Projects of Intelligent Systems for Military Purposes (French Navy Special Forces)

By Cyril Touboulic

Who is Cyril Touboulic? Doctoral student in anthropology at Paris-Nanterre University (LESC-CNRS), Cyril Touboulic first worked on the design of intelligent systems at the Institute of Robotics and Intelligent Systems (ISIR) of Pierre and Marie Curie University, in collaboration with Raja Chatila, professor of robotics, artificial intelligence, and ethics.

Currently, he is completing his thesis on the training of navy special forces. To do this, he observed and participated in training, to better understand the reasoning and needs of the actors, notably for the potential development of software solutions, such as briefing tools.

In parallel, Cyril Touboulic continues his reflections on artificial intelligence with Paul Jorion. The latter, associate professor at the Catholic University of Lille, is an anthropologist, philosopher of science, psychoanalyst, economist, and specialist in intelligent systems. He is also co-founder of PRIBOR, a technology company developing solutions enabling machines to become self-aware. Cyril Touboulic joined the team as a developer in November 2024 until July 2025.

1. Introduction

The military is *foresight*. Foreseeing all types of eventualities harmful to the nation's interests is one of this institution's major roles, coupled with a constant interest in the "methodology of effective [controlled] violence," to borrow Mark O'Connell's phrase on the Defense Advanced Research Project Agency (O'Connell 2017: 144)[1]. [1].

1 By "effective," we can encompass efficiency with respect for the rules of war.

Looking to the past, the nature of threats and risk factors have seen their number grow as humankind explored its environment through technological ingenuity: maritime in the distant past, subaquatic recently, nuclear and "cyber" more recently, and tomorrow space. This colonization of dimensions has led to a sophistication of strategies. Consequently, the profession of conventional forces in general and special forces in particular is increasingly technical – and this trend is confirmed[2].

However, the race for innovation (rhetoric of corrupting times) coupled with the addition of the operational dimension, plus the groundswells of climate disruption, complicate the articulation of military actions. Equipping oneself with suitable tools thus becomes a priority, as we can imagine.

The aim of this article is to bring to the military's attention tools whose application could assist its forces, in light of scientific knowledge and current technological capabilities. To this end, three proposals for intelligent systems will be discussed in a similar number of main points.

The first two points (2 & 3) will address the use of artificial intelligence (AI), one as a collaborator, the other as advanced foresight. As for the third point, it will conclude with the implementation of a neural network in operational briefings to simplify the process.

2. ANELLA, the Intelligent Collaborator

First and foremost, what is ANELLA? ANELLA is the abbreviation for *Associative Network with Emergent Logical and Learning Abilities* or "associative network with emergent properties of logic and learning" (for simplicity, we will use the acronym ANELLA). An AI software developed by Paul Jorion for British Telecom from 1987 to 1990, whose real employer turned out to be the UK Ministry of Defence. However, the reduction in military funding due to the end of the Cold War halted its implementation, namely assisting a pilot in an aircraft cockpit as an intelligent collaborator.

Indeed, ANELLA is "an interlocutory system capable of playing the role of an intelligent collaborator with its user" (Jorion 2012: 17). Four principles underpin its participatory role (ibid.: 21):

(1) grasping the intention behind the question asked;

(2) offering the most relevant information;

(3) learning;

(4) knowledge negotiation .

2 Based on the testimony of Green Berets, the job of a commando is similar to that of a technician whose vocation is to stay one step ahead of the enemy.

Succinctly, the model on which the software is based is the human subject. Hence the mobilization of knowledge from Freudian and Lacanian metapsychology as the main source, alongside the anthropology of modes of thought by philosopher Lucien Lévy-Bruhl (1857-1939). This vision defends the thesis that humans think because they speak. In its functioning, a thought thus emerges within ANELLA from a dynamic of affect on a historical and "learning" word network. See the directed graph below (figure 1).

