GOODMAN'S PARADOX GENERALIZATIONS

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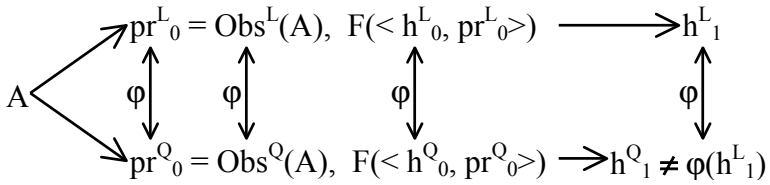
In our paper we have examined the problem of induction drawing a line between the famous Goodman's paradox and the contemporary inductive inference.

The general formal definition of inductive method considers it linked with the set of necessary requirements that according to their essence induction methods must satisfy to. Among the necessary requirements there is a requirement of invariance of the induction methods with the respect to the formulating language (language to represent hypotheses and experiment results).

N. Goodman in his "new riddle of induction" was the first who had noticed the dependence of the induction methods on their languages establishing it in the case of two predicates Green and Grue.

We have shown that paradox in its pure form can be generalized to the paradoxical situation that appears for every step of hypothesis reinforcement. These contradictions have the following matter: for some language L and any initial hypothesis h_0, and protocol pr_0, and for any inductive method F there always can be constructed a language Q and translation $\varphi : L \leftrightarrow Q$, which induce one-to-one transformation of the protocol sets for these languages, such that the following diagram is fulfilled.



Obs^L, Obs^Q – are experimental procedures, which for an object set A produce a protocol of experiment in two different languages L,Q;
h^L_0, h^Q_0 - are empirically equivalent hypotheses;
pr^L_0, pr^Q_0 - protocols obtained by applying the experimental procedure Obs^L to set of objects A. These protocols of experiment must satisfy hypotheses h^L_0, h^Q_0;
h^L_1, h^Q_1 – reinforcements of hypotheses h^L_0, h^Q_0 by the inductive method F;
$\varphi(h^L_1)$ – transformation of hypothesis h^L_1.

Despite the met symmetry the resulting hypotheses h^Q_1, h^L_1 are different (when compared with respect to φ) and hypotheses h^Q_1, $\varphi(h^L_1)$ provide different predictions about experimental results. Moreover, by choosing the language and experimental procedure for a protocol basically we may choose any prediction that we'd like. Such negative results are strictly demonstrated in the paper for the first order logic and feature space R^n with Euclidian metrics.

Traditionally induction and predictions are considered to be objective, but diagram illustrates that they entirely depend on our own choice of the language, the point where it turns out to be subjective.

Our main contribution to the problem under consideration is a new stating of induction problem centered on introducing the strict frames of language/ontology (exactly we define as empirical axiomatic system). It allows to avoid the omnipresent paradoxical situation and to obtain inductive methods most adequate to prediction purpose.