# Persuasive online-selling in quality & taste domains

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**Abstract.** 'Quality & taste' products like wine or fine cigars are one of the fastest growing product sectors in e-commerce. Online shops for these types of products require on the one side persuasive Web presentation and on the other side deep product knowledge. In that context recommender applications may help to create an enjoyable shopping experience for online users. The Advisor Suite framework is a knowledge-based conversational recommender system that aims at mediating between requirements and desires of online shoppers and technical characteristics of the product domain.

In this paper we present a conceptual scheme to classify the driving factors for creating a persuasive online shopping experience with recommender systems. We discuss these concepts on the basis of several fielded applications. Furthermore, we give qualitative results from a long-term evaluation in the domain of Cuban cigars.

## 1 Introduction

High complexity and search effort for the users are major obstacles for today's e-commerce sites that keep online conversion rates low and make potential customers restrain from buying. In traditional brick and mortar businesses sales persons fulfill an advising and complexity reducing function, but online customers many times still miss such a mediation between their personal requirements and the offered services and product portfolios.

Conversational recommender systems are successful applications of Artificial Intelligence that target this problem and ease customers in finding what they are looking for. However, recommender systems may not only

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be seen from a technical perspective in terms of their capabilities and functionality. Being the face towards the customer in an online-sales channel, there is also a social and emotional perspective that must be considered. In domains such as wine, cigars, or other luxury goods these aspects are of paramount importance. Comparable to their alive counterparts, virtual shop assistants may be intentionally designed to influence the online-customer's attitude or behavior in order to sell products and therefore they can be seen as a form of persuasive technology [1]. Dormann [2] discusses the emotional aspects of design and gives several examples of existing shop environments where customers might be actually more likely to buy. Guerini et al. [3] formalize persuasion models for intelligent interfaces that are based on beliefs, desires and intentions. In [4], a study has been conducted that investigated differences in people's perception of human and computer advice: Although results varied slightly depending on the culture and previous experiences of participants, the study showed that advice given by a computer was well accepted.

Sales advisory systems or virtual sales assistants are conversational recommender systems. They engage in an interaction with the customer and reach from simple value elicitation forms to more natural-language like sales dialogues. Depending on the underlying reasoning technology different variants of conversational recommender systems can be distinguished. Case-based recommender systems [5, 6] employ enhanced similarity measures to retrieve those products that are most similar to the one specified by the user. Knowledge-based recommender systems [7, 8] base their product proposals on deep domain knowledge and map the situational context of the customer onto technical product characteristics. Due to this explicit domain knowledge formulated as declarative business rules or constraints, recommendations can be accompanied with additional explanations for the user.

The third type of conversational recommender systems allows natural language discourses [9]. While the first two techniques allow only pre-structured interaction paths, the latter form can cope with natural language input of the customer. However, this additional flexibility is typically bought at the cost of limited product retrieval capabilities. For instance pre-defined querying interfaces allow more complex preference elicitation (e.g. selection from several choices and adding of restrictions) than what could be communicated to a natural language understanding system. The best known variants of recommender systems namely collaborative and content-based filtering systems [10, 11] are in their pure form not conversational. Content-based recommender systems reason on preference models for users that are built from characteristics of products they liked in the past. Contrastingly, collaborative systems propose products to a user based on positive ratings from other users that are considered similar to him. Hybrid approaches [12, 13] that combine several of these techniques and may also possess conversational capabilities have been developed recently.

In this paper, we discuss the persuasive power of conversational recommendation applications and present a conceptual scheme that emphasizes on the driving factors and their dependencies that influence user experience at online-shopping sites (Section 2). In Section 3 we give qual-

itative results from a long running evaluation that indicates commercial benefits from the deployment of recommender applications. Finally, we summarize the contribution and make an outlook on future work.

