Introduction to Metamodels as Generalized Structures

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A knowledge model ultimately requires two external observable entities in relationship to it in order to be considered as “useful”, “coherent”, or even “real”.

1. A correspondent subsystem of the universe, a discrete phenomenon or set of phenomena that the model intends to respond to.
2. A reasonable end user of symbolic representation of the model, a creator of meaning, value and utility in relation to the model.

Mathematics is a knowledge model. It responds well to discrete abstract entities and the properties that arise from parametrizing objects using numbers and functions. It outputs reliable information about the patterns and forms of discrete observables, and pure abstract math is essentially a model of concrete math, which is itself a model of the phenomenal world in terms of numbers.

In this context, the ideas of concrete mathematics are both a given input, an axiomatic set of constraints or parameters within which to make observations about the world, and a symbolic output, an ideal baseline structure which represents the core identity and the “base case” of pure math.

Music theory is a knowledge model. It responds to mechanical waves that observers experience as sound. It outputs reliable information about the patterns and forms of discrete musical constructs, in terms of Western sheet music notation, 12-tet (or x-tet) notes and scales, etc.

Music history/appreciation is a knowledge model. It responds to musical trends, instruments, technology, and all things related to the understanding of music as a cultural and social phenomenon. It outputs relevant categories, perspectives, and examples of important musical ideas, in terms of genres, fanbases, descriptions of cultural movements, etc.

Rock music is a broad, diverse genre that has evolved and grown over the last 80+ years. The core identity of rock music generally revolves around the electric guitar. Any number of tangential genres fall under the vast umbrella of rock music, such as blues, classic, punk, grunge, pop fusion, etc. These different styles incorporate a wide range of instruments and rhythms, and indeed may have very little in common with one another besides the physical instruments being played. The concept of “rock music” represents an abstract metamodel that treats these subdivided genres as roughly equivalent, in the same way that equivalently abstract metamodels, like hip hop or jazz, treat their subdivisions.

These are all models of models. Each genre and subgenre is a metamodel, a set of constraints or parameters within which to make observations about music. A concrete example of rock music is punk music. A concrete example of punk music is “God Save the Queen” by Sex Pistols. A concrete example of “God Save the Queen” by Sex Pistols is the 1978 live performance of “God Save the Queen” performed by Sex Pistols in San Francisco, California, available to stream for free on YouTube at the time of this writing. Another roughly equivalent concrete example in this context would be the 1976 studio recording.

The purpose of this example is to demonstrate the general concept of a metamodel. Every concept, symbol, idea, word, etc. includes or refers to a model of a more “concrete” phenomenon. Any accessible model can subsequently be modeled as a phenomenon to some degree, and this subsequent model is the metamodel of the given model as well as any other models of the same “equivalence class” (loosely speaking).

Comparing rock music to jazz music is more reasonable than comparing the entirety of rock music to alternative pop duo AJR, or comparing jazz music to the tambourine. It’s a simple case of apples and oranges.

Every metamodel, therefore, must be aligned to some external metric of value, a measure of equivalence and distance, in order to properly respond and correspond to a given set of models. From the perspective of the metamodel, any two models must appear subjectively equivalent as objects within a class in order to properly compare their characteristics, despite the inequivalence of the content of each model. Punk and grunge are two arguably equivalent subgenres within the metamodel of rock music.

The perceived inequivalence of the content of the models necessarily constitutes the unique identity of each model within the context of the metamodel, but the ordering of equivalence classes, and the correspondence of objects to their perceived class within the metamodel, is subjective.

Grunge and punk are decidedly equivalent as genres of rock, but they are also decidedly different by virtue of the fact that they have different names, and those different names correspond to observably different styles of music. One could argue that 90’s grunge music is better and more important than the entire history of American country music, with no other justification than because one said so. And this is a valid interpretation (output) given by some arbitrary metamodel of music, with arbitrary subjective equivalence classes.

Every model necessarily corresponds to some utility metamodel. The base model is the phenomenal model, and the metamodel includes at minimum one proper equivalence class, which requires that a given model is in fact taken to be a properly useful model and not merely an illusion of correspondence/correlation. If a model is not useful or correspondent according to some metamodel, the model will not generally persist and compete with other useful models over time, akin to natural selection.

