Concordance correlation coefficient: an incursion into virtual reality

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Abstract

Lin (1989) defined a new reproducibility index, named concordance correlation coefficient, to quantify the agreement between two measurements. This coefficient has two components: precision, which evaluates how far the observations deviate from the adjusted linear regression line, and accuracy, that takes account of the deviation between the regression line and the concordance line. To quantify the agreement between more than two measurements several generalizations have been proposed (e.g. Barnhart et al., 2002). If the objective is to give emphasis to the agreement of the lower or higher observations, a weighted concordance coefficient should be used, e.g., the top-down concordance coefficient (Iman and Conover, 1987).

Virtual Reality (VR) allows the generation of realistic scenarios that have been used to study people behavior in several scopes, namely to assess behavioral compliance with safety warnings (Duarte et al., 2010). The type of warnings and the level of environmental clutter can result in different space exploration strategies. The concordance correlation coefficient was used to evaluate the agreement of space exploration maps among five experimental conditions, defined by the type of warning and the level of clutter. Top-down concordance coefficient was also used and the results of these two coefficients were compared. The potentialities of these measures of agreement in the analysis of space exploration maps in VR-based studies are discussed.

Keywords

Agreement, Concordance correlation coefficient, Virtual reality.

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