Trip@dvice Technology and eCTRL Solutions

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Introduction and Company Development

The Internet has made it possible for destination management organizations, travel services suppliers and intermediaries to reach directly their customers, to talk with them and offer their proposals. But talking to a customer through the web and offering services and products listed in an electronic catalogue containing thousands of items is not an easy task, and it is difficult for the traveler to find the right information related to destinations and tourism services she may like. Recommendation technologies have been proposed in the last years to guide more effectively customers in the selection of their preferred tourist products. These technologies are being integrated in web sites of tour operators, travel agencies and destination management organizations to support travelers in the selection of travel destinations or travel products (e.g., events, attractions, flights, hotels).

Trip@dvice (Ricci 2006) is a recommendation technology explicitly designed for the tourism domain. It has been developed at the eCommerce and Tourism Research Laboratory of ITC-irst, Trento, Italy, a research centre with more then 300 researchers focussing on artificial intelligence and micro electronic. From 2000 to 2005 Trip@dvice has been designed and developed in a national project (CARITRO project, founded by the CARITRO local bank foundation) and an international project (Dietorecs, IST project of the 5th EU framework programme).

In 2005, after some empirical evaluations, demonstrating that the technology was effective (Zins, 2006), and a careful analysis of the market demand, ITC-irst and some of the researchers that developed Trip@dvice started up a new company, eCTRL Solutions, dedicated to further improve, commercialise and support this recommendation technology. ECTRL Solutions' final customers are tourism organizations which want to develop tourism portals capable of interacting with the portal visitors in a personalized way, helping them to find the tourist products and services most suited for their needs.

Trip@dvice

Trip@dvice is a flexible software tool that can be integrated in existing tourism portals to support the user in her trip definition tasks. The tool allows the portal visitor to put together a tailored travel package, choosing a hotel, places to visit, things to do or activities to practice. The user can choose trip components that make up the package in the order he or she wants. Advanced recommendation technologies explicitly designed for the tourism domain have been implemented to identify and recommend in a personalized way a reasonable number of products and services that meet the user's needs.

Thanks to the Interactive Query Management technology incorporated in Trip@dvice, the system can help the user to formulate travel requests. If the request can't be satisfied because no or too many products can be identified, Trip@dvice, like a real travel agent, guides the user toward the best solution by proposing those minimal changes to the requests which make it satisfiable.

Figure 1 Specifying Travel Preferences (veneto.to)

Personalized recommendations are provided based on:
- Travel preferences and limitations that the user enters, such as budget, place of origin, travel period and more.
- Previous travels (his own and other people's) that match similar requirements.

Tourist organizations integrating recommendation and personalization technologies gain several advantages. Portal visitors can find more easily the tourist products and services they are looking for, increasing their satisfaction while interacting with the system. In Trip@dvice, personalized and innovative search tools enable users with different decisional styles to find the products they are looking for (Fesenmaier 2003). The results are web portals which increase their visitors' loyalties, simplify the buying process, and increase the looker to booker conversion rate. In addition, the system records the user choices and preferences to base its recommendations. These data are available to tourist organizations to analyse customers' behaviour for their business and market analysis.

Even if there are several large companies active in the Customer Relationship Management sector and web personalization technologies (e.g. BroadVision, E.piphany, and Vignette), none are dedicated to the tourism sector as Trip@dvice.

Personalization technologies in tourism have been implemented by some of the largest on line travel agencies, but they have developed their own technologies to gain competitive advantages on their direct competitors. Thus, they do not (and are not interested to) commercialise the developed technology.

Trip@dvice fills this gap, allowing tourism organizations which cannot afford large research investments to integrate advanced personalization technologies explicitly dedicated to the tourism sector in their tourism portals.
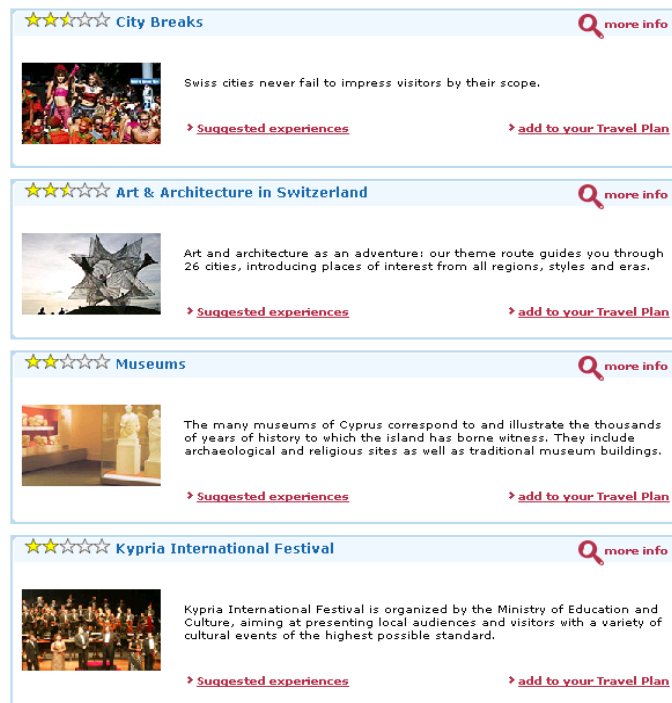

Figure 2 Personalized Recommendations (visiteurope.com)

Business Model

eCTRL Solutions is a technology provider. It develops personalization technologies and necessary services to integrate them in tourism web sites. ECTRL Solutions main customers are destination management organizations interested in providing personalized contents and travel planning support to their portal visitors. Trip@dvice has been already chosen by several tourism organizations for their tourism portals. Visiteurope.com is the e-marketing tool of the European Travel Commission to promote Europe as a tourism destination; it provides the travel planner tool, a specific Trip@dvice component that supports their world-wide and heterogeneous tourism visitors in their information search process. The Italian Veneto region has also integrated the Trip@dvice travel planning and recommendation component in its official tourism web portal. The Austrian National tourism Board is developing a recommender tool based on Trip@dvice for the austria.info portal. The Italian province of Biella is developing a new web portal providing personalization and recommendation functionally supported by Trip@dvice.

 Stakeholders of eCTRL Solutions are, first of all, the partners which first studied and developed the product and then founded the company to commercialise the technology. Then, ITC-irst, the research institute where the technology has been studied and initially developed, and the Trentino local government, which supported research and technological innovation in travel and tourism, and encourage this initiative. ECTRL Solutions is an example of how research investments, when addressing the right sectors and focussing on applied research, can create new business and employment

opportunities for the community, one of the primary goal of the Trentino Province research efforts.

Trip@dvice is sold in two ways. As provision of technology, thus on a software licence basis plus services required to customize and maintain the technology. Alternatively, eCTRL Solutions provides Trip@dvice as ASP (application service provider), on a per-year service licence.

ECTRL also provides the necessary services for analysing the specific personalization issue and adapting the data structure and user interface to customer needs. Additional services are provided to analyse the data acquired by the system while it is used by the portal visitors and provide information to tourism organizations about the tourist behaviours, their preferences and related choices.

Research and Development resources are invested to simplify the integration of the recommendation component in the overall web site, improving the quality of recommendations and reducing the maintenance cost to increase the share of potential customers. Another model suited for Trip@dvice technology which is likely to be adopted in the future (mainly for eTravel agency and tour operators) is the brokerage model (Rabanser, 2005), where a fee for each transaction enabled by Trip@dvice is charged to the tourist organization exploiting the service.

Technological and Business Innovation

The main technological innovation of Trip@dvice is the capability to learn, directly from the users, the knowledge required to make reliable recommendations. By exploiting and adapting the Case Based Reasoning methodology (Ricci 2006), it learns from the same user experiences the relationships between the user travel preferences and the products to be chosen and identifies the products to be recommended according to the users' needs and sought benefits. This is particular important for the travel sector, where decision behaviour models which relate users' preferences and tourist products are still to be well understood and are still subjects of academic research.

From the business side, Trip@dvice is a web technology proposed in an innovative way. It can be integrated in existing tourism portals, extending without replacing the existing web infrastructure, thus allowing the preservation of the investment already done for the web presence.

To develop and market this kind of technologies several issues should be faced. From the technological point of view, the complexity of the tourism domain should be address. It is well known that supporting travellers in their decisional task is challenging. Tourism data model is complex and not standardized, people decisions depend on a large set of variables which cannot easily be matched on the tourism data (Ricci 2002). Research on tourism behaviours and recommendation technologies should continue to enhance Trip@dvice performances.

From the software development point of view, a tool which can be easily integrated in existing portals requires to be continuously updated to reflect the new approaches and techniques which are introduced at a very high pace in the field of software engineering and web architectures.

From the business point of view, often it is difficult to market this kind of technologies to people not fully aware of the potential impact of recommendation and personalization technologies and to convince them that these technologies are already available and effective (not just research studies) and that they can really improve their business. The advantages of adopting personalization technologies should be made clear in a simple and comprehensible way also for people not expert in this field. In addition, the integration of this technology in existing web sites requires interacting with the technology providers that

developed the portal; these relationships are not always easy because they could consider eCTRL a potential competitor.

Key Challenges for the future

Be a company active in a highly technological innovation field is challenging in general. For the type of product we are addressing is even more complex. In fact, innovation is required in two main fields, which are related but require different type of knowledge. From one side, the basic algorithms underlying the Trip@dvice technology should be steadily improved, hence expertise in Artificial Intelligence is needed. New algorithms and solutions should be studied, developed, and evaluated. From another side, having a tool which can easily cooperate with existing web portals, exchange information, and can be easily plugged in existing systems, requires deep knowledge of the most advanced techniques in software architectures and developments. Technical people of the company should stay updated on both the areas. The cooperation with research laboratories and universities help us to improve the knowledge in these fields.

ECTRL Solutions is a young and still small company (200.000 € turnover estimated for 2006). But there is an increasing interest in its solutions and competences. The challenge is to be able to grow at a sustainable pace, and this can be done only correctly balancing economical and human resources. New human resources entering in the company (both commercial and technician) should be trained to acquire the required competences. Considering the investment that this represents for the company, the personnel selection and acquisition should be carefully analysed and performed with proper medium-term budget availability.

The future of the company

ECTRL goal is to integrate this technology in the major national and regional destination management portals. Trip@dvice was created and studied initially for this kind of portals and its effectiveness has been demonstrated. But it is suited also for other tourism areas, like on line booking engines, on line travel agencies and major tour operators, where Trip@dvice can be fully exploited.

To sustain the growth, in the medium future other sectors (culture, eGovernment, eLearning) could benefits from Trip@dvice recommendation technologies as well. In fact, the basic approach (exploiting choices that other users make in similar situations), which is used now to identify tourism products and services suitable for a given trip goal, could be adopted, for example in an eGovernment portal, to help citizens to find the documents and services useful to achieve a given goal or manage a situation (e.g. adopt a child or open a new business).

New technologies should be considered both in the software engineering (User Interface Design, Data Integration and Harmonization, Application Integration) and artificial intelligence (User Modelling, Machine learning, Human Computer Interaction) area to be able to deliver more and more updated solutions which meet the desire of tourists and the needs of tourist organizations.

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