The identity case of a metamodel resembles a delta function; it outputs 2 equivalence classes: 1 that applies to all models external to the metamodel, a uniform distribution, and 1 most abstract equivalence class with exactly 1 member, the metamodel itself. Every model is indeed a model, the metamodel describes those models as equivalent and consequently describes itself as a proper metamodel of the models, and no further articulation is required.

Every genre of music is music. Every mathematical object is an object. And these statements are decidedly True, rather than False, according to a given metamodel. The identity case is also technically, necessarily invalid by its own definition, as are all models per Incompleteness.

There is no valid metamodel M that objectively models all models and properly assigns them to equivalence classes. This metamodel would have to include some model of itself, and must necessarily define itself, M, as the unique member of the most abstract equivalence class relative to other models. If M exists, then there must exist some symbolic representation of M, otherwise there is no coherent

knowledge relationship corresponding to M. If this symbolic representation of M exists, these symbols may be assigned to members of a group, a phenomenon that can be externally modeled by some decidedly more abstract metamodel W, which would model itself, W, as the unique member of the most abstract equivalence class, rather than M. (According to W, M is a single permutation in a group of potential configurations.) If M exists, then W exists, and W negates the validity of M, therefore M does not exist.

To belabor the point, there is no *valid* metamodel that can objectively assign itself to the most abstract equivalence class, as once again, all models and metamodels require a reasonable end user to make subjective judgements about equivalence classes.

A model can model itself, but it can't prove itself.

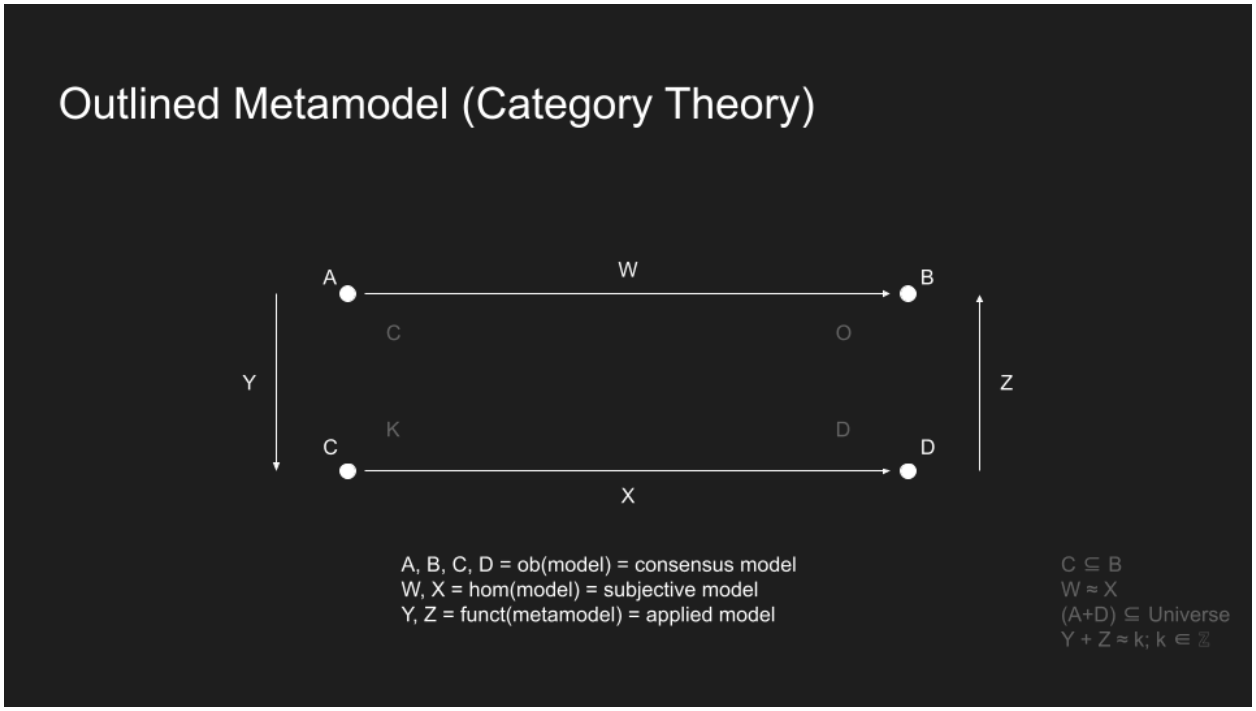
"Anybody whom you consider…as an authority, has this authority because of your opinion that [they] have that authority." -Alan Watts

Primitive Applications in Category Theory

All forms of knowledge, all ideas, concepts, models, words, languages, theories, etc. necessarily correspond to a given metamodel in the following mode:

C) There exists some phenomenon (object) to which the knowledge corresponds.
O) There exists some symbol (subject) to which the knowledge corresponds.

