

J. Appl. Math. & Informatics Vol. 43(2025), No. 2, pp. 277 - 286 https://doi.org/10.14317/jami.2025.277

AN INVENTIVE METHOD FOR ESTIMATING RARE AND SENSITIVE VARIABLES USING A RANDOMIZED RESPONSE METHODOLOGY[†]

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ABSTRACT. This comprehensive study aims to delve deep into the process of determining the average quantity of individuals possessing a rare and delicate attribute through the utilization of stratified random sampling in conjunction with the widely acknowledged and widely used Poisson distribution. The inherent characteristics and properties of the recommended estimation procedures are meticulously examined, leaving no stone unturned in the pursuit of a thorough understanding. In order to provide further validation and substantiation to the theoretical findings, empirical studies have been conducted, employing real-world data to support the claims made. The results of these empirical investigations overwhelmingly demonstrate the superiority and pre-eminence of the proposed estimators in comparison to the existing estimators that have gained recognition and acceptance within the field. By carefully analyzing and interpreting the outcomes, valuable insights are obtained, resulting in the formulation and presentation of pertinent recommendations that are specifically targeted towards practitioners in the survey domain, thereby enabling them to enhance and refine their methodologies.

AMS Mathematics Subject Classification : 62D05. *Key words and phrases* : Estimation stratified random sampling, Poisson distribution, empirical studies, attribute prevalence.

1. Introduction

In a world that is characterized by an ever-expanding reservoir of data and an unyielding thirst for knowledge, the ability to accurately quantify the presence of rare and delicate attributes within a given population takes on a paramount

Received April 24, 2023. Revised October 30, 2023. Accepted November 8, 2023. *Corresponding author.

 $^{^\}dagger \rm This$ work was supported by the research grant by JKSTIC vide no. JKSTIC-SRE-397-400 under order no: 95 of 2021.

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