On the general form of the grue paradox

Chaohui Zhuang

Abstract: The grue paradox, also called the new riddle of induction, posed a great challenge to the common understanding about induction. This paper shows that there is a close relation between the grue paradox and the problem of conditionals. This paper presents a general form of the grue predicate. Based on the general form, this paper argues that this kind of predicates can not be used for induction and prediction.

Key words: the Grue Paradox; the New Riddle of Induction; Induction.

1. The grue paradox

The grue paradox was originally conceived by Nelson Goodman in his book “Fact, Fiction, and Forecast” [1].

Consider a hypothesis: “All emeralds are green.” Clearly this hypothesis is confirmed by observations of green emeralds. Because all emeralds examined thus far are green. This leads us to conclude that also in the future emeralds will be green.

Now consider a new hypothesis: “All emeralds are grue.” Relative to a fix time t in the future, the predicate grue is defined as follows: An object X satisfies the proposition "X is grue" if X is green and was examined before time t, or blue and was not examined before t.

All the evidences, which confirm the green hypothesis, also confirm the grue hypothesis. But the grue hypothesis forecast that the emeralds examined after time t will be blue. This is counter-intuitive.

About the grue paradox, Putnam said: “The central difficulty, which Goodman was the first highlight, is the projection problem: what distinguishes the properties one can inductively project from a sample to a population from the properties that are more or less resistant to such projection?”[2]

Goodman argued that the green hypothesis is more entrenched than the grue hypothesis. But what is the meaning of entrenchment, it remains unclear. Many other scholars attempted to solve this problem, but their methods are unsatisfactory. This paper will present a new method.

2. The conditional problems

There is a close relation between the grue paradox and the problem of conditionals.

Also in the "Fact, Fiction and Forecast", we can find examples of the problem of conditionals.[3]

Consider a hypothesis: “All marbles in the bag are red.” Suppose that we know that all marbles except d are red. By the usual kind of confirmation theory this gives strong confirmation for the red hypothesis.

Consider a new hypothesis: “All marbles are P.” P means that “in the bag and either is not d and is red, or is d and is not red.” The known facts also give confirmation for this hypothesis. But this hypothesis will forecast that d is not red.

3. The general form of the grue paradox

Combined with the grue paradox and the problem of conditionals, we can get a

general form of the grue paradox. Given a predicate G(x), P(x) means: "G(x) if x has been observed and ~G(x) if x has not been observed."

In more general form, P(x) means: "G(x) if x has been observed and S(x) if x has not been observed." S(x) is an arbitrary predicate. In formal form, it is: "(O(x)→G(x)) and (~O(x) →S(x)))". O(x) means that x has been observed.

From the general form of the grue predicate, we can get lots of similar predicates. For example, Green_Square(x) mean : "Green(x) if x has been observed and Square(x) if x has not been observed." Green_NotBlue(x) mean : "Green(x) if x has been observed and ~Blue(x) if x has not been observed." These predicates are intuitively meaningless.

4. The more general form of the grue paradox

Considering the antecedents and consequents of predicates, a more general form of the grue paradox is: "(O(x) →(P(x) →G(x))) and (~O(x) →(Q(x)→S(x)))".

Only Under the premises "Q(x) →P(x)" and "G(x) →S(x)", can the predicate (O(x) and P(x) →G(x)) and (~O(x) and Q(x) →S(x)) be meaningful.

We could not use this kind of predicate for forecast, because it is meaningless. A question is whether some meaningful conclusions also have been ruled out? The answer is not, because we can also get these conclusions from right arguments.

The inductive method is a process of using observations to develop general principles about the known subjects, and make prediction about the unknown subjects.

The general form of the grue predicates has two features. On the one hand, they

confine the projections of known subject to past experience. On the other hand, they make arbitrary predictions about the unknown subjects.

5. Conclusions

This paper presents a general form of the grue paradox. Based on the general form, this paper argues that this kind of predicates can not be used for induction and predication. By solving the grue paradox, this paper makes a contribution to what is not induction.

References:

1. Nelson Goodman, Fact, *Fiction and Forecast*, Harvard University Press, 1983.
2. Nelson Goodman, Fact, *Fiction and Forecast*, Harvard University Press, 1983, page viii.
3. Nelson Goodman, Fact, *Fiction and Forecast*, Harvard University Press, 1983, page 26.