Measurement Theory Meets Mereology in Resemblance Nominalism

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The *problem of particulars and universals* consists in a crossroads of *ontology* and *semantics*: When we translate a natural language into a first-order (modal) language, (though it is a problem which formal language we should adopt in this translation), the *semantic problem* as to which entity we should choose as the semantic value of a symbol in the *model* of first-order modal logic depends crucially on the *ontological problem* as to which ontology we should adopt. According to Rodriguez-Pereyra (2015), there are at least two kinds of *Nominalism*: one that maintains that there are no *universals* and the other that maintains that there are no *abstract objects* like classes, functions, numbers and possible worlds. On the other hand, *Realism* about universals is the doctrine that there are universals, and *Platonism* about abstract objects is the doctrine that there are abstract objects. The doctrines about universals and the doctrines about abstract objects are *independent*. According to Rodriguez-Pereyra (2015), Nominalisms about universals can be classified into at least eight types: (i) Trope Theory, (ii) Predicate Nominalism, (iii) Concept Nominalism, (iv) Ostrich Nominalism, (v) Mereological Nominalism, (vi) Class Nominalism, (vii) Resemblance Nominalism, and (viii) Causal Nominalism. Resemblance Nominalism in general is confronted with at least seven problems: (i) Imperfect Community Problem, (ii) Companionship Problem, (iii) Mere Intersections Problem, (iv) Contingent Coextension Problem, (v) Necessary Coextension Problem, (vi) Infinite Regress Problem, and (vii) Degree of Resemblance Problem. As Rodriguez-Pereyra (2015) argues, according to Resemblance Nominalism, it is not because things are scarlet that they resemble one another, but what makes them scarlet is that they resemble one another. Resemblance is *primitive* and the properties of a thing are *defined* by resemblance. Resemblance Nominalism reifies neither resemblance nor accessibility relation in themselves. We (2020) propose, in terms of *measurement theory*, a first-order modal resemblance logic *MRL* that can furnish solutions to all of the problems (i)-(vii). Yi (2014) raises a version of degree of resemblance problem. Yi (2014, pp.622-625) argues as follows:

(1) Carmine resembles vermillion more than it resembles triangularity.

(2) is a resemblance-nominalistic formulation that expresses what makes (1) true:

(2) Some carmine particular resembles some vermillion particular more closely than any carmine particular resembles any triangular particular.

In Rodriguez-Pereyra (2002)'s theory , the *degree of resemblance n* is defined as follows:

Definition 1 (Degree of Resemblance)

The particulars resemble to the degree *n* iff they shares *n* properties.

Under Definition 1, (2) compares the *maximum* degrees of resemblance. But (2) is false because a possible carmine particular completely resembles a possible triangular particular (the same particular might be both carmine and triangular). Rodriguez-Pereyra (2015) responses to Yi by replacing (2) by (3):

(3) Some carmine particular resembles some triangular particular less closely than any carmine particular resembles any vermillion particular.

Under Definition 1, (3) compares the *minimum* degrees of resemblance. Rodriguez-Pereyra (2015, p.225) argues that (3) is true because the minimum degree to which a carmine particular can resemble a triangular particular (degree 0) is smaller than the minimum degree to which a carmine particular can resemble a vermillion particular (a degree greater than 0). Yi (2018, p.796) criticizes this Rodriguez-Pereyra's response by arguing that it rests on a false assumption: the minimum degree to which a carmine particular can resemble a vermillion particular is greater than 0. When we considered this Rodriguez-Pereyra-Yi debate, we realized that the model of *MRL* was not able to deal appropriately with the *multidimensionality* of his type of problem. The *aim* of this talk is to revise *MRL* so that the *revised first-order modal resemblance logic RMRL* can solve Rodriguez-Pereyra-Yi Problem in terms of measurement-theoretic multidimensional representation (Suppes et al. (1989)) of degree of resemblance. *Mereology* (cf. Varzi (2019)) makes an essential contribution to the construction of the *multidimensional model* of *RMRL.* The punch line of Resemblance Nominalism is the *reduction* of universals into resemblance relations. The point of *formalizing* Resemblance Nominalism in *RMRL* is to avoid the *circularity* in this reduction into which it tends to slide. We try to give a solution to Rodriguez-Pereyra-Yi Problem by *redefining* in *RMRL* the *degree of resemblance* that is the main culprit of this problem.（使用言語：日本語）

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