A Model of Cognizing
Supporting Origination of Cognizing in Nature

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Abstract

1. **Our model of cognizing** roots in developmental psychology by Jean Piaget (Flavell1962), follows researchers in modeling cognizing by solvers of combinatorial games (Benergji 1969, Pogossian 1983, Laird 1987) extends the structures of object–oriented representations to ones in English and tends to be consistent with questioning the origination of cognizing in Nature (Pogossian 2020-23).
Let's introduce the basics of the model, provide arguments of its adequacy, followed by ones supporting the origination of cognizing
2. **Interpreting Piaget,** *human cognizers* are defined as realities over *energizers* that in collaboration with analogous cognizers of members of their communities *learn* and organize *mental systems* for preserving their personal and community utilities.
Energizers are interpreted as realities attributed by ability to gain energy from any sources to preserve certain utilities, especially ones for diversified reproducibility of energizers.
Mental systems (mss) are identified by their *doings* either *inherited,* or *learned* both *by revelation* and *acquisition* of mss with and from communities C.
Revelation /discovery/ assumes to be goal oriented, thus, *motivated*, and includes *doings of inductive, deductive, imaginary and intuitive inferring of mss, enhancement of effectiveness of mss, processing mss to search or prognosticate classifiers and strategies.*
Effectiveness of mss can be raised by *cellular or constructive regularizing, constructive and adequate modeling,* others.
Acquisition assumes gaining mss straightly from teachers or from *representations of mss.*
2.1. Humans, as a type of cellular realities, *cellulars,* include *roots* or inherited utilities, which humans in lifetime enrich with new ones. Roots, sensors of all over, effectors to figure out our doings, overall controllers and some others embrace *octaves* of our cognizing.
Sensors along with other classifiers inherited and identified by *controllers* in conjunction with those studied and identified in a lifetime, i.e., revealed, but mostly acquired from cultures of communities, comprise our *attributes.*
2.2. The outputs of attributes entail *imprints* in each member x@C. Classifying imprints members x represent their causers, particularly those caused by the impacts of causers on the utilities of x.
2.2.3. The imprints, their causers and classifiers are *realities of x@C,* while the totalities of realities of x comprise *the observable Universe of x, xU*.
2.3. *Doers*, generally, are realities having input-output parts and for realities at the input parts that are not necessarily pre-classified either elaborate certain output realities or remain passive.
(Note, that in-/outputs of doers are arbitrary realities what differ them from ones of operators in physics).
2.3.1.In-realities causing elaboration of output realities and totalities of these out- realities comprise *in- out- domains,* or *in- out-doms* of doers, correspondingly.
Indoms with respect to outputs are split into classes of equality, thus, the absence of outputs, i.e., the absence of activation of doers, corresponds to the *class (?) of uncertain inrealities*.
2.3.2. Doers are *do-classifiers* Cl if indoms are split into two classes +Cl and ?Cl; otherwise they are *corresponders, cors.*
Classifiers of n-tuples of nominals are *n-place relationships.*
3. *Generalized cognizers*. are defined as realities that include energizers and in their lifetime regularly and unlimitedly learn and organize certain constructions, *mentals,* exempted from cellular and computer dependency.
3.1. The definition of mentals is incremental and is based on ones of doers, sensors, classifiers, relationships, attributes, imprints, identifiers, nominals, doins, systems over nominal and others (Pogossian 2020-23).
Particularly, doins (or *doers over IDs of nominated realities*) are interpreted as algorithms that use IDs of imprints and IDs of algorithms either innate or learned.
For example, in OOP, the projection of doins corresponds to the algorithms that use either IDs of basic types (integers, symbols, etc.) as inputs, or IDs of other algorithms encapsulated in abstract classes, while mss correspond to systems of abstract classes incrementally ascended from ad hoc available ones by attributing, parenting and do types of relationships, interpreted as *have, be* and *do* (hbd) ones.
Mentals in addition to *hbd* are enriched by English relationships that are capable to be formed by revelation algorithms (inductors) analogous to ones of formation of 1-place classifiers, say by neuron nets (NN) (Pogossian 2020-23).
4. Given generalized cognizers (cogs), in the *problem HU* of humans H cognizing the* entire *Universe U** it is required to develop cogs for effective supporting the promotion of utilities of these cogs in the universe U*.
5. **Justification of cognizers as adequate models** of cognizing tends to be done by analogy with justification of algorithms as adequate models of computability by Church.
5.1.Particularly, the adequacy of mentals, at first, should be proven for several mss, then, a hypothesis h on adequacy of mentals to any mss should be declared to be examined empirically until h is refitted by some mss.
Ideally, this justification means that for the original problem HU* for systemic classifier sClm of any mss m of any x@C solving HU* it is possible to provide mentals m' with classifier sClm' equal to sClm.
5.1.1. Realistically, since the adequacy of mentals can be examined only for finite number of mss it is worth to examine h, first of all, for selected key mss.
As such key mss we select meta mss, i.e., those doing over mss, then ones acknowledged by psychologists and psychotherapists as a nucleus for identifying the norms of being humans.

