

Quantifying Fuzziness in Human response due to Scale, Respondent or Attribute

S. DAS

Research Chair Professor (Statistics and Actuarial studies)
Indian Institute of Management Bangalore
shubho@IIMB.ERNET.IN

Abstract

When a product or performance is rated or a behavioural response is sought, the alternatives typically do not have well-defined and universally understood demarcations. The resultant fuzziness in response depends, among other factors, on the number of options available to the respondent and this vagueness is quantified in [1]. The measure, expressed as a percentage of the total variability, is arrived at by separating the fuzziness from the randomness present in the data, and it is used to provide a guideline regarding the appropriate number of levels in measurement. While the proposed measure can be computed under stringent assumptions, two approaches of estimating it under weaker assumptions are also discussed in this work. Numerical data analysis on a real as well as a simulated data set suggests that a response scale with five to seven options may be appropriate. The same measure can be used in resolving the number of classes while constructing a histogram, in general and in appropriate determination of a letter grade system [3].

A second direction of fuzziness in Human can be pointed to the lack of sincerity and clarity in the thought process of the respondent as well lack of clarity of the attribute being evaluated. A formal measure of this aspect of fuzziness is formulated in [2] on the basis of consistency of the respondent's response to the same question repeated in multiple scales. Discarding haphazard and insincere respondents can improve the quality of data resulting in more efficient survey analysis. This may be achieved in the framework of statistical testing of hypothesis using the probability distribution of the proposed fuzziness measure. Similarly, an attribute can be fuzzy, and it may generate inconsistent response from many respondents. The application of the proposed methodology extends to identifying such fuzzy or unclear attributes. We will also discuss an algorithm for screening inconsistent respondents and fuzzy attributes simultaneously.

References:

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