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A Stratified Randomized Response Model for Sensitive Characteristics using Geometric Distribution of Order K

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Abstract

Taking the clue from the work of Hussain et al.'s (2016) we have suggested a new stratified randomized response model. The properties of the suggested stratified randomized response model have been studied under proportional and "Neyman" allocations. Numerical illustrations are given in support of the present study.

Keywords: Randomized response model, Estimation of proportion, Stratified random sampling, Variance.

1. Introduction

In both clinical and community setting, survey research concerning sensitive questions such as gambling, alcoholism, sexual behavior, drug taking, tax evasion, illegal income and else, direct techniques for collecting information may induce interviewed people to refuse answering or to give untruthful or misleading responses. To reduce non respondents rates and biased responses arising from sensitive, embarrassing, threatening, or even incriminating questions, some special statistical techniques may be employed to ensure interviewee anonymity or, at least, a higher degree of confidence. Such techniques, known as randomized response methods, use a randomization device, such as a die or a deck of cards, rather than a direct response to collect reliable information on sensitive issues. Depending on the result produced by the randomization device, the interviewee gives an answer concerning his/her true status. Since the interviewer is unaware of the result of the device, the use of these methods ensures that respondents cannot be identified on the basis of their answers. Warner (1965) was first to develop an ingenious method of collecting information on sensitive characters. It provides the opportunity of reducing response biases due to dishonest answers to sensitive questions. According to the method, for estimating the population proportion π possessing the sensitive character "G", a simple random with replacement sample of n persons is drawn from the population. Each interviewee in the sample is furnished an identical randomization device where the outcome "I possess character G" occurs with probability P while its complement "I do not possess character G" occurs with probability (1-P). The respondent answers "Yes" if the outcome of the randomization device tallies with his actual status otherwise he/she answers "No". Some

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