giving rise to a more dynamical situation where the top agent is constantly changing. These considerations are applied to the concept of the global brain, in order to avoid that this becomes another imposing structure.

The standard model of evolution assumes a fixed fitness landscape. Usually there is coevolco-evolution, though: besides being influenced by its environment, an agent also shapes its environment (as described by niche construction (Laland et al., 2001)). View this as a swamp-like fitness landscape that changes as an agent moves through it and acts in it.

This interplay is happening on different similar aspects: between 'natural and cultural', 'social and infrastructure', 'function and structure', 'society and technology', 'decisions and acts', 'theory and practice' and 'micro and macro'. In general, out of the interactions of local elements, there is a bigger structure that emerges. This structure could then impose itself onto the agents, so that a status quo is reached: agents are influenced by the structure, while they do not have any more influence in return (Stirner and Leopold, 1995; Stewart, 2014).

One of these structures could be the global brain. The global brain can be defined as the distributed intelligence emerging from the coordination of humans and technology through the internet (Heylighen, 2014a). The global brain thus is shaped by humans, but on the other hand it can influence humans and construct its environment.

1. The problem

Aimpstrsystem could start to live "its own life": it strives for its own survival, instead of that of the agent(s) who created it. Stirner (Stirner and Leopold, 1995) describes this process on several levels. In the individual mind, first you have the creative process where ideas get created. But then this transforms into a "fixed idea", a dogma, where the person starts to live to serve the dogma, instead of the idea serving the person. The same mechanism happens on the societal level: first people start to cooperate because then they are all better off. A society is created. But then rigidity comes into play, this social mode (for example, a state) becomes a higher value, for which the people constituting it are subordinate. The goal of the system thus stops being aligned with that of the agent(s).

Heylighen (Heylighen, 2006) explains how this process works in several steps. First, a collective forms a medium, a support for carrying interactions. These interactions start to get coordinated, the medium becomes a mediator. Finally, this mediator evolves into a manager: instead of passively mediating actions of the agents, it starts to actively initiate and control such actions. This is when this system becomes to have its own goals, since it starts to have a control function. e the "imposing structure" I spoke about can come into play: But why would the goals of this system be in the best interest of the agents?

Heylighen (Heylighen, 2006) and Stewart (Stewart, 2014) explain this by the evolution from an extoculexploiter to a cultivator. An exploiter that is too successful will weaken and eventually kill the exploited, and thus endanger its own survival. That's why exploiters tend to evolve into cultivators: they become more benign, thus being able to harvest an ongoing stream of benefits from those they control. However, there is still an asymmetrical relationship between the cultivator and the cultivated. While the cultivator will let the cultivated survive as long as that's in its interest, it won't enable them to grow and develop, to live. It is only interested in these aspects of the agents that give it benefits, and does n ot care about the rest.

An example of the emergence of a cultivator is the rise of the welfare state. First, there were factories that exploited the workers and put them into horrible working conditions. The workers could not accept this, and started to protest against this in various ways: strikes, sabotages, demonstrations, …. Until the state saw this as a threat for its

E-mail address: ebusseni@vub.ac.be.

http://dx.doi.org/10.1016/j.techfore.2016.07.022
0040-1625/

survival. So it decided to do some reforms to silence the protest: voting rights, social security, …. It thus became a cultivator, being more benign. But the fundamentals of the system were not really changed: people still were n ot able to form the society they wanted to live in, and they still had to work in factories for little (although a bit more) money, while others earned a lot simply because they owned these factories.

One of the main characteristic of this situation is that there is some depdependency. The agents usually need this bigger structure to survive. Examples are the cells in a human body, or humans in society (most humans will not survive anymore in the jungle). But it can also be another goal than survival that cannot be reached anymore without this structure. An example is a drug addict: he feels like he can not continue anymore without the drug. Previously (and maybe still in some respects) the drug has fulfilled his desires, but now it is actually detrimental. This is a specific case of supernormal stimuli (Barrett, 2010): these are stimuli that used to be beneficial in the past, but because the situation has changed (for example, because they are now there in bigger quantities), it has become detrimental.

This dependency also manifests itself in an asymmetry in influence: the bigger structure can influence the agents, but the agents that are constituted in it can not influence the bigger structure. This is why this structure can be rigid and maladapted to the agents. autThe agent loses its autonomy, since it can no longer accomplish its goals itself, but depends on the bigger structure to provide its needs.

Whether one considers this dependency problematic, is dependent of ones value system. In some cases and for some agents, a loss in autonomy might cause an increased survival. I personally value autonomy, and thus considers dependency as problematic. I can give some arguments for this (as done before), but in the end there is no accounting for taste. That is why in this paper I am mainly focusing on how this rigid structure can emerge, and how this can be avoided, rather than trying to prove why this rigid structure is indeed problematic.

