Dr Li-Chun Zhang

Title:

A prediction approach to representative sampling

Abstract:

We first take a look back on the historic evolvement of the concept of representative sampling, starting with the Norwegian statistician N. Kiaer. Both design- and model-based approaches will be discussed, where the contrast between randomization sampling and balanced sample seem to figure prominently. Also noticed is the contrast between representativeness and efficiency (for the estimation population totals).

We then outline a prediction approach to representative sampling, and suggest that it is more readily connected to the individual mean squared error of prediction (IMSEP). It will be shown that randomization designs are necessary in order to control the unconditional IMSEP and, thus, can be motivated under a prediction framework. The unconditional IMSEP can be regarded as the expected amount of information about each unit in the population. We discuss what we perceive to be the principal advantages of introducing the control of individual prediction as a design criterium.

Sampling designs in practice need to balance between representativeness and efficiency. We outline how a number of familiar but seemingly unrelated sampling techniques can be motivated from such a unified prediction point of view.