



**УНИВЕРЗИТЕТ „ГОЦЕ ДЕЛЧЕВ“ - ШТИП
ФАКУЛТЕТ ЗА ИНФОРМАТИКА**

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VOLUME I

**GOCE DELCEV UNIVERSITY - STIP
FACULTY OF COMPUTER SCIENCE**

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СОДРЖИНА
CONTENT

DEVELOPING CLOUD COMPUTING’S NOVEL COMPUTATIONAL METHODS FOR IMPROVING LONG-TERM WEATHER GLOBAL FORECAST Zubov Dmytro	7
PERVASIVE ALERT SYSTEM FOR FALL DETECTION BASED ON MOBILE PHONES Kire Serafimov, Natasa Koceska	17
ESTABLISHMENT OF A HEALTHCARE INFORMATION SYSTEM Alexandar Kostadinovski, Drasko Atanasoski	26
TIME COMPLEXITY IMPROVEMENT OF THE FIRST PROCESSING STAGE OF THE INTELLIGENT CLUSTERING Done Stojanov, Cveta Martinovska	36
MOODLE AS A TEACHING TOOLS IN MATHEMATICS-CASE STUDY IN UNIVERSITY “GOCE DELCEV” STIP Tatjana Atanasova-Pacemska, Sanja Pacemska, Biljana Zlatanovska	45
TOURISM RECOMMENDATION SYSTEMS: ANALYTICAL APPROACH Biljana Petrevska, Marija Pupinoska-Gogova, Zoran Stamenov	57
CLOUD COMPUTING APPLICATION FOR WATER RESOURCES MODELING AND OPTIMIZATION Blagoj Delipetrev	66
IMPROVING THE SECURITY OF CLOUD-BASED ERP SYSTEMS Gjorgji Gicev, Ivana Atanasova, Jovan Pehcevski	77
USING OF THE MOORE-PENROSE INVERSE MATRIX IN IMAGE RESTORATION Igor Stojanovic, Predrag Stanimirovic, Marko Miladinovic	88
THE INFLUENCE OF THE BUSINESS INTELLIGENCE ON THE BUSINESS PERFORMANCE MANAGEMENT Ljupco Davcev, Ana Ljubotenska	99
LINQ TO OBJECTS SUPPORTED JOINING DATA Mariana Goranova	109
GLOBALIZATION, INFORMATION TECHNOLOGY AND NEW DIGITAL ECONOMIC LANDSCAPE Riste Temjanovski	120

WEB БАЗИРАН СОФТВЕР ЗА SCADA АПЛИКАЦИИ INTEGRAXOR Марјан Стоилов, Василија Шарац	130
SECURITY IN COMPUTER NETWORKS FROM THE PERSPECTIVE OF ACCESS CONTROL Saso Gelev, Jasminka Sukarovska-Kostadinovska	139
FREQUENCY DISTRIBUTION OF LETTERS, BIGRAMS AND TRIGRAMS IN THE MACEDONIAN LANGUAGE Aleksandra Mileva, Stojanče Panov, Vesna Dimitrova	149
TOWARDS A GENERIC METADATA MODELING Pavel Saratchev	161
ECONOMIC VALUE OF INFORMATION SYSTEMS IN PRODUCTION PROCESSES Aleksandar Krstev, Zoran Zdravev	175
TUNING PID CONTROLLING PARAMETERS FOR DC MOTOR SPEED REGULATION Done Stojanov	185
COMPARISON OF THE PERFORMANCE OF THE ARTIFICIAL BOUNDARIES P3 AND P4 OF STACEY Zoran Zlatev, Vasko Kokalanov, Aleksandra Risteska	192
CORRESPONDENCE BETWEEN ONE-PARAMETER GROUP OF LINEAR TRANSFORMATIONS AND LINEAR DIFFERENTIAL EQUATIONS THAT DESCRIBE DYNAMICAL SYSTEMS Marija Miteva, Limonka Lazarova	200
THE BLACK-SCHOLES MODEL AND VALUATION OF THE EUROPEAN CALL OPTION Limonka Lazarova, Marija Miteva, Natasa Stojkovic	209
BITCOIN SCHEMES- INOVATION OR A THREAT TO FINANCIAL STABILITY? Violeta Madzova	221
JAVA IDEs FOR EASILY LEARNING AND UNDERSTANDING OBJECT ORIENTED PROGRAMMING Aleksandra Stojanova, Natasha Stojkovic, Dusan Bikov	232
STUDENTS' KNOWLEDGE TEST CONTROL – METHODS AND RESULTS' INTERPRETATION Ludmila Stoyanova, Daniela Minkovska	241