We could in fact differentiate three configurations of the influence in a system:

- The 'dictator': one (or few) agents can influence the bigger structure, the other agents have no influence.
- 'not-my-metasystem': none of the individual agents have any influence on the bigger structure. Though the structure emerges out of these individual agents, they are components of the system, but they are interchangeable.
- 'shared world': every agent can partly shape the world around him, where and how he wants to live, everyone has influence.

A lot of systems, like most of the democratic countries, are in the second configuration. This is pretty difficult for a lot of people to grasp, because there is not a clear structure ruling over another structure. This is how a lot of the conspiracy theories saw birth: they correctly see a world which seems to have its own goal, which is beyond their control. So they conclude there should be a small group of people responsible for the situation in the world (the first configuration). They do not see that the problem lies in how society is configured, in which the individual agents are interchangeable. Probably, if they would get into power, the situation would remain the same. On the other hand, if one tries to explain that there are certain social forces, that there is a 'system' with its own goals, its own need for survival, which is n ot always the best for the individual, this system is assumed to be a separate body with clear boundaries. This puts one in the conspiracy camp. The concept of aspect system (Heylighen, 2006) can put some clarity in the matter. An aspect system is a subset of the set of relations, interactions and properties that characterize the structural components of a system. The idea is thus to distinguish on the basis of function, instead of structure. An example are the cultural, political and economical systems in society. It is therefore important to note that this system that emerges out of local interactions, is often not some external agent or well-defined body, but more of an aspect system of the whole system (although it has distinguishable attributes). Often people will search for a small group of people responsible for the situation in the world (the dictfirst configuration). They do not see that the problem lies in how society is configured, in which the individual agents are interchangeable. Probably, if they would get into power, the situation would remain the same.

luhmLuhmann's theory (Moeller, 2012) also states this: that humans are n ot really part of the social system in the sense that they are interchangeable, and the social system will maintain itself, it is an autopoietic system. According to Luhmann, society has changed from stratified differentiation to functional differentiation, with function systems that are autonomous. Luhmann uses the term function systems for what we have previously called aspect systems. Elsewhere in this issue, Lenartowicz (Lenartowicz, 2016) applies Luhmann to interpret social systems as intelligent, evolving 'creatures'.

What is described here is a meta-system transition: a transition to a higher level of complexity. The global brain can be understood in this respect: as a higher structure that emerges and develops its own goals, which might become more and more independent of individual goals (although these individuals constitute and sustain the global brain). This is already more or less happening today (where we for example see that a state is n ot really fulfilling individual needs), but the danger with the global brain is that it would be more intelligent than the hierarchical system of today. It would be a self-organizing, emergent system, and thus it could n ot simply get dismantled by taking away the top. The stronger this structure will be, the more difficult it will be to break it down. Thus, if it would be omnipotent and omnipresent (as argued in (Heylighen, 2014a)), will it not be also impossible to resist?

I now elaborate how this process works in several domains.

2. Aspects

2.1. Technology - creating the environment

Technology is in interaction with a certain kind of society and ideas. Technology strengthens a certain type of society, while it is also out of current ideas that a technology is created. Technology creates the circumstances, the environment, in which one can act. Even if in the beginning or in its roots a technology is n ot configured for the current social mode, a technology can easily be recuperated for a certain dominant idea. Thus, technology often reinforces the status quo, the current tendency.

This is a basic manifestation of co-evolution. The classical view of evolution is that species adapt to an assumed fixed environment. With the rise of technology, humans more and more created their environment themselves. We thus created the selection criteria for our species ourselves. This is the flaw in using the 'survival-of-the-fittest'-argument in the present human societyof some capitalists. Their argument is that it is only natural that only the strongest individuals, firms, …. survive. But we artificially created the selection criteria of what defines 'strongest' (in capitalism, this is basically what can make the most profit). These selection criteria could be changed so that a wholly different kind of social organization would rise.

But new ideas from society can create new technology, which could change society. Technology could thus help liberationThere might be technology that helps to liberate though, either because it is constructed for it or because technology does n ot always follows the path its creator had in mind. With liberation I mean moving away from a depdependency relation and becoming autautonomous. This relates to the concept of self-actualization: "the desire for self-fulfillment, namely the tendency for him [the individual] to become actualized in what he is potentially." (Maslow, n.d.). Bakunin's definition of freedom is quite in line with this, in "the full development of all the material, intellectual and moral powers which are to be found as faculties latent in everybody" (Bakunin and Kenafick, 1950).