5.1.2. The next barrier in justifying the adequacy of mentals is the incredibility of HU* problem in examining the equality of mentals to target mss.
Ideally, to prove adequacy of mentals m' for target mss m, we should confirm equality of m and m' for any type of their relevant processing for any tasks of HU* problem, which is unrealistic.
5.1.3. To overcome this barrier, we follow the views that the HU* problem can be approximated by game models. Then, we argue that combinatorial games with known hierarchies of utilities and solutions in spaces of possible strategies of game trees can represent the HU* problem with a proper adequacy.
5.2. Arguing adequacy of our models of cognizing we state that the models
-are completely explainable
-preserve the majority of statements and algorithms of cognizing including
= inductive learning algorithms, particularly in the NN mode,
= Personalized Planning/ Integrative Testing algorithms elaborating strategies in target situations dependent on learned classifiers, thus, relationships "if then"- the base for formation algorithms , say by A. Markov or E.Post (Pogossian 2020-23).
=algorithms of acquisition of strategy meanings by experts and ones from texts (Pogossian 2020, Grigoryan 2021) conceptually close to (Langley, Shrobe, H.,Katz, 2020)
-provide models of expert like explanation/interpretations
- can be based on NN classifiers to consist functional and connectivity models of cognizing
- successfully approximate expert solutions of security, competition and dialogue HU* cases (Pogossian 2020)
-are supportive to revelation of origination of cognizing.
5.3. Illuminative advances of generative pre-trained transformer BERT, Chat GPT, others question their positioning with respect to human like cognizing and possible integration with models. Assuming that humans store entire lifetime imprints caused by realities and intuitive reasoning relies on these stores, it is challenging, whether chatbots are modeling intuition?
6. **Questioning origination of cognizing** must, first of all, address to origination of cognizing of living realities, i.e., cellular, and, as a minimum, of the simplest cellular, uncials. By one of prevalent hypotheses, *abiogenesis*, uncials, were originated by a chance from already existed in nature chemical compounds. Unfortunately, in spite of ongoing intensive research efforts, abiogenesis owns more difficulties and hopes than advances (Irreducible complexity 2023).
6.1. While studies in abiogenesis continue, new ideas and hypothesis on the origin of uncials arise attempting to exempt from the above difficulties.
By hypothesis on *origin-able cognizing in nature* (oacin), arisen in constructive modeling of cognizing, cellulars were designed by a type of cognizers of the Universe that
-were earlier originated in nature as elementary recurrent classifiers, then
-evolving had attained power of cognizing comparable, at least, with the highest human one, followed by
-designing cellular, analogous to human design of robots nowadays.
6.2. Viability of oacin hypothesis is strengthened by assertions that
-the constructions, *mentals*, adequately model mental systems
-mental systems and means of their constructing can be composed from elementary "atoms", *recurrent 1-/2- place classifiers*
-a type of constructive cognizers, *octaves*, exempted from computer dependencies and able to enhance the power of cognizing by learning mentals, but so far limited in that, can adequately model cognitive development of newborns by Piaget
- octaves, and assumingly their roots, *can be reduced* to some alphabet of uniform units, i.e., inevitable constituents of cognizers
- studying of the origination of octaves/ roots can be based on studying of the origination of their constituents
- functional definition of constituents of octaves/roots soften the requirements to their implementations .
7. Thus, **upcoming researches** in origination of cognizers reduce, particularly, to origination of dynamicity of doers, energizers and their ability to develop to the octaves, other unavoidable constituents including
-carriers of and compartments for constituents of cognizers
- doers of the types of 1/2place symbolic and not symbolic recurrent classifiers (*possibly represented firstly as case based g/gg-matrices) and comprising nets Ncb*
- Ncb searchers of strategies equal to symbolic and not symbolic procedures that
---compose the variety of doers into energizers.
---compose case-based g/gg-matrices into *rule-based* 1/2place classifiers and their nets Nrb
- Nrb searchers of strategies equal to algorithms,
as well as to the fundamental question of the
-reproducers of constituents and their compositions including themselves.
7.1. These researches along enriching applications of current cognizing models, if successful, will support in illuminating the fundamental question of the origin of cellular, thus, humans.

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