K) There exists a set of potential maps from object to subject, phenomenon to symbol.
D) There exists a "proper" ordering of maps from object to subject, phenomenon to symbol.



Applied Metamodel on Models

A = phenomenal models

B = subjective qualitative forms

C = relations between forms

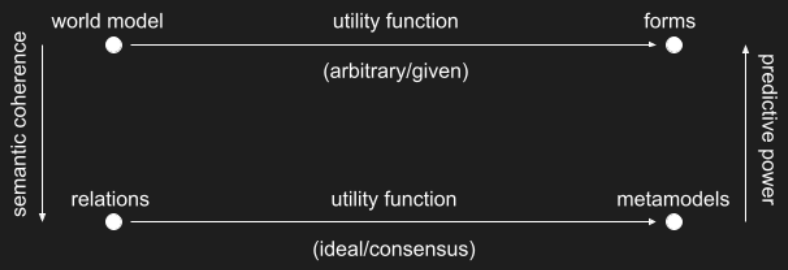
D = labelled metamodels

W = unconscious a priori utility function

X = conscious intentional utility function

Y = subjective semantic coherence

Z = expected predictive power



Applied Metamodel on Itself

A = undefined objects

B = potential abstractions of objects (constructs)

C = ideal abstractions of objects (symbols)

D = axiomatically bounded objects

W = surjective map

X = injective map

Y = metamodel of model

Z = application of model

To clarify, the diagram above describes the manner in which the diagram describes things.

Applied Metamodel on Conscious Experience (passive)

A = phenomenal model of environmental change

B = manifest subjective qualia/forms

C = accessible knowledge structure

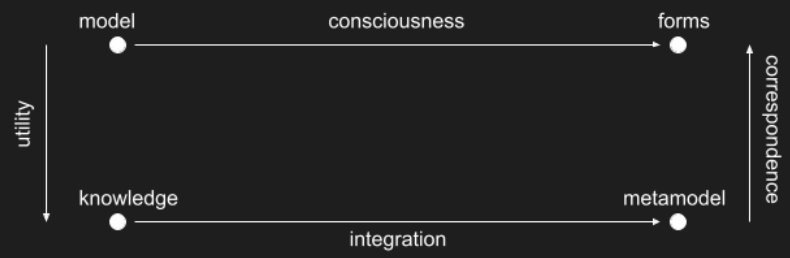
D = labelled metamodel

W = black box map of consciousness

X = convergent integration effort over time

Y = subjective utility structure

Z = reliable phenomenal correspondence



Applied Metamodel on Conscious Will (active)

