Networks of traditional cuisines as cultural benchmarks

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Cooking recipes represent a precious framework for studying cultural evolution and spreading [1-3]. In fact, what people eat is traditionally connected to what one can grow, gather, hunt or fish, which is related in turn to the geographical location. Furthermore, food preparation requires knowledge of cooking and preservation techniques, as well as biological processes such as fermentation and leavening. Thus, culinary traditions are linked to fundamentals of cultural heritage, its evolution and spreading. Also, food has a relevant social dimension, providing a base for cultural and social communications at all levels of society. Last but not least, cuisine has a creative dimension, as exemplified by gourmet cuisine.
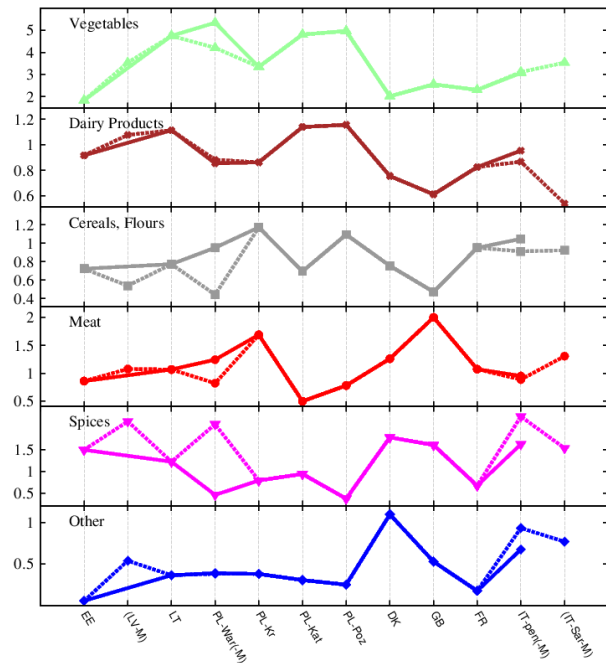

Fig. 1. Overview of regional usages of ingredients based on the analysis of the six main ingredients categories used in the analysis.

From the standpoint of complex systems theory, a parallel

between language and cuisine has been noticed by various authors, in that ingredients suitably combined together can create a new unit - a certain food/recipe - having features possibly different and unexpected with respect to the original ingredients, similarly to the way words can be combined to form a new sentence with a different and new semantic meaning [1] or to any other emergence process prototypical of complex systems. Following this analogy, we study the historical and geographical aspects of cuisine through an analysis of the bipartite network based on single ingredients and recipes. We mainly use data from older original cookbooks and compare them with newer cookbooks, which allows the comparison between different countries as well as different times. To make the comparison more reliable, we restrict the analysis to a homogeneous category of food, namely soups, which are a traditional food in basically all cultures. The structure of the relations between the various cuisines and their mutual distances, computed from the culinary Levenshtein distances between the corresponding recipes, highlights cultural and historical connections.
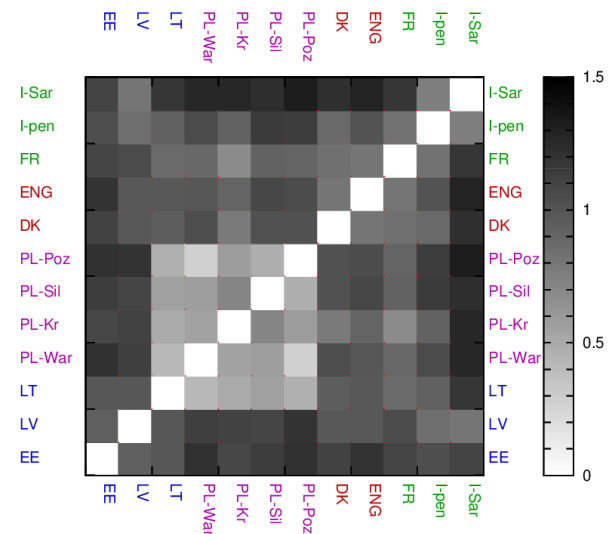

Fig. 2. Heatmap of the culinary distance matrix between the various cuisines, computed in a way analogous to the Levenshtein distance matrix for languages.