WEB SERVICE FOR AMBIGUOUS TRANSLITERATION OF FULL SENTENCES FROM LATIN TO CYRILLIC ALPHABET	
Stojance Spasov, Zoran Zdravev	252
ON THE APPLICATION OF KEEDWELL CROSS INVERSE QUASIGROUP TO CRYPTOGRAPHY	
Jaiyéolá Tèmitopé Gboláhàn	264

TOURISM RECOMMENDATION SYSTEMS: ANALYTICAL APPROACH

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Marija PUPINOSKA GOGOVA⁷

Zoran STAMENOV⁸

Abstract: Since tourism generates numerous positive impacts, each country is interested in its development. The base for increasing the number of tourists lies in capability to meet their preferences, which is not a trouble-free process, particularly in times of ever-changing environment. The tourist's behavior has changed dramatically specifically to the way how they search for information in the Web as the leading source. The paper argues the importance of introducing tourism recommendation systems, particularly in small and tourism developing countries as Macedonia. Moreover, it makes an attempt to justify the necessity of designing tourism recommenders in order to assist the tourists to identify their holiday in more sophisticated way.

Key words: Tourism; Recommendation systems; Tourists' preferences.

1. Introduction

Tourism has emerged as one of the major industries in the world economy by benefiting numerous sectors. Thus, each country insists in developing it and making a profit from its variety of impacts. Everyone is interested in increasing the number of visitors since it serves as a source of economic growth. In 2011, the international tourism continued to grow, despite an increasingly uncertain global economy, political changes and natural disasters around the world. The international tourist arrivals reached a record 982 million, an increase of 4.6% compared to previous year, while receipts grew by 3.8% to €740 bn (UNWTO, 2012: 7). With growth forecast to continue in 2012, although at a slightly slower rate of between 3% and 4%, international tourism will hit a major milestone in 2012: one billion international tourists. The one billionth tourist is expected to travel sometime in December 2012 (UNWTO, 2012: 8).

However, attracting bigger number tourists is not a trouble-free process, particularly in times of ever-changing travel preferences. Despite the variety of options regarding tourist destination or attraction, tourists frequently are not capable to cope with such a huge volume of choice. So, they need advice

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about where to go and what to see. In a tourism domain, recommendations may indicate cities to go to, places to visit, attractions to see, events to participate in, travel plans, road maps, options for hotels, air companies, etc. Such scope of work very often is not a trivial task. In this respect, recommenders assist tourists by facilitating personal selection and prevent them from being overwhelmed by a stream of superfluous data that are unrelated to their interest, location, and knowledge of a place. So, it is much easier for tourists to access the information they need thus resulting in shorter lead-time for bookings, making last-minute decisions and generally, tailoring their own packages from a suite of options. Solution is seen in developing recommenders in tourism domain.

Generally, the contribution of this paper lies in the fact that gives an overview of necessity for developing recommendation systems in tourism. Moreover, it may serve as a starting thinking point for making attempts for introducing tourism recommenders in Macedonia. Finally, the paper may alarm the relevant tourism-actors in Macedonia, that the time has changed and that on-line experience has shifted from searching and consuming to creating, connecting and exchanging.