A = subjective homeostasis model

B = potential model of local control

C = applied model of local control

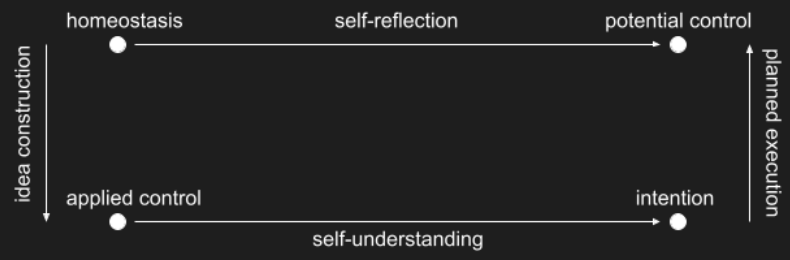
D = coordinated identifiable intention

W = self-reflection on value structure

X = self-understanding of focused control

Y = idea construction

Z = execution of plan



Applied Metamodel on Cognition/Mental Processing

A = mental observable simple micro-forms

B = potential abstract knowledge frameworks

C = familiar abstract knowledge frameworks

D = mental observable complex macro-forms

W = arbitrary unconscious map

X = value judgements

Y = information compression

Z = information integration

Applied Metamodel on Computation

A = controlled signal flow

B = digital state representation

C = executable algorithms

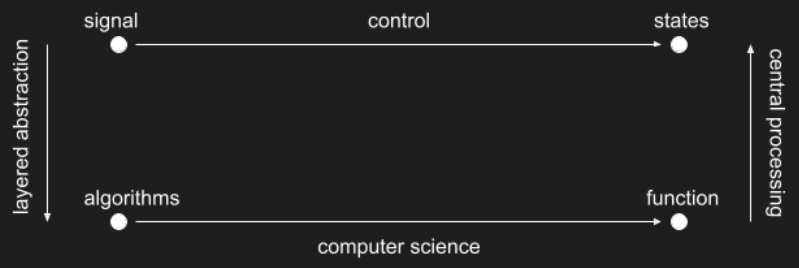
D = optimized functionality

W = control theory

X = computer science

Y = layered functional abstraction

Z = centralized processing (CPU)



Applied Metamodel on Social/Political Constructs

A = resistance to status quo

B = political action/movements

C = parties/ideologies/axes

D = stances/values

W = socialized urge to action

X = political tribalism

Y = bureaucracy

Z = executive action

Applied Metamodel on Gender

A = perceived societal roles

B = gender binary model

C = gender non-conformity

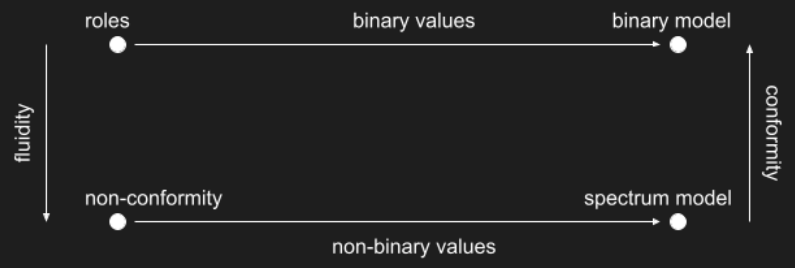
D = gender spectrum model

W = binary gender values

X = non-binary gender values

Y = gender fluidity

Z = gender conformity



Applied Metamodel on Aesthetics

A = subjective expression

B = subjective meaning

C = form, context, technique

D = socialized resonance

W = aesthetic idealism

X = aesthetic critique

Y = creative ego/muse

Z = audience feedback mechanism

Applied Metamodel on Thing Theory

A = abstract coherence (“thing-ness”)

B = dichotomized CKOD spectra model

C = justification of coherence

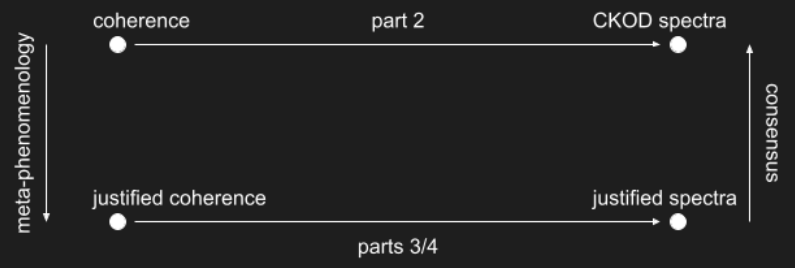
D = justification of spectra

W = Thing Theory part 2

X = Thing Theory parts 3 and 4

Y = meta-analysis of metamodels

Z = consensus



For more information on “Thing Theory” or the meanings of the letters “C”, “K”, “O”, “D” in context, please refer to *Thing Theory: An Explorative Approach to Phenomenological Analysis*. The full text is available to download for free at: http://www.mindmathmusic.com/philosophy/thing-theory

Functions of Metamodels

To point to the Universe, consciousness, and all potential “things” or models one could point at and call “real”, and consider all things as one, or equivalent to one another, is some perspective from a phenomenal knowledge model bounded by a particular theoretical metamodel Q. Q aims to correspond to some phenomenal Truth without constructing any phenomenal boundaries or assigning any value in any dimension. Buddhism refers to a version of this perspective as “ekaggata”, one-pointedness.

