

INFORMATION SCIENCE AND ITS CONNECTION WITH STATISTICS

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1. Introduction

The purpose of this paper is to give an exposition of the general scope of information science and to make clear its connection with statistics. It is expected that this will be helpful in finding directions of active development of the latter. For this purpose we must develop several preliminary considerations in order to secure the understanding of the readers on the reasons why the author wishes to present the topics on such an occasion. By information science we mean a newly organized branch of science which has at least two characteristic aspects. The first aspect is shown by the fact that it is presently drafting a form of blueprint of its own future development. It is indeed a science planned in its scope and thus is sharply distinct from the natural growth which has been experienced in a majority of areas of pure sciences. The second characteristic aspect comes from its construction in which constituents range over a vast ensemble of individual sciences, and it is apparent that information science is an amalgamated science whose constituent branches have their respective scientific principles. In short, information science is a planned, consolidated, and integrated science having several different branches, and because of these two characteristic aspects, its methodology ought to be explained in some detail.

We shall explain our points of view on these two characteristic aspects, both from our experience and from somewhat more logical considerations. In giving our explanation we have to refer to various topics which will range over physics, biology, electronics, and so on, none of which seems at first sight to be an appropriate topic of the *Symposium on Mathematical Statistics and Probability*. Moreover, we do not intend to give a report on established results of some scientific area, but are merely trying to give our ideas on how to organize a new field of science. In spite of these two unusual circumstances, we intend to refer to a topic which has a definite connection with the development of statistics in the coming days.

2. The road leading to information science

The author has been working in the area of successive processes of statistical inference and control [37]–[45] for the fifteen years since 1950. The image of