Beyond Clothing Ontologies: Modeling Fashion with Subjective Influence Networks

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ABSTRACT

Extracting knowledge and actionable insights from fashion data still presents challenges due to the intrinsic subjectivity needed to effectively model the domain. Fashion ontologies help address this, but most existing such ontologies are "clothing" ontologies, which consider only the physical attributes of garments or people and often model subjective judgements only as opaque categorizations of entities. We address this by proposing a supplementary ontological approach in the fashion domain based on subjective influence networks. We enumerate a set of use cases this approach is intended to address and discuss possible classes of prediction questions and machine learning experiments that could be executed to validate or refute the model.

Categories and Subject Descriptors

H.4 [**Information Systems Applications**]: Miscellaneous; I.2.4 [**Artificial Intelligence**]: Knowledge Representation Formalisms and Methods—*Semantic networks*; I.2.6 [**Artificial Intelligence**]: Learning—*Knowledge acquisition*; D.3.1 [**Programming Languages**]: Formal Definitions and Theory—*Semantics*

General Terms

Ontologies, Knowledge Graph, Fashion, Subjectivity

Keywords

Ontology, Temporal Networks, Social Networks, Fashion, Subjectivity, Influence

1. INTRODUCTION

As on-line fashion retail industry has been growing rapidly against traditional physical shopping, there has been a corresponding shift to a much more data-driven paradigm for business operations including manufacturing, merchandising, and marketing. In particular, future-focused data analysis has become a particularly important activity, such as predicting fashion trends, price forecasting, construction of recommender systems, and identification of consumer influencers. Often, these activities are approached using statistical, machine learning or other data-driven techniques. However, much of the data in the fashion domain comes from deep, diverse, cultural entities and phenomena. While fashion in itself is part of and can define culture, it also borrows from other cultural domains, such as music, language, film, religion, mythology, local folklore and many others. In most cultural domains, it is important to understand the narrative of history and contemporary subjective judgements and opinions. For example, in music, Italian words are used to contextualize abstract musical concepts (e.g., *allegro, largo, presto*). However the meaning of these words in the context of music has evolved and diverged from their original, common definitions. Knowing the history as well as the current interpretation of these words by the composers who use them is required to fully understand their musical meaning. Similarly, fashion is an inherently subjective, cultural notion. It is defined not by quantitative, testable measures, but by its history and the perceptions of people who care enough to form opinions about it. Therefore, in order to understand fashion in any rigorous way, this subjectivity must be an intrinsic part of the model.

One of the techniques for addressing the subjective, cultural parts of a knowledge domain is to use ontologies. Schemas, ontologies and its data population through knowledge graphs (KGs) are formal tools for expressing organized meaning and provide sense or context to a domain. More concretely, ontologies often integrate common-sense and human expert knowledge as well other external knowledge sources into machine readable computational models. Unfortunately however, most existing ontological work in fashion partially avoids subjectivity by simply focusing on "clothing ontologies" rather than fashion as a whole. Clothing ontologies primarily model the structure of physical feature values (e.g., sleeve length, colors, fabric). A particular garment can be represented in a multidimensional feature space chosen from such an ontology. Usually each garment class (e.g., top, bottom, shoe, hat) is considered to have a distinct feature space from other classes. When they do include subjective elements, clothing ontologies often do this through the inclusion of non-objective features (e.g., expected occasion, style category), but these features are usually opaque categorizations of entities, with no explicit semantics. Despite the limitations, these clothing features spaces are still useful because they provide semantic structure to data that can be used when applying analytic/prediction techniques (e.g.,