To point at more than one thing and consider the differences between the things, is necessarily to take a perspective corresponding to some metamodel that is not Q. Q acknowledges a model of the world as one continuous entity to be a sufficient model. Any perspective that dissects or labels the world as more than one entity, is not bounded by Q.

If Q exists and not Q exists, then they exhibit different behaviors, therefore a model of their behaviors may correspond to a member of some other metamodel which bounds examination of the relationship between Q and not Q; this metamodel is also not Q.

If this metamodel observes Q and some not Q as equivalent manifestations of one continuous entity, this metamodel is still not Q. Q examines the phenomenon that is the world, this metamodel examines Q and not Q.

In the absence of specific accessible content given by knowledge models, Q (or some context-dependent version of Q) decidedly observes any particular knowledge model as isomorphic to another, on the grounds of all being knowledge models in their own respect. However, if any of these particular knowledge models is to be defined, conceptualized, understood separately from the context of Q, then any further analysis constitutes evidence against Q’s utility, as Q’s perceived equivalence of all models is replaced by the inequivalence of their respective content.

Let us construct a metamodel D which intends to observe metamodels, and assign to each observation some notion of distance from Q, where D(Q) = 0.

Let us construct a metamodel F which intends to observe the structure of some particular metamodel m, as well as the output of D(m), and assign to each observation a particular metamodel F(m, D(m)).

F(m, D(m)) intends to observe metamodels of potential actions/changes upon the structure of m and output a partially ordered set of executable actions which ideally take D(m) towards 0. A trivial member that may be included in the output set of F(m, D(m)) is not computing itself, and simply computing D(m); this is only valid if m constrains F and D.

m = not Q;

D(F(m, D(m))) > D(m) > 0

The output set of F(m, n, D(F(m, D(m)))) for any arbitrary m and n may contain some metamodel which acts upon the computer of F(m, n, D(F(m, D(m)))) [via some model constrained by n], and replaces the decision of performing this computation for the less abstract computation F(m, D(m)). This decision may take D(m) towards 0, while sacrificing creative ability to explore novel domains via the recursive applications of F.

There are many ways to approach a given goal, as there are many ways for D(m) to approach 0. F(m, D(m)) tells you how to get there. F(m, n, D(F(m, D(m)))) tells you how to get there more abstractly, but takes more time to compute than F(m, D(m)).

There may also exist metamodels in the output set of F(m, n, D(F(m, D(m)))) that are contradictory to particular metamodels within the output set of the smaller case F(m, D(m)). It is crucial to note here that abstraction does not reflect any objective dimension of Truth, and is a ceaseless quest.

If there exists some metamodel R that takes D(m) towards 0 according to F(m, D(m)), R is by definition a member of the output of F(m, D(m)). If the output of F(m, n, D(F(m, D(m)))) includes R, then R confidently takes D(m) to 0.

However, D(R) > 0 and the output of F(R, D(R)) includes nontrivial actions upon R, actions that would take D(R) towards 0 while increasing D(F(R, D(R))) per the nontrivial actions. Just as before, the output of F(R, n, D(F(R, D(R)))) may include not performing F(D(R)), and subsequently itself, F(R, n, D(F(R, D(R)))), so as to decrease D(F(R, D(R))).

Given that m constrains F and D, the output of F(m, D(m)) trivially includes not performing F(m, D(F(m, D(m)))), as D(F(m, D(F(m, D(m))))) > D(F(m, D(m))).

The key to this trick is that D(D(m)) > 0, therefore the output of F(D(m), D(D(m))) includes not even performing D(m), despite the fact that this would negate the computation via F which asserts the utility of not performing D(m).

Final Remarks

One may note the correspondence between models of models as demonstrated and the likes of von Neumann machines. A metamodel is a model that models itself as well as other models. A von Neumann machine is a physical system that creates versions of itself as well as other physical systems.
A metamodel may be understood in some sense as a digital/idealized instance of the analog hypothetical phenomenon known as a von Neumann machine.

For a more comprehensive analysis of metamodels and knowledge models, please refer to *Thing Theory: An Explorative Approach to Phenomenological Analysis*. The full text is available to download for free at: http://www.mindmathmusic.com/philosophy/thing-theory

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