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Title
A recommender-network perspective on the informational value of wine critics

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Conference Presentation

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Keywords
wine critics, recommender systems, social influence, taste homophily, wine choice, crowdsourcing.

Research Question
Are the evaluations of wine critics representative of the tastes of amateur wine consumers and how should they be best used?

Methods
k-nn algorithm, recommender networks, crowdsourced data, out-of-sample predictions, decision-making strategies, social influence analysis, network visualization.

Results
-Tastes of critics and amateurs differ
-Critics' are more consistent and predictable
-Drawing advice from a few critics outperforms drawing advice from amateurs.
-It is possible to identify talented amateurs

Abstract
There are some people among us whose judgements on matters of taste are regarded as valuable by many others. Consider for a moment calling a friend to ask for wine recommendations. Early research in communication science revealed that other people in your network of common acquaintances are also likely to come up with the same

person, and referred to these influential people as opinion leaders. Even more so, for a few select individuals—the critics—expressing judgments on matters of taste has turned into a profession. Critics are employed in the daily and weekly press to assess wine labels, while some even run websites where they post their reviews, thus generating novel information about different wine labels and vintages. It has been shown that the judgments of influential critics can predict or even alter the overall financial performance of products (Eliashberg and Shugan, 1997; Basoroy et al. 2003; Ali et al. 2008). Yet, at the same time there are often reports about the disagreements between experienced wine professionals, such as Robert Parker and Jancis Robinson, or even more disconcertingly, blind tasting experiments pointing to the inability of some critics to distinguish high quality from low quality wines (Hodgson, 2008; Gawel and Godden, 2008; Ashton, 2012).

So are the evaluations of wine critics representative of the tastes of amateur wine consumers and how should they be best used? Hitherto, the few empirical studies exploring whether the opinions of critics in different taste domains (e.g. cinema, theater, music etc.) and amateur consumers align have produced mixed results. Most of these studies report modest correlations between the tastes of critics and the general public (Holbrook, 1999, 2005). However, some studies also find negative (Hirshman and Pieros 1985) or even strong positive correlations (Wanderer, 1970). Taken at face value, previous work across taste domains seems to suggest that there is a lot of variation across domains. Yet there is little evidence from the domain of wine. Thus, it is still unclear whether wine critics' evaluations are more or less informative when compared to amateur evaluations and, if so, why. Furthermore, although it is obvious that there is substantial variation in the extent to which different critics or amateurs can influence or inform others (Cameron, 1995), existing studies disregard it and focus on reporting average correlations between critics and amateurs.

A number of questions about the ways in which critics can inform and influence the broader public in matters of taste remain unanswered. First, are the opinions of different critics more informative than those of amateurs in matters of taste? Second, is it possible to identify key features in the judgments of critics that make their opinions valuable for other individuals and is it possible to leverage these features to identify talented amateurs who have the potential to become critics themselves? Third, how can the opinions of critics and amateurs be best combined and how would information flow between critics and amateurs in an informationally efficient network? To provide answers to the above questions we need a methodology that allows us to measure the informational value of the opinions of different groups of individuals for others as well as the potential of different individuals, critics and amateurs alike, to influence others.

In our contribution, we put forward such an approach combining methods from the recommender systems (Breese et al. 1998), machine learning (Simsek, 2013) and network science communities (Krackhardt, 1987; Currarini et al., 2009) and from the study of expert judgments in matters of fact, where different strategies for choosing among experts or for identifying the best experts have been explored in domains ranging from medicine to agriculture (Ashton, 1986; Shanteau, 1992; Kurvers et al. 2019). We leverage the weighted k-nearest neighbors algorithm (k-nn), a classic recommender systems algorithm that encodes an array of strategies for choosing among experts as special cases (Analytis, 2018). For each individual and item to be predicted, our implementation of the algorithm draws advice from the k most similar other individuals in the database who have evaluated that item and weights their opinions according to a similarity sensitivity parameter. By assessing the out-of-sample performance of the algorithm when drawing advice only from critics, amateurs or both (and varying the number of neighbors k and the similarity sensitivity parameter ρ) we can compare the performance of different strategies involving each of these groups, and thus assess their relative informational value.

The k-nn algorithm spans an advice network among different individuals (Analytis, 2020), and it is thus possible to visualize and study the properties of such a "taste network" in any dataset where a group of people have evaluated a set of items, even when the overlap in the ratings of different people is relatively small (i.e., sparse rater–item matrix). Individuals whose tastes are relevant for many similar others, be they critics or amateurs, are sought often for their advice from the k-nn algorithm—they have a large recommender potential. This potential, however, can only materialize to actual influence when the advisers have experienced the items that their advisees are considering. To assess the flow of influence between two categories of individuals—critics and amateurs—we adapt the notion of homophily from network science and show how it can be applied to the domain of taste and any rating dataset where items have been evaluated by two or more categorical groups of raters.

To examine how the opinions of wine critics relate to those of amateurs we created a new dataset consisting of the ratings from both renowned wine critics' and regular wine consumers' (i.e., amateurs, non-professionals). We obtained critics' data from Bordoverview, a website summarizing the en primeur ratings (first sampling of a production year) of critics on Bordeaux wines, and matched these ratings with amateur data on the same wines from Vivino. The resulting dataset consists of 1978 wine labels (322 different wines across 15 different vintages from 2004 to 2018 included) from 14 professional critics (or wine magazines employing critics) and 120 Vivino amateurs, and has 25907 ratings in total. Applying our methodological framework we find that the tastes of critics and amateurs differ, as expressed by correlation profiles and taste homophily. Critics' are more consistent and predictable when compared to amateurs, and thus drawing advice from a few critics outperforms drawing advice from amateurs. Getting advice from both groups can further improve performance, but only by a small margin. Critics exert the largest overall influence because they are more prolific raters. At the same time, it is possible to identify talented amateurs that have the potential to become influential critics. Our results provide new evidence on the informational function of critics, while our methods can be leveraged to design better and more transparent wine recommender systems.

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