Environment , Big Data and Artificial Intelligence .

We will agree that three concepts such as Big Data, Artificial Intelligence (AI) and Environment are some of the coolest concepts today.

These three concepts are very present in Argongra and we ask ourselves why they do not relate to each other.

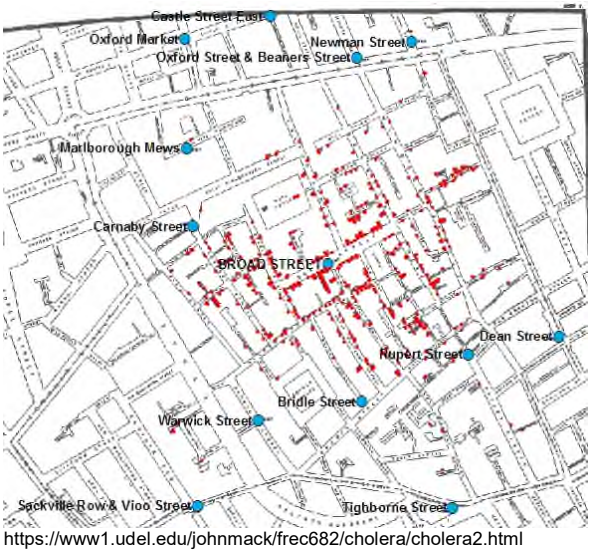
It seems an amazing idea that we use artificial intelligence on such an important issue as the environment, where the human species seems to have lost its sanity.

We do not believe that humanity has lost its sanity, we only confront new, complex and varied problems and therefore we need new tools to face them.

Science is built of facts the way a house is built of bricks: but an accumulation of facts is no more science than a pile of bricks is a house" (Henri Poincaré).

The start point

Today there is a great fear that artificial intelligence will have an unfortunate influence on jobs, reducing as never before the amount of available work. Predicting the future is impossible. It is easier to look to the past to get ideas that illuminate our thinking about the future.



https://www1.udel.edu/johnmack/frec682/cholera/cholera2.html

If the human species has been a so successful species, and in just over 1 million years has managed to go from a helpless being to thinking about colonizing other planets, is due to a simple reality: The human being has known how to make tools. The tools have allowed us to break our limitations. We did it the first time we threw a stone to kill an animal or an enemy, we did it when we made an ax or a spear to achieve a better management of the launch, we did it when we discovered the fire and we learned that it warm us, that it protected against beasts or that it cooked our food, we did it with the wheel and we learned that it was easier to move things.

The stones, the fire, the wheel have not been full virtuous inventions; each and every one of them has its own dark side. Dark side that humans have had to learn to control it. With the AI too, we will have to do it.

In this point, we have to ask ourselves a question, is the human being limited by his intelligence? Do we need a tool like AI?.

Some people think that human stupidity (the lack of intelligence) is responsible that we are putting ourselves in danger as a species. Our bad decisions on issues such as climate change, water scarcity, the misuse of energy and a very long etc., are making our future not very clear. It seems an amazing idea that we use artificial intelligence on such an important issue as the environment. Where the human species seems to have lost its sanity.

We do not believe that humanity has lost its sanity, we are only confronting new, complex and varied problems and therefore we need new tools to face them.

Environment.

In relation to the environment, it must be said that any past period was not necessarily better.

Snow´s map and Google image (London)

This goes from the environmental extragos that have been generated in some areas, such as the burning

of wood for cooking or construction, to the unhealthiness of cities in the 19th century. For example, according to some sources, the epidemics of cholera that occurred in Spain, in large cities, throughout the nineteenth century killed almost 10% of the total population of the country.

In Argongra we like to tell the case of Dr. John Snow that in 1845. Dr Snow used, what we now call Big Data + GIS technology, to determine where the outbreaks of cholera that hit London at that time were. He made an exceptional discovery; the cholera origin was wells of water contaminated by the septic pits. This new knowledge allowed controlling the cause of the epidemic. The case of London cholera is an example from which much can be learned about the subject of this application note. Until then there were very diverse theories but they had not served to solve the problem. If we understand the problem, to solve it is easier. (see figures).

Big Data

Dr. Snow collected the addresses of some hundreds of people affected or not affected by the disease, as well as a few hundred wells of water supply and septic pits. He drew a map with all this information. This maps showed a pattern to explain because some persons were affected and some persons did not affect. Today, many environmental problems involve collecting thousands, if not millions, of data.

Big data has been developed in recent years to process these large amounts of data. We needed IT powered enough, a calculation power much higher than what we were used before and the traditional algorithms needed to be improved. A human mind has no ability to process this amount of data. A human mind is limited, for example, to work on 10D spaces.

It is very difficult to be aware of the amount of environmental data that is taken each day, How many millions of sea temperature values we have per day?. Do you know some useful use of this info?.

Satellite images are fundamental tool to know effects of climate change. The European constellation of Copernicus satellites generates every day of the year 4 Terabytes of information. The file of satellite images in the world is of the order of exabytes (10^{18} bytes). How much useful information is there?. How are we going to process this incredible amount of data?. From a technical point of view our problem today is: we have too many data and we need increase a lot our capabilities to process them. So we need new tools to process them.

Artificial intelligence

Artificial intelligence has always been a dream in computer sciences since the dawn of computers. Today begins to be a reality, but not only in the laboratory but is our pockets. The applications of artificial intelligence are very varied and make our mobile phone is able to send a written message that we have dictated, but also translate it to the language we want, to tell us when we take a picture if everyone is smiling, or estimate how old is a person in a picture, etc.

Today there is software, hardware and services that put in the hands of anyone an incredible artificial intelligence capacity. Several years ago we said that in AI a quantum leap was mandatory. The leap is here. Argongra has staff with more than 25 years of experience in this field..

Artificial intelligence has put on the table new work methodologies taking advantage of both the enormous amount of data available today and an amazing calculation capacity.

Implementation of solutions based on AI is possible today even in little companies.

Argongra developments

Argongra is working on AI on several lines. Some examples.

One of the field of specialization of Argongra is mining and its environmental problems, The first one is to detect asap any environmental conflicts, specially in relation with the subsoil and water. The problems of contamination of the subsoil present several particular problems among those:: they have a long detection time, size, cost of remediation, difficult to monitor the remediation, etc. So Argongra is working on methods to detect this contamination as soon as possible.

In Argongra we use satellite images intensively for different uses, for example, to monitor mining activities, including production, environmental or risk monitoring. Satellite image are an amazing source of information, but new products, more near to make decisions, are needed. Image satellite are data, but management requires information. To have info, images have to be interpreted and AI is developing interesting tools to do it. To do it on time and on cost.

Conclusion

Actually, Artificial intelligence is not an option, it is a need if we want to solve environmental problems that we face now. The AI is the only way to be able to use all the power that data and technologies such as earth observation, internet of things, or communications put in our hands to understand our environment. We have to use Artificial Intelligence if we want to continue enjoying our Natural Intelligence.