

Press release

Ramonville Saint-Agne, 21 March 2019

ADAGOS wins the Grand Prize of the CONTINENTAL start-up challenge 2019

ADAGOS drastically reduces the size of artificial neural networks, enabling Continental to embed them in their cars of the future

ADAGOS has developed a new parsimonious approach that reduces the resources (including energy) required for implementing machine learning algorithms by orders of magnitude. This approach was the missing piece that will enable Continental to complete the puzzle of embedding its artificial intelligence algorithms into the cars of the future; an ambition that requires hunting down and eliminating every possible source of wastage.



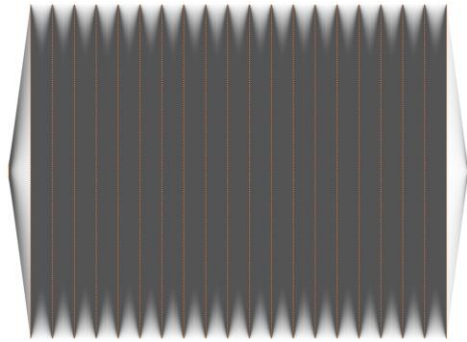
The state of the art of artificial intelligence is largely inspired by the biological brain, including its redundant nature. While this redundancy may ensure the continued functionality of the living brain despite regular, and sometimes accidental, loss of the neural cells, the same argument does not hold for artificial neural networks, which are made from inert matter.

Occam's razor, also known as the principle of parsimony, proposes that from a set of competing hypotheses, the simplest solution is the most credible, or as Einstein phrased it: "Everything should be made as simple as possible, but no simpler." However, making things simple is not always itself a simple task and so the use of redundant neural networks persists in the state of the art.

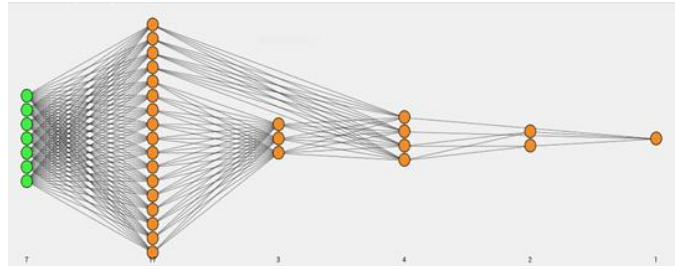
In accordance with Occam's razor, ADAGOS configures small, parsimonious neural networks in a fully automatic manner. Meanwhile, the state of the art is still limited by a tedious, manual trial and error process; this manual approach is itself a source of redundancy and cannot produce neural networks of a small size.

Furthermore, many artificial intelligence users, particularly those in the field of the healthcare, complain about their methods yielding bizarre results. Parsimonious neural networks provide an effective solution to this problem; they are able to capture with great accuracy the physical or biological phenomena conveyed by the data. They even allow creation of highly reliable complex dynamical models, including for quasi-chaotic phenomena; a case in which even the slightest flaw of parsimony would have irremediable consequences on the quality of the model.

A major industrial player put ADAGOS in competition with one of the world-leaders in AI on the problem of predicting turbocharger blade deflections. Without a doubt, the results were in our favor:



The world-leader's network



ADAGOS' parsimonious network

	Giant of AI	ADAGOS
Learning data (Percentage of total available data)	1 000 000 samples (100 %)	10 000 samples (1%)
Size of the network (Number of links)	500 000	200
Computing resources	A 15 000\$ Tesla GPU card	1'13" on a laptop
Energy consumption (estimation)	1 kWh	0.0005 kWh

Franck Desaulty - Startup Program Manager for Elektrobit Automotive:

"Thanks to the Continental Startup Challenge 2019, we were able to discover ADAGOS' unique approach to optimizing neural networks, which allows us to see a very promising potential for use in automotive computers. We look forward to further progress with ADAGOS and making our contribution to the development of autonomous vehicles of tomorrow together. "

About ADAGOS:

Created in 2011, ADAGOS is a spin-off of the Institute of Mathematics of the Paul Sabatier University (Toulouse, France) and CNRS: www.adagos.com

Our parsimonious methods are represented by three products:

- deepROM for compression and learning static phenomena,
- xROM for dynamic modeling,
- coROM, an implementation of our parsimonious convolutional method, for data distributed on a grid (e.g. images or data obtained from simulations).

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About Continental:



Continental develops state-of-the-art technologies and services for sustainable and connected mobility of people and their goods. Founded in 1871, the technology company offers safe, efficient, smart and affordable solutions for vehicles, machinery, traffic and transportation. In 2018, Continental achieved a provisional turnover of approximately 44.4 billion euros and currently employs some 244,000 people in 60 countries and markets.