Classifying the items of a Likert based questionnaire in different competences

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Abstract

A Likert scale is a psychometric response scale primarily used in questionnaires to obtain participant's preferences or degree of agreement with a statement or set of statements. Respondents are asked to indicate their level of agreement with a given statement by way of an ordinal scale. The most commonly used is a 5-point scale ranging from "Strongly Disagree" on one end to "Strongly Agree" on the other with "Neither Agree nor Disagree" in the middle.

Normally, when a company wants to check the capabilities and skills of their employees (or when looking for new employees), a huge Likert scale questionnaire is asked to be filled up. With such a questionnaire, different competences are evaluated and therefore, the result of a questionnaire will provide important information about capabilities and skills of the respondents for each competence.

As an example, we will describe, for a real questionnaire of n (n≈200) Likert items (questions) and m (m≈25) competences, how to classify each question with the corresponding competence. That is, to find out, for each Likert item, which competence is evaluated. We will present how to face and solve the problem using two different techniques: an approximate method, using a genetic algorithm, which required software which deals with numeric approximations (specifically, we used MatLab); and an exact method, solving a quadratic system of n equations and n unknowns, which required the use of a Computer Algebra System (specifically, we used Derive) for exact computations.

After this example, we will set the basics to solve this competence-assignment problem for a generalized version of similar questionnaires with n Likert items for evaluating m competences. The advantages and disadvantages of both techniques will be also shown.