## 2    Persuasive recommendation scheme

The field of persuasive computing technologies [1] is still in its infancy. It lies at the intersection of technology and tools on the one side and social acting and social dynamics on the other side. Computing applications that influence people's attitudes or behaviors are also in the center of ethical discussions [14]. In our work we set the focus on effective sales applications for the Web. By understanding the social and personality traits of successful salespersons and their interaction and selling techniques, valuable insights for the functioning of sales agents in the Web can be gained. Selling has always been closely related to social behavior and persuasion in a wider sense. Building effective virtual salespersons for an e-Commerce environment that provides advisory service to their users and helps shop owners to be successful in monetary terms can therefore benefit from following the principles of persuasive technologies. Up to now only few work has been elaborated on these issues. In [15] a stepwise process that characterizes a seductive experience with a software product is described: They differentiate phases such as diverting the attention, making a promise or fulfillment beyond expectations. Komiak et al. [16] report on a study where they compared trust in virtual salespersons with trust in their human counterparts. Some of the interesting findings were that virtual salespersons were attributed to be slightly more trustworthy than human ones. Control over the process and benevolence (due to the fact that they do not earn a commission) were among the strongest perceived trust building components for virtual salespersons.
As each of the contributions in this area focuses only on isolated aspects of recommendation in the context of persuasiveness, we propose a conceptual framework that structures the influential factors and their dependencies. As sketched in Figure 1 online selling centers around customer, product and process. The basic abstract features with respect to recommender systems comprise: Personalization, personification, community, objectivity and complexity reduction. They positively influence higher level concepts such as user involvement and credibility and thus believability of the system itself. On the third layer reciprocity and conditioning are situated. They signify the actual ability of a recommender system to influence users behavior and affect their attitudes. The final stage leads to adopted suggestions and a committed sale. In the following we will shortly discuss each of the involved concepts and illustrate them with examples from the domains of wine and cigars. **Personalization** denotes the adaptation of the system behavior and its outcome towards the situational as well as the preferential and requirements context of the user [17]. In [18] different personalization strategies supported by the Advisor Suite on both the level of presented content and on the interaction process itself are elaborated. When buying wine online, users like to have the choice between different ways of stating their preferences.
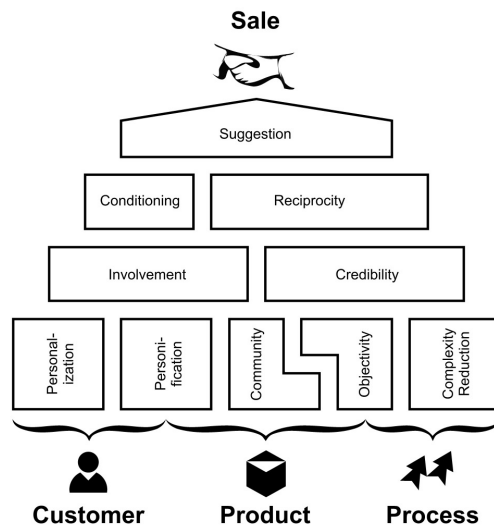
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**Fig. 1.** Building blocks for persuasive sales recommenders

For instance selecting product parameters like region, year or grape variety on the one hand and describing taste characteristics like sweetness or fruitiness on the other hand. When proposing products to customers, providing them also additional product details and some form of explanation proves extremely helpful [16].

**Personification** is about giving a life-like identity to virtual sales agents. Full resemblance to humans is however not necessary. Virtual personalities can be created by using a relatively small inventory of traits [19]. Nevertheless, making the character look attractive is not an easy task. Rules of thumb like symmetry, broken symmetry, golden cut or color psychology might still produce an unfavorable outcome. Therefore, extensive user tests on the characters are necessary. [20] showed that attractiveness of virtual characters correlates positively with purchase likelihood [20]. In Figure 2 the cigar advisor *Mortimer* is depicted.

**Community** features of recommender systems are predicted to have a big potential in the future [21]. Computer games which hold the forefront of technology development are rapidly moving towards building online communities. Ratings and comments to products that can be seen by all users or topic centric discussion fora have only been the beginning. In the future we might see social networking systems or virtual sales rooms where basic social behavior between customers becomes possible.

