

Induction Problem and Carnap's Theory of Probability Confirmation

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ABSTRACT

Hume's skepticism is not only the end of rationalism, but also the end of empiricism. In "A Treatise of Human Nature", Hume argument the theory of causality through three prerequisites and a principle, illustrating the nature of the problem of induction. The problem of induction challenges the legitimacy of inductive reasoning, and later philosophers have discussed it, among which Carnap's probabilistic logic scheme has attracted much attention. Carnap studys inductive process through deductive method and introduces the concept of the degree of confirmation. By demonstration, Carnap converted the problem of determining the probability P logically into the probability of determining the description of the state, and the induction problem was solved. However, using the method of deductive inference to study inductive logic is not desirable.

KEYWORDS

Problem of induction; Probability logic; Degree of confirmation

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1 The Proposal and Impact of Inductive Problems

Hume, a modern genius philosopher in Britain, has been paid more attention and researched because of Kant's high praise for him, which makes him have a special position and influence in the history of modern western philosophy. Besides, because of the in-depth study of modern empirical positivists on him, he continues to profoundly influence the world in the hundreds of years after his death, which makes him more and more significant in the history of modern western philosophy. There are many philosophical problems in the history of western philosophy, but few of them can always puzzle philosophers from their birth to now, and induction problem is one of them. This paper makes some preliminary analysis on induction problem

Facing the problem of induction, we must first face Hume himself and the problems he faces. Hume is often characterized as the end of modern empiricism. He inherited the philosophical thoughts of the empiricists such as Bacon, Locke and Berkeley. He not only ended rationalism but also ended empiricism in solving the source of knowledge. After criticizing and ending the dispute between nominalism and realism in medieval philosophy, Western philosophy in early modern times put forward the epistemological problem, that is, the problem of the source of knowledge, which led to two views, that is, British empiricism and European rationalism. British empiricism believes that the fundamental source of human knowledge is sensory experience, and the acquisition of sensory experience must be through the induction of experience. Continental rationalism, on the other hand, holds that innate reason is the source of human knowledge, which has certainty and truth, and reason is deduced by deductive method. Born in Edinburgh, Scotland, Hume received the

traditional education of British empiricism when he was a teenager, especially when he was in the University of Edinburgh. He firmly believed that human knowledge came from sensory experience, and this concept became the starting point and fundamental principle of Hume's philosophy. Hume's post-school business travels in Europe, and his particular preference for France in particular, exposed him to a great deal of continental philosophy, especially rationalism. This made him not only criticize rationalism, but also doubt empiricism when thinking and reflecting on the source of human knowledge, and finally Hume entered into skepticism. "Skepticism is the expression of doubt about the possibility of human acquisition of knowledge, the justification of existing beliefs or judgments, and the justification of doubt." "After a comprehensive analysis of human cognitive activities, Hume pointed out that human cognitive capacity is limited and the scope of cognition is narrow, and except for experience and mental activities, we have no definite and concrete knowledge of the existence of the external world, the identity of the inner self and personality, and the universal regularity and necessity. Nor can any objective and valid proof be presented."^[1]

The inductive problem, also known as Hume's problem, is Hume's questioning of the rationality of causal or inductive reasoning, that is, "the question of whether inductive reasoning is correct, or under what conditions."^[2] Popper's generalization of the problem of induction is "the question of whether inductive reasoning is proved, or under what conditions."^[3] The theory of causality is the core theory of Hume's philosophical epistemology, and the problem of induction is exactly a skeptical conclusion of the theory of causality. If we say that induction problem is a doubtful conclusion, it is better to say that causality theory and argumentation process, that is, from the argumentation process we can find the essence of induction problem.

Hume's discussion of the theory of causality in *A Treatise on Human Nature* is complicated, meticulous and rigorous, but its basic idea is clear bright and creative. The demonstration of causality theory includes three preconditions and one principle. The first premise is that human knowledge comes from sensory experience, which is the fundamental condition. The second prerequisite is Hume's classification of knowledge, that is, he divides knowledge into intuitionistic deductive knowledge and experience-based probabilistic knowledge. The third prerequisite is that everything must have a cause for its existence, that is, "everything that began to exist must have a cause for its existence."^[4] One principle is the principle of human nature, the principle of human inertia, or the principle of psychology. For example, when people see the sun rising in the east many times, they develop the habit of thinking that the sun rises in the east, and that it will do so every day. However, the conclusion brought by this psychological inertia is not inevitable, but probable, that is to say, the relationship between premise and conclusion is not a certainty and truth, but an inertia action relationship based on experience. In *A Treatise on Human Nature*, Hume distinguished between "constant combination" and "eternal combination" between cause and effect, and held that "constant combination" was only a hypothesis, but could never be proved, and "eternal combination" was a yearning, an idealized conclusion. There is only the customary principle of "constant association" in causality, but there is no real realization of "eternal association". "Cause and effect, though a philosophical relation encompassing proximity, succession, and constant union, can be reasoned about, or drawn from, only if it is a natural relation, and a union arises between our ideas."

