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Fallacious styles of reasoning have been studied and classified from ancient antiquity. Example terms are: "Slippery Slope", "Appeal to Authority", and so forth--See Classical logical Fallacies. New fields, such as Computational Neuroscience, have their own set of fallacious styles of reasoning, whose study has only just begun.

G.I.G.O

Garbage in, garbage(or gospel) out. Well known problem with all computational models.

UNITY GAIN SIMULATION

You build an elaborate model of a simple phenomena, including many redundant mechanisms to get out the phenomena. If done well, you get the result that you wired in, but learn nothing, hence unity gain. If done poorly, reduces to G.I.G.O. True unity gain, although not interesting, is technically difficult, and requires some skill.

TIBETAN PRAYER WHEEL

Building merit by turning cycles (on your computer). Your model is conceptually simple, and/or of little interest, but it required a supercomputer to run it. Legitimizing your model by emphasizing that it required the "world's largest computer" to run....

TWO CARD MONTE

The street card game (shell game) played in academia: you sell the computer scientists that your model is an important contribution to biology, and you sell the biologists that your model is an important contribution to computer science. But it is neither. Works even better with more than two disciplines involved. The more remote they are, the better.

THE DEVIL MADE ME (NOT) DO IT

Your implausible and/or poorly constructed model (conveniently) can't be realistically tested due to computational complexity.

PSEUDO BIOLOGICAL DETAIL (PBD)

Related to two card monte. Overload your model with irrelevant biological parameters and metaphors, in an attempt to direct attention away from conceptual weakness.

BRUNO'S LEMMA

When it is pointed out that the fundamental idea of your model strongly violates basic facts, you claim that your model can be fixed, since it is a model of the brain, and the "brain can do it".

PROOF BY SALES RECEIPT

I'm a neuroscientist. I bought ten MACS (Suns, PC's,etc.) on my grant. Therefore, I'm a computational neuroscientist.

KLAUS'S TRANSFORM

A colleague publishes a simple version of your complex mechanism. You then claim his simplyfing idea as your own, and cite his (simplification of your model) as one of many complex models explained by "your" simplifying assumption.

CARGO CULT

<New Guinea natives built plywood airplanes after WW-2 in order to lure down cargo planes, which were no longer arriving after the war.> "My network babeled like a baby while it was learning...." therefore my network is mimicking the learning process in a baby... See "totemic model" below.

TOTEMISM

The totem is believed to (magically) take on properties of the object. The model is legitimized based on superficial and/or trivial resemblance to the system being modeled.

HAIL MARY

<After the football play of the same name: you have the ball, but no one is free downfield. So ... close your eyes and hurl for the end zone.>

You have a fragment of an idea, but don't know how to state, develop, or support it. But, if true, you will be famous. So, embed it in a far-fetched "model" and publish it, in the hope that your "model" will be proven "correct", somehow, someday.

BIG GAME FISHING IN THE GOLDFISH BOWL

You claim "predictions" for your model which are actually trivial and/or unavoidable properties of the nervous system: "A prediction of my model is ... the existence of lateral inhibition in the pulvinar".

NEURO-BAGGING

<See carpet-bagging, as in the U.S. Civil War.Thanks to Mark Rubin for this one.> You assert that an area of physics or mathematics familiar to few neuroscientists solves a fundamental problem in their field. Example: "The cerebellum is a tensor of rank 10^12; sensory and motor activity are contravariant and covariant vectors". Related to 2-card monty (above), but distinguished by more extreme bodaciousness.

SCIENTIFIC POINTILLISM

< see Impressionist painting technique, e.g. used by Seurat, consisting of a small dabs of paint creating the illusion of a figural painting. >

Your "humanoid robot" is really a pair of active vision camera's and robot arms bolted together, with a flashy plastic body. The rhetoric describing it is laden with terms indicating its humanoid abilities: it "interacts" with humans (and even graduate students); it has emotions. However, when looked at more closely, the thing is supported by simple software that appears to be ten or fifteen years behind the state of the art. If done well, you can enjoy the feeling of metaphorically, as well as literally, being the "star of your own movie".