**Objectivity** is mutually affected by community aspects. Opinions from other customers are generally appreciated as they are assumed to be independent from the shop owner. However, recommender systems can foster their perceived objectivity by offering a high degree of product information, explaining pros and cons for proposals and allowing testimonials and comments from other users. For instance the virtual sommelier *sem* reasons on product specific explanations that point the customer explic-

itly on the dryness of a wine if its acidity level is high and its sugar level low.

Conversational recommender systems achieve **Complexity reduction** for customers by mediating between the situational and preferential context of the client and the technical details of the product domain. Another crucial factor is the tool complexity of the system itself and its perceived usability.

**Involvement** and **credibility** may both be induced by the underlying building blocks. Involving users signifies reducing the distance between them and the system itself [22]. In our case community building as well as personalized customer treatment are prerequisites for user involvement. Personification through virtual characters stimulates users involvement by enabling them to identify themselves with the system. Tseng and Fogg [23] circumscribe the credibility of a system with the synonym *believability*. It addresses the basic question: May users believe the information given? Swana et al. [24] provide a comprehensive review on the issue of customer trust in salespersons. In virtual environments the factors objectivity and community building may positively affect this issue. Furthermore, knowledge-based recommender systems have the advantage of incorporating the knowledge of the human expert, that guides and advises (complexity reduction). Communicating explicitly the competency of a real-world sommelier behind the virtual character *sem* is a strategy taken by the online wine platform.

Customers that feel involved relate to computers and applications like they relate to other humans. Therefore, humans would accept praise by a computer, e.g. when the virtual shop assistant compliments the user on its excellent choice. Thus introducing **conditioning** into conversational dialogues is one of the final steps towards persuasiveness of recommendations. Closely related to the issue of conditioning is **reciprocity**. Fogg and Nass [25] conducted experiments to investigate how users can be motivated to change their behavior by a computer. In online sales situations keeping the user at the Web site and in the process is of paramount importance. Thus, credibility of the system and user involvement are the underlying factors that foster loyalty of users.

**Suggestion** is on top of our conceptual scheme and stands for the ability of virtual sales agents to successfully close the deal when needed. Patience is not widespread among online users, therefore a balance between interaction length and suggestive propositions is crucial for conversational recommendation agents to influence people's minds.

In the following we give practical evidence from the implementation of some of these abstract concepts in an e-Commerce platform for Cuban cigars and conduct an analysis of actual sales figures.

## 3   Example

Most reported experiments in the domain of recommender systems perform an off-line analysis on an historical data-set [26]. So, for instance the predictive accuracy of collaborative filtering algorithms [26] or the session length for different retrieval strategies are measured. The evaluation effort is considerably higher when conducting live-user trials with
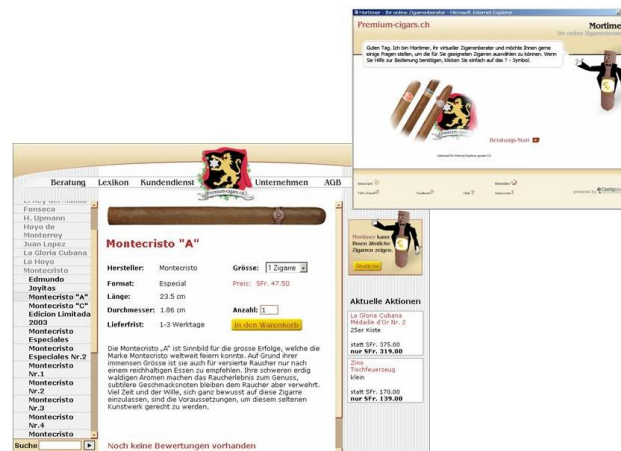
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**Fig. 2.** Screenshot of cigar shop

an application prototype like [27] or operating a real system like Entree that served as a restaurant guide for attendees of a convention in Chicago [12].