2 The Scheme of Carnap's Probabilistic Logic

Inductive problem is the essential problem of inductive reasoning, related to the legitimacy of inductive reasoning, is an unavoidable problem in the study of epistemology and inductive logic,

so the answer to the inductive problem has become an important object of philosophers, especially modern philosophers and logicians. However, philosophy, or metaphysics, is a never-ending battlefield, full of arguments and doubts, various views or theories are on the stage, and can not reach a consensus, which makes the problem of induction in the debate more and more difficult, more and more confusing. Later generations have given various answers to the problem of induction. Mr. Zhou Xiaoliang, after integrating the solutions of modern and modern western philosophers, summarized them into the following schemes: Kant's apriori theory, Mill's universality of nature, Max Black's self-supporting theory of induction, Russell's Postulate theory, Carnap's probabilistic logic scheme, and so on. Popper's hypothesis - Deductivism, Goodman's "New Inductive Enigma" and Reichenbach's Pragmatism. Due to limited capacity and space, this paper can only briefly introduce Carnap's probabilistic logic scheme.

Carnap used deductive methods to study the induction process and the logic of the relationship between the degree of confirmation of evidence E to hypothesis H , so that inductive logic can be formalized. On this basis, he put forward a system theory of probability logic, so as to answer Hume's "induction problem", and at the same time provide a rational logical basis for the whole empirical science.

In probabilistic logic, Carnap introduced the concept of degree of certainty, or validation, which refers to the degree of confirmation of a conclusion or hypothesis by a given piece of evidence or premise. Thus inductive logic can be expressed as: according to evidence E , the degree of confirmation of hypothesis H is R , which can be expressed by the function expression $P(H, E) = R$. Carnap believes that inductive logic can be understood as a theory of the degree of certainty of a conclusion. With the help of probability theory, we can establish the inductive logic to study the degree of certainty of the inductive premise to the conclusion, which is the rationality of inductive reasoning.

Carnap's theory of probability logic is reflected in his papers and works, such as *The Logical Basis of Probability*, *The Logical Structure of the World*, *Inductive Logic and Truth*. Carnap thinks that inductive reasoning is non-deductive reasoning, it depends on the reasoning of probability, so inductive logic is equivalent to probability logic, and logical probability is the basis of inductive reasoning. Probability is generally interpreted in two ways, one is to say that probability is a hypothesis with respect to a statement of evidence, and the other is to say that probability is the relative frequency of one property of a thing or event with respect to another property. Probability in Carnap's probabilistic logic is the former interpretation, which is the semantic concept of logic. In other words, logical probability is to interpret probability $P(H, E)$ as a logical relationship between two propositions H and E , and do not judge the truth values of H and E respectively. Therefore, in order to determine probability P , one does not need to rely on sensory experience, but only on a semantic model that allows the various possible worlds to be fully expressed, after all, the individual words of things and the predicates that represent their properties are always finite.

Different possible worlds correspond to their own world descriptions, that is, state descriptions, and world descriptions can constitute several structural descriptions. Propositions can be divided into atomic propositions and non-atomic propositions, and non-atomic propositions can be constructed from atomic propositions through logical constants and logical methods, so that the truth value of any non-atomic proposition is determined by specific logical laws for each state description. In this way, the problem of determining the probability P of logic can be transformed into determining the probability of the state description.

3 Views on Carnap's Probabilistic Logic Scheme

Carnap's probabilistic logic scheme is the representative of logical empiricism to the solution of inductive problems. His probabilistic logic is an important achievement of modern inductive logic, and it also becomes the main development direction of modern inductive logic. However, it seems to me that it is methodologically illogical to use deductive methods to study non-deductive inductive logic. Why do we struggle to find out how to make probability a necessity? To demand probability by the demand of necessity is not to demand fish to run on land, and horses to swim in the abyss? This makes the accuracy and decidability pursued by modern analytical philosophy become a problem, that is, why does knowledge need to have necessity? Is this knowledge needed or credible? No. For human beings, knowledge must be a meaningful existence, and the existence of the world must also be a meaningful existence, otherwise they have no reason to exist. There are events or things that are fictional, that have uncertainty in their truth value, that exist because they have some or some meaning for human existence.

About the Author

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