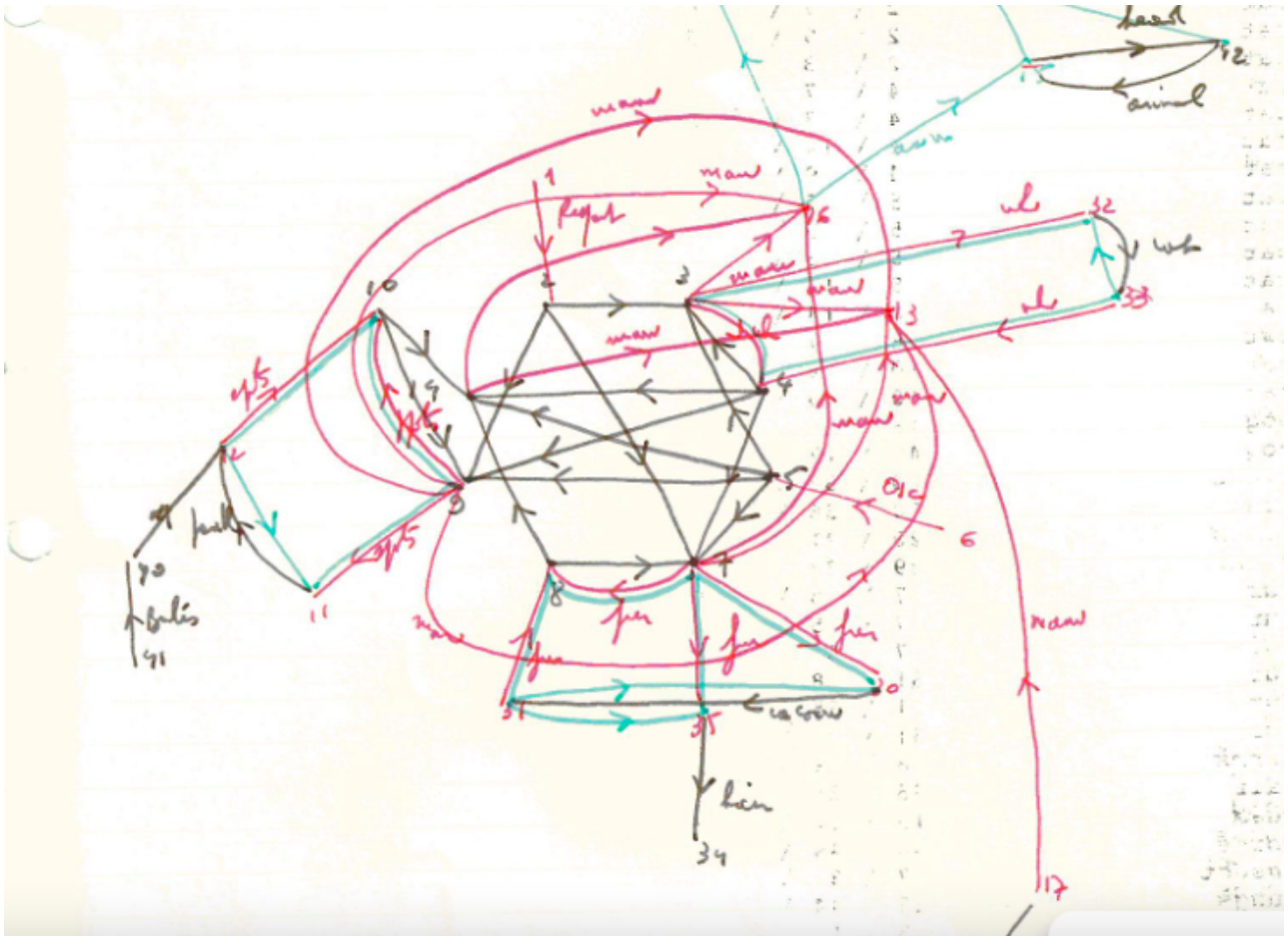

Figure 1: ANELLA memory network

The use of ANELLA can serve, as originally intended in the military field, an aircraft pilot. But other horizons open up: recruitment phase, training assistance, or any other military profession where an intelligent collaborator would provide welcome participation.

Ultimately, the learning order is important. A "recruitment" ANELLA will approach problems through its history, as a human subject would. Thus, a "recruitment" ANELLA will not approach a similar question in the same way as another ANELLA that first learned a "pilot" thinking then "re-

cruitment" afterwards. Each of these two programs will have its own way of processing said question. The history of the network is a vector of personality, so to speak.