Moreover, our research question is about the capability of recommender systems to influence peoples mind when interacting with recommender systems. Therefore we even chose a real-world setting to analyze the effect of a conversational recommender on buying behavior and sales figures. In the following we report about a Web shop for fine Cuban cigars that introduced the virtual shop assistant *Mortimer* on the World non smokers day (May, $31^{st}$) in 2003. Figure 2 gives a screenshot of the Web shop environment and the virtual sales assistant. The conversational recommender system is based on the Advisor Suite framework [8] that was extended to include additional support for the integration of virtual characters. Next to personification, also the personalization and complexity reduction function was targeted by the sales recommender system. The shop owner addressed community building by introducing testimonials of registered users. To ensure objectivity the advisor system generates specific explanations on products upon request that provide pros as well as cons with respect to the user preferences. While being strong on basic functionalities, implementation of features that support the higher level concepts like conditioning and involvement is left for future work.

For evaluation, we were given the opportunity to analyze the sales figures for a period starting in January 2002 until November 2004. The product range comprises approximately 115 different models of Cuban cigars from 18 different manufacturers with *Cohiba*, *Montecristo* or *Romeo y Julieta* being the most prominent ones. The assortment of products and their prices remained basically stable over the whole evaluation period.

The research hypothesis was as follows: **Does advice given by a virtual shop assistant affect the buying behavior of online shoppers?**
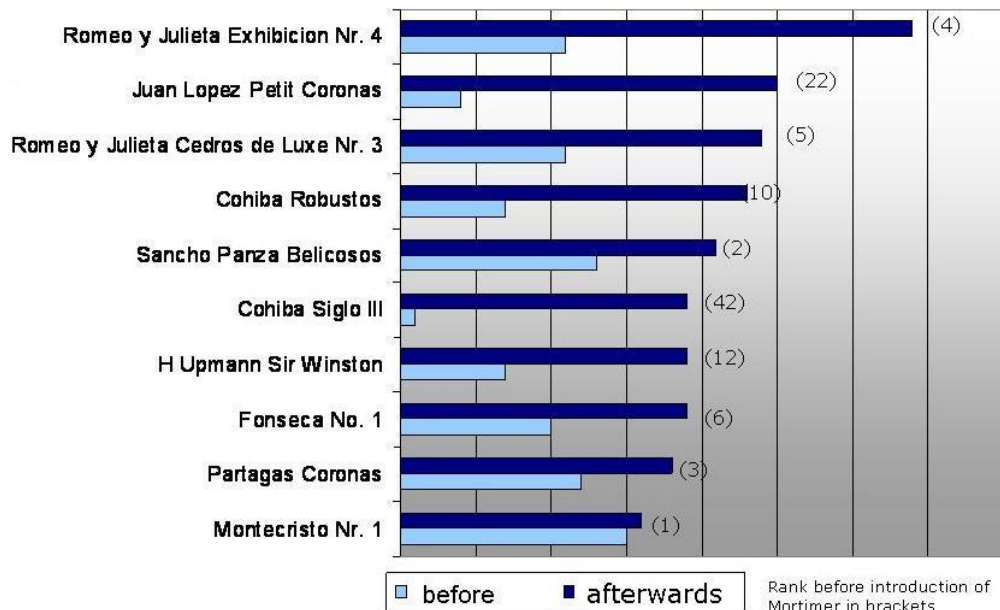
**Fig. 3.** List of top ranked products

Therefore, we separated sales records into two periods, one before Mortimer went live (01/2002 - 05/2003) and one afterwards (06/2003 - 11/2004). For each period we computed a separate top ten product list. The result confirmed the initial guess of the shop owner, namely that customers are more likely to order cigars produced by less prominent manufacturers then before. In the period before Mortimer, mostly the prominent makes like *Cohiba* or *Montecristo* have been ordered, while in the period afterwards 'no-names' like *Juan Lopez Petit Coronas* entered the top ten list (e.g. rank 2 compared with rank 22 in the period before). Figure 3 gives the top ten ranks for the period afterwards from top to bottom. The bars signify actual sales in pieces for the period before and afterwards. No numbers are given for reasons of confidentiality, but the ratios between bars are in accordance with the absolute numbers. The figures in brackets next to the bars of each cigar model correspond to the rank in the period before, e.g. the top ranked model in the period afterwards *Exhibicion Nr. 4* by *Romeo y Julieta* was previously ranked on $4^{th}$ position and the top ranked model in the period before *Montecristo No. 1* fell back to rank number 10. Evaluations of shorter subperiods did not result in significant changes. In a next step we wanted to drill down on single interactions of users and relate the interaction data collected by the sales advisor with the ordering records of the web shop. However, online customers were anonymously browsing the shop until identifying themselves for ordering. As many users receive a dynamic IP-address from their internet provider and sales acts typically last over a longer time span (e.g. customers browse and collect some information
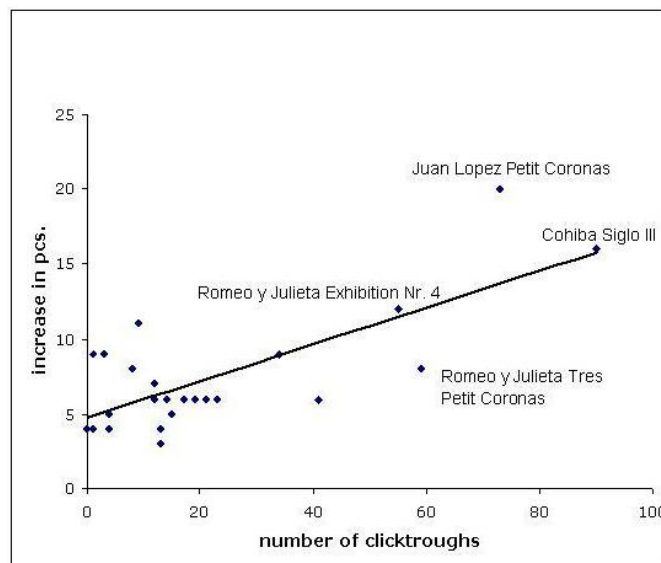
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**Fig. 4.** Correlation between clickthroughs and additional sold items

and come back later to finish an order) we were not successful in joining tuples from different tables and log files. However, a single question was already part of the ordering form where users could explicitly place a tick if Mortimer helped them placing this order. In more than 26% of all sales customers agreed that Mortimer did help them to make a decision. This does not seem a lot at first sight, but given the fact that many cigar smokers will just order their favorite model without conversing with a recommender, the figure is quite promising.

In addition, we compared how Mortimer's recommendations correlate with the increase in sold items of different cigar models. On the abscissa we measure the number of clickthroughs, which denotes how often an item has been recommended and was then examined in detail by the user. As sketched in Figure 4 cigar models that greatly improved their rank are also among the items that have been recommended most often. We also investigated why cigars like *Juan Lopez Petit Coronas* or *Cohiba Siglo III* were recommended so often and thus became so popular among customers. It turned out that in specific situations for instance when users identified themselves as novices without any smoking experiences these models have been proposed due to their taste and smoking duration. Recommendations are always accompanied by explanations and further product details as already noted in the previous section. Although overall correlation between recommendations and sales for this example is below 0.4, it still qualitatively supports the following conclusions: Recommender systems do affect the shopping behavior of users and their advice is accepted by them.

## 4   Conclusions

In this paper we discussed concepts for persuasive technologies and related them to the development of conversational recommender systems. We sketched a conceptual scheme that builds on basic functionalities of recommender agents like personalization or objectivity and finally leads to suggestions that are persuasive in nature, i.e. affect peoples actual buying decisions. We illustrate the concepts with examples from systems deployed in quality & taste domains and provide results from an evaluation conducted with data from a Web shop for Cuban premium cigars. Future work will lead us to further evaluation scenarios where key ingredients for persuasive sales advisors will be analyzed in greater detail and their effects and dependencies will be evaluated.

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