

Bipolar rating scales: A survey and novel correlation measures based on nonlinear bipolar scoring functions

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Abstract

© 2017, Budapest Tech Polytechnical Institution. All rights reserved. A bipolar rating scale is a linearly ordered set with symmetry between elements considered as negative and positive categories. First, we present a survey of bipolar rating scales used in psychology, sociology, medicine, recommender systems, opinion mining, and sentiment analysis. We discuss different particular cases of bipolar scales and, in particular, typical structures of bipolar scales with verbal labels that can be used for construction of bipolar rating scales. Next, we introduce the concept of bipolar scoring function preserving linear ordering and the symmetry of bipolar scales, study its properties, and propose methods for construction of bipolar scoring functions. We show that Pearson's correlation coefficient often used for analysis of relationship between profiles of ratings in recommender systems can be misleading if the rating scales are bipolar. Basing on the general methods of construction of association measures, we propose new correlation measures on bipolar scales free from the drawbacks of Pearson's correlation coefficient. Our correlation measures can be used in recommender systems, sentiment analysis and opinion mining for analysis of possible relationship between opinions of users and their ratings of items.

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Keywords

Association measure, Bipolar scale, Correlation, Opinion mining, Rating scale, Recommender system, Sentient analysis

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