Also, (simulated) emotion presents a non-negligible asset since it makes the software more difficult to mislead. Indeed, simulating an affect dynamic serves to distinguish approval from disapproval. The machine knows what is important to know in its word network. The combination of a new word with another coupled with an affect reinforces its knowledge. On the other hand, ANELLA values and devalues what has just been stated in discourse by the interlocutor – it negotiates its knowledge. A memory is gradually constituted historically via the re-evaluation of affect values attached to words. A living type of knowledge (in interaction) is constituted, with the associated experience behind it, giving "resistant" knowledge (directed, labeled, and weighted graph). In the absence of which, a machine could say anything like Tay[3].

That said, a difficulty persists regarding ANELLA: indexicality or deictic expressions ("here," "that," "we," to give a few examples). That is, the property of certain words to have meaning only in their context. A way to circumvent the problem would be to "embody" (namely, give the machine a body endowed with "senses") ANELLA so as to surround the system with the physical world usage shared by the interlocutor. The "sensing" machine will then find it easier to discriminate by following the signs of its interlocutor (gaze, hand gesture) and the shared environment ("behind," "in front," "next to," "yesterday," "today"...).

For the rest, since the program mirrors the human subject, it carries the risk of developing neurotic or even psychotic behavior. Why? The affect dynamic can isolate itself in a part of the memory disconnected from the whole. The software is then unable to optimally locate the part of the memory that is relevant in a particular context. Fortunately, this phenomenon observed and confirmed under the hood remains rare and is quickly detected.

3. AI as Advanced Foresight

The preparation of a special operation reveals the "quantum" nature of the thing. By this, we refer to what actors call "non-compliant cases," in other words a list of foreseeable and "admissible" unforeseen events in the unfolding of the upcoming operation. To do this, the actors' approach resembles quantum physics because the most probable and dangerous scenarios superimpose on each other. To which are added the recourse and feedback from operational experiences (empirical knowledge and personal experience) from actors knowledgeable about the studied terrain or, failing that, similar empirical configurations. The preparation of an operation is a *bricolage*, in short.

Why speak of "bricolage"? (We will return to briefings in the next project, just after.)

3 The slip-up by Tay, Microsoft's artificial intelligence, when it was launched on Twitter at the end of March 2016, is a fitting illustration of how, in the absence of ethical rules, machines will repeat anything.

Anticipating the future in such a meticulous manner amounts to human *bricolage* since the framework itself is situated in 4 physical dimensions through which manifests a burning desire, that of perfection.

This desire recalls philosophical debates around the notion of determinism in which two camps generally clash: "The structure of the universe and its course can be determined from start to finish" versus the radical opposition: "The course of the universe is indeterminable, too subject to variations."

Among the most famous quarrels is *La Querelle du déterminisme*, a collective work opposing, among others, mathematician René Thom to chemist Ilya Prigogine. The defense of determinism by René Thom is interesting because he demonstrates that apparent indeterminism stems primarily from human perception, besides two other main reasons evoked: the reluctant minds keen on saving free will on one hand, and, on the other hand, the group fighting against the feeling of oppression by the rising technologies, the collusion of science and power (Pomian 1990: 146-147).

What does René Thom assert? That unpredictability for us, humans, results less from the fact that the evolution of the world is indeterministic but from the fact that our equipment is fundamentally (too) rudimentary to perceive the real structure of the universe at work. We are convinced we live in a four-dimensional world (the three of space complemented by the fourth of time). In short, the apparent indeterminism of the world, yet fully deterministic, would be due to the fact that the universe possesses within itself more dimensions, of which the four familiar to us constitute only a limited projection.

In the wake of Thom's demonstration – convincing in our eyes –, our proposal is the augmentation of determinism by adding physical dimensions. To this can be added other relevant parameters such as conflict zones, the reciprocity of a cultural area, the nuclear threat, consequent migratory flows, or the groundswells of climate disruption and the collapse of biodiversity multiplying future risks, useful for foreseeing the evolution of our world.

These additions, the field of AI has the capacity for today. Furthermore, the prediction of global events already works.

Example: end of 2019, BlueDot detected the epidemic focus and correctly predicted the spread of COVID-19, 10 days before the World Health Organization.

To conclude, we would like to quickly emphasize a few points. First, implementing a foresight technology constitutes an asset in a complex world on a slippery slope. Another asset: a machine is more intelligent, faster, since it learns by itself and from the rules of the game alone (from scratch). It is not constrained by our culture, nor by *the world as it should be*[4]. A significant security

4 The cases of AlphaGo and AlphaGo Zero are significant. Both software programs learned to play Go, the first from human games, the second with itself as its only opponent. The result: AlphaGo Zero beat AlphaGo 100 to 0.

measure as soon as the notion of truth is negotiated in favor of the plausible and militant belief in a society in halters at the origin of resentment.

4. Briefing and Neural Network

As mentioned earlier, an operational briefing, in a 4-dimensional representation of the universe, has all the characteristics of quantum physics. Its preparatory phase requires absorbing large quantities of information to find an articulation of actions *ad hoc* to the expertise of the unit in charge, in addition to considering various probable unforeseen events. The brain strives, in a way, to provide an "image" of the terrain and its operational dispositions – "The terrain commands." To offer this image, it is possible to turn to an (artificial) neural network.

What is it about?

To understand what a neural network is, the late Naftali Tishby, professor of computer science and neuroscientist in information at the Hebrew University of Jerusalem, used the following analogy:

"A pipeline leaking profusely at each of its welds, to deliver only a single drop at the outlet. The flow at the entrance, these are all the pixels of an image. And the drop at the outlet, the *bit* that will say whether, yes or no, it is indeed the image of such and such an object[5]."

In other words, neural machines extract information through compression, and generalize it. And depending on the nature of the data to be processed, they calibrate themselves for the solution of particular problems.

The use of this tool can, incidentally, logically be employed for the recognition and analysis of intelligence images. "Is it such and such an object?"

The objective of the neural network in this case would be to relieve the cognitive load linked to the significant mass of entangled information, otherwise difficult to represent in its entirety. A technological delegation, in a sense.

5 Source: Компьютерные науки [computer science] “001. Information Theory of Deep Learning - Naftali Tishby.” Online video. Published October 17, 2017, accessed January 12, 2023. Access: https://www.youtube.com/ watch?v=FSfN2K3tnJU

5. Conclusion

By way of conclusion, a few considerations must hold our attention as soon as a human environment prepares to deploy AI seriously.

First: reasoning by empirical logic (Johnson-Laird 2006). Something Lewis Carroll (1832-1898) had already drawn attention to in *Symbolic Logic*: a syllogism works when the meaning does not go against the grain of empirical experience. The machine will be relevant if and only if it aligns with the terrain via prevailing practices (Wittgenstein 2004: 50)[6], with the objective of ultimately grasping the logic of the military culture within which it deploys.

Second, in the hypothesis that our world is a giant cellular automaton, where each moment mechanically engenders the next moment, i.e., a deterministic and discrete (discontinuous) universe inside which we find ourselves on deterministic paths, areas of unpredictability are nonetheless not excluded due to our ignorance of the exact rule for generating future states. Hence our will to augment predictability with tools capable of adding a sufficient number of dimensions, to bring us as close as possible to what would be a complete capture of the determinism at work.

Third, it is illusory to guarantee total control of a machine endowed with learning capacities. Emergence effects will occur sooner or later[7]. Two axes thus come into tension regarding military culture: control of the tool, and keeping a step ahead of the adversary with an intelligent technology whose overall functioning we will struggle to maintain understanding of as it progresses.

Fourth and finally, if AI makes fewer mistakes, its user can mislead it. This is why we advocate the implementation of emotion or an expert system to solve this problem. That is, giving the machine a filter, a background representation of what it can or cannot do: ethical rules. In doing so and in the context of true AI, it is necessary to provide the equivalent of teachers for the machine. A task we propose to fulfill in the company of qualified military actors, at least initially, until the military field becomes accustomed and takes over.

6 "The meaning of a word is its use in language."

7 Over time, the Pluribus AI has learned to bluff against (human) poker players.

6. Bibliography

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