Universal Prediction

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Propositions accompanying the dissertation

UNIVERSAL PREDICTION

by

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1. Solomonoff's theory of universal prediction is an offspring of Carnap's program of inductive logic. It is particularly close to the conception of Carnap's program that Putnam challenged in his diagonal argument. (Chapter 1.)
2. The Solomonoff-Levin measure can be defined as a universal transformation of any given continuous computable measure. Equivalently, it can be defined as a Bayesian mixture with computable prior over any acceptable enumeration of all lower semi-computable measures. This equivalence can be called a representation theorem. (Chapter 2.)
3. A Bayesian mixture, including the Solomonoff-Levin definition, can be interpreted as operating under a particular inductive assumption, relative to which it can be said to be reliable; or as an aggregating method over a pool of competing prediction methods, relative to which it can be said to be optimal. (Chapter 3.)
4. The Solomonoff-Levin definition can be understood as an attempt to escape Putnam's diagonal argument. In the end, however, the Solomonoff-Levin definition fails to escape diagonalization. The Solomonoff-Levin predictor is not a universally reliable method, nor a universally optimal method. (Chapter 4.)
5. There can be no universal prediction method. (Part II.)
6. The Solomonoff-Levin definition does not lead to a justification of Occam's razor. (Chapter 5.)
7. The Solomonoff-Levin definition does not give a convincing formalization of Occam's razor. (Chapter 5.)
8. Vovk's proposed definition, a generalization of the Solomonoff-Levin definition, does not give a convincing notion of predictive complexity. (Chapter 6.)
9. Algorithmic information theory falls short of giving a notion of intrinsic complexity in the context of prediction. (Part III.)
10. Negative results represent progress, too.