ABSTRACT

Often, in surveys involving sensitive and controversial questions, participants belonging to groups with sensitive attributes may not give truthful responses due to social stigma or fear of creating unnecessary inconvenience and danger. Hence, estimating the proportion of people belonging to this sensitive group becomes inaccurate and challenging. Thus, the purpose of this thesis is to solve this problem by proposing methods that are extended from pioneering works. Pioneering work from Warner (1965) suggested an impressive procedure called the Randomized Response Technique that resolves this issue by providing some form of anonymity to the participant. Several others such as Huang (2004) as well as Liu and Chow (1976) have modified his pioneering work to derive methods that can further reduce the uncertainty of the estimator used to estimate the proportion of the population in the sensitive group while protecting the participant's anonymity at the same time.

In this report, two methods that are extended from the works of Huang (2004) by incorporating Liu and Chow (1976)'s procedure have been proposed to estimate the proportion of people belonging to the sensitive group in a trichotomous population. As such, the works of Huang (2004) as well as Liu and Chow (1976) are first explained in Chapter 2. Chapter 3 then discusses the two proposed methods, namely the derivation of the estimator and its variance for subsequent comparison. Thereafter, to identify the better method between the two, a comparison of the variance of the two proposed estimators is produced in Chapter 4. Chapter 5 then focuses on the method that is more efficient and discusses ways to minimize the variance of the estimator as much as possible, while providing anonymity to the participant at the same time. This thesis then ends with Chapter 6 where a conclusion is drawn from these findings.