

An Account of Active Inference Modeling

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In Active Inference, we develop (ensembles of) generative models of [ecosystems of shared intelligence](#) by [accounting for cognitive system](#) and [phenomena](#). The work of developing generative models is more like doing accounting than doing calculation, memorization, or inference itself – the generative model does the inference for us.

- One of our functional roles or capacities as an engaged generative modeler, is to take an analytical stance towards accounting for cognitive properties, processes, and perspectives.
- In this setting, we are the Active AccountAnts. The generative model we create is an Active InferAnt.

Consider a financial accounting situation: at some point one's actions reveal a preference that reflects acceptance of given accounting tools as sufficient in order to do something else (stopping-time rules-as-strategy) .

- Basic (and beautiful) questions like “*how are numbers added in principle?*” and “*does this spreadsheet program accurately implement number adding?*” are Research questions. In contrast, (question-driven) Application is the regime of attention, where one uses those numbers for their business in practice.
- At some point during practical application, one trusts that within a validated spreadsheet program, given the numbers entered, the resulting calculations are correct. This doesn't mean that one appropriately accounted for all relevant variables (e.g. [unknown knowns/unknowns](#)), or quantified everything accurately, or what to do with that accounting result, or how things will work out for the company, etc. – that is not the concern of the algorithm (and analytical theory) that adds and subtracts numbers (and yet people use numbers every day).

In Active Inference we are accounting for cognition broadly – for [action, perception, and beyond](#).

- That such a holistic and integrated approach might even be plausible (let alone likely), rests upon a [first-principles scale-free approach](#), rather than a highly-specific scheme for cognitive systems. In other words, Active Inference can be used to say more, because by itself it says less.
- Active Inference learners often look at representations such as [Figure 4.3 from the 2022 textbook](#) or [Figure 1 from Friston 2019](#), seemingly expecting to find sophisticated phenomena such as affect or narrative reflexivity in, or on, that representation. Two key aspects of my response in that situation are:
 - First, if Active Inference were to include even relatively simple cognitive phenomena (e.g. learning, attention) in its essential particular formulation, this would explicitly restrict the scope of analysis to systems with that character, and silently diminish our capacity to distinguish across that difference.
 - Second, natural language or conceptual descriptors of cognitive phenomena are secondary attributions better understood as [relational rhetorical assertions](#) using a [pattern language of phenomena](#) about a [given realized generative model](#), rather than fundamental or intrinsic aspects of the system of interest itself ([Map-Territory fallacy](#) [fallacy] and all that).
- Recently, [category theory approaches to Active Inference](#) have been developed, resonating with the relatively [well-developed category theoretic](#) methods used in [financial](#) accounting. Thus the connection among financial and cognitive accounting likely goes far deeper than the analogical or pedagogical. Such connections, and a further account of modeling, awaits future attention and collaboration.

To conclude:

- In Active Inference, we use the [four-fold particular partition](#) to model Internal, External, Sensory, and Active states as a cognitive Tetrahedra (this form being the minimal space-encloser in our shared [4D scenario](#)).
 - We're whole-Tet accountAnts (or multi-Tet accountAnts, in the [multi-agent case](#)). We expect and prefer to account for the whole Tet – nothing less and nothing more.
- The outcome of Active Inference Research-Application work is both organic-aesthetic and analytic-synthetic, as generative models can be crafted and/or interpreted as an [intra-active art-science](#) in [P-adic time](#).