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Nowadays, statistics is applicable in variety of fields. It is necessary to learn more about statistics. One of the sources that students use to support their professional studies is from research articles which are written by expert researchers who have statistical research background. Sometimes from the article, we can not only learn knowledge about statistic but also gain some astonishing insights. Depending on the type of discipline, articles are presented in many kinds of formulas, graphs and tables. My major is Statistical Science. After making some researches, I have found an article which is very interesting and useful to analyze. The title of the article is *Statistical Applications of the Poisson-Binomial and Conditional Bernoulli Distributions*, which is written by Sean X. Chen and Jun S. Liu (1997). This paper is a research paper and the main aim of this paper is to introduce the new method Poisson-Binomial and applied in Bernoulli model.

In the article “*Statistical Applications of the Poisson-Binomial and Conditional Bernoulli Distributions*”, Chen and Liu (1997) mentioned a new statistic method Poisson-Binomial, which is based on Binomial Distribution. The scope of this article was within some of well-known and widely used statistical distributions such as Binomial, Poisson and Bernoulli Distributions. Using the Binomial Distribution must satisfy the probabilities that an event occur should be equal. However, it is unrealistic that the individual response of a survey has an equal probability. The inequality of probability of individuals gave the motivation of the objective method that the article was going to research. The proposed method of weighted sampling in survey does not require the probability of individual to be equal. The purpose of the authors was to create new method used in logistic regression for hypothesis testing, a new algorithm to find the maximum conational likelihood estimate (MCLE) applied in case-control studies and new weighted sampling for finite population (Chen & Liu, 1997, p.875). Chen and Liu (1997) highlighted many researches and studies to help them to explain and create their study. In particular, the authors used conditional Bernoulli model in probability-proportional-to-size (PPS) sampling (as cited in Sugden and Smith, 1984, p495-506). The methods that the authors mentioned in the article can be useful in applied statisticians and computer scientists (as cited in Knuth, 1968, n.p). There was also a very interesting question, “The Poisson-Binomial Distribution mostly applied for the circumstances when sample size is large, however, for the future question, under circumstance when small sample size N due to the limited source, what would be an appropriate method for researchers to sampling” （p.876）? We can get the information about the article that we have mentioned in this paragraph from abstract and introduction section.

Having known the summary of this article, we will analysis the structure next because it is useful for me to design my logic in my future academic writing. In this article, the overall structure follows Abstract, Introduction, Method, Application and Conclusion format to organize this article. What’s else, the article also has Acknowledgement part to make it credible. In this article, abstract shows the object and purpose of this article. Introduction gives readers the scope, driving question, exigence and relevance. In Method parts, the authors introduced two methods for computing the Poisson-Binomial distribution and then comparing them to determine which one is more efficient. This part leads to the following section which introduces the new method. In application section, Chen and Liu (1997) depicted the Poisson-Binomial distribution and how it works in generalized linear models (GLMs) and hypothesis testing in logit regression model (p.877-891). The authors also gave five methods for Bernoulli model. Lastly, the conclusion is a summary of this article. In statistic field, a lot of paper calculate or summarize a new method a new theory, therefore, using the structure like the article was analyzed above is a good choice.

The introduction section shows three moves by Chen and Liu (1997) in this article, but without Move 1A. At the same time, for Move 1B reviews some previous studies. For example, Chen, Dempster and Liu (1994), “the conditional Bernoulli model for PPS sampling enables an easy calculation of high-order joint inclusion probabilities and guarantees the no negativity of the variance estimator” (p.877). The second move (Move 2) is noted the authors talk about the problem. For instance, “In many surveys, the individual units are not necessarily drawn with equal probabilities” (Chen & Liu, 1997, p.876). Finally, the third move (Move 3) is what the article’s purpose. For example, Chen and Liu (1997), “In the article, we provide a general theory about the Poisson-Binomial distribution concerning its computation and applications, and as by- products, we propose new weighted sampling schemes for finite population, a new method for hypothesis testing in logistic regression, and a new algorithm for finding the maximum conditional likelihood estimate (MCLE) in case-control studies” (p.875) and “one of the main motivations for the investigation reported in this article is the problem of weighted sampling in survey studies” (p.876).

As a statistics article, it includes a lot of formula and data. The article displays data and information through tables and graphs to show the data clearly. Authors cited the research just paraphrase and use APA citation style. Because this article is about statistics and half of it are about the method and the detailed computations of the method. What they cited are the theorem and definition, it just need to paraphrase.

All in all, as a research study, the article “Statistical Applications of the Poisson-Binomial and Conditional Bernoulli Distributions” shows me a great example about how to organized research paper. My major is Statistical Science and it is in engineering field, most of paper we will write is research paper, therefore, study well about this is very important and useful. Moreover, I have also learned how to use mathematical language in paper. The article solves the problems that bother me for a long time.

**Reference:**

Chen, X. H., Dempster, A. P. and Liu, J. S. (1994). Weighted finite population sampling to maximize entropy. Biometrika 81, 457-469.

Knuth, D. E. (1968). The Art of Computer Programming, vol. II. Reading, MA: Addison- Wesley.

Sugden, R. A. and Smith, T. M. F. (1984). Ignorable and informative designs in survey sampling inference. Biometrika 71, 495-506.