The remainder of the paper is organised in several sections. After the introductory part, the section 2 provides a brief overview of developing recommendation systems in tourism. Section 3 presents a snapshot on theoretical and empirical literature. Section 4 is rich on facts at glance towards the necessity of developing tourism recommenders in Macedonia. The most interesting conclusions and future challenges are presented in Section 5 which is the final part of the paper.

2. Recommendation systems in tourism

Tourism is an interesting phenomenon particularly for recommendation purposes. Being detected as the only way out in assisting tourists and travelers to identify their ideal holiday, recommenders offer personalization of information delivery to each traveler, together with travel history. Yet, the advanced tourist information systems must offer more than just relatively static information about sights and places. Over the past two decades a noteworthy transformation was made from just passive searching and surfing to creating content, collaborating and connecting. In this respect, the Web became the leading source of information particularly important in times of increased number of competitors in tourism market. The way out is detected in application of recommenders as a promising way to differentiate a site from competitors.

Generally, recommendations may be made to a tourist by software, as in a multimedia totem, an ATM device, or in a Web site, or by a human intermediary (e.g., the travel agent) who will receive information from a decision support system (Figure 1). However, the most successful results may be expected by applying collaborative filtering and content-based filtering (Figure 2). Based on conversational approaches, such recommenders are promising in tourism, meaning that the user is giving opportunity to choose a quantum of tourist items with regards to personal preferences.

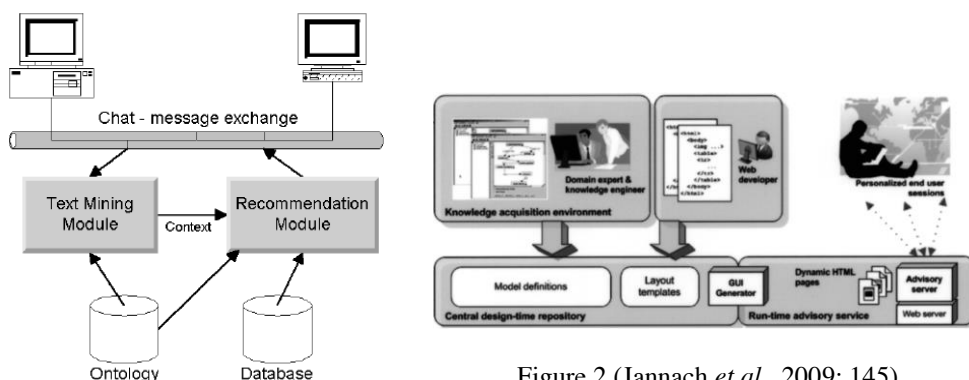


Figure 2 (Jannach *et al.*, 2009: 145)

Figure 1. Architecture of decision support system (Loh *et al.*, 2004: 159)

It is more than obvious that whether a potential tourist will be interested in a certain item depends on his preferences. Although may sound fragile, but the vast majority of today's tourists know exactly what they are looking for. Yet, they are very demanding and have complex, multi-layered desires and needs. Today's so called "postmodern tourists" have specific interests and individual motives which results in tailored made tourist products according to their particular preferences. They are often high experienced in travelling and demand perfect tourism products rather than standardized ones. Consequently, they take much more active role in producing diversified tourism products with shorter life cycles enabled by increased usage of ICT.

Many researchers were interested in identifying tourists' needs, expectations and behavior. Hence, numerous papers discuss tourist roles in order to define their considerable variations. In mostly, the behavior is related to specific demographic and background characteristics emphasizing the life course as the leading component for investigating tourist role preferences. Yet, attention should be paid to a variety of social structures and processes, including psychological needs and lifecourse stage.

3. Literature review

One may argue the inevitable relationship between tourists and information. Moreover, it is a widely-recognized fact that information and decision-making have become the foundation of world economy (Wang, 2008). Due to tourism essentiality, recommenders applied in tourism have been a field of study since the very beginnings of artificial intelligence. There is a large body of literature regarding the significance and effectiveness of applying the recommenders in tourism, travelling and hospitality. It is a matter of identifying a class of intelligent applications that offer recommendations to travelers, generally as a response to their queries. They mostly leverage in-built logical reasoning capability or algorithmic computational schemes to deliver their recommendation functionality. Thus, recommenders are an attempt to mathematically model and technically reproduce the process of recommendations in the real world.

Numerous researchers made efforts in their introducing. In this respect, the need for developing intelligent recommenders which can provide a list of items that fulfill as many requirements as possible is elaborated (Mirzadeh *et al.*, 2004; McSherry, 2005; Jannach, 2006). Also, a recommender dealing with a case-based reasoning is introduced in order to help tourist in defining a travel plan (Ricci & Werthner, 2002; Wallace *et al.*, 2003). Yet, as the most promising recommenders in tourism domain are the knowledge-based and conversational approaches (Ricci *et al.*, 2002; Thomson *et al.*, 2004). The knowledge-filtering, constraint-based and casebased approaches are further engaged for recommendation (Kazienko & Kolodziejski, 2006; Ricci & Missier, 2004; Zanker *et al.*, 2008). Additionally, the recommenders based on text mining techniques between travel agent and customer through a private Web chat may easily find an application (Loh *et al.*, 2004).

Furthermore, we refer to some late research that brought more sophisticated outcomes, like: introducing a personalized tourist information provider as a combination of an event-based system and a location-based service applied to a mobile environment (Hinze *et al.*, 2009); Investigation on sources and formats of online travel reviews and recommendations as a third-party opinions in assisting travelers in their decision making during trip planning (Zhang *et al.*, 2009); Findings regarding development of a web site in order to enable Internet users to locate their own preferred travel destinations according to their landscape preferences (Goossen *et al.*, 2009); Selecting the destination from a few exceptions (Niaraki & Kim, 2009; Charou *et al.*, 2010); Usage of orienteering problem and its extensions to model tourist trip planning problem (Vansteenwegen & Wouter, 2011); and similar. It is evidently that the research area is extending resulting in improved

dependability of recommendations by certain semantic representation of social attributes of destinations (Daramola *et al.*, 2010).

4. Necessity of developing tourism recommender in Macedonia

Macedonia identified tourism as a strategic priority for national economic development (Government of Macedonia, 2009). Up-to-date, tourism in Macedonia has accomplished an average growth of 4.64%, GDP share is 1.7% and it incorporates 3.1% of total workforce. Additionally, in the frames of services, tourism inflows are the second biggest item (just a little bit lower compared to the inflows of transport services), which is 1.3 times higher than the inflows of business services and 2.4 times larger than communication services inflows. Such condition indicates high potential to increase tourism effects in economic activity of Macedonia.

Furthermore, forecasts regarding tourism development in Macedonia are very optimistic. Namely, according to estimations by 2021 it is expected that direct contribution of tourism to GDP will reach to 1.6 % thus bringing revenue of €170 million according to constant 2011 prices; total contribution of tourism to GDP will rise to 6.0%; visitor exports will generate €76 million and investments in tourism will reach the level of €76 million representing 2.8% of total investments. Additionally, it is expected that number of employees that indirectly support tourism industry in Macedonia will rise to 35000 jobs representing 5.4% of total workforce (WTTC, 2011: 3)

With regards to international tourism demand in Macedonia, the upward trend is expected to continue in the next period (Petrevska, 2012). This optimistic view is supplemented additionally with the fact that the number of user ratings is permanently increasing by 15% monthly growth rate. Supportive and not surprising is another fact noting an upward trend of web portal users which complements the positive general conclusion referring tourism income in Macedonia. The average tourism consumption of €50 per day (WTTC, 2010) is anticipated to note an increase of one third of a euro, which may be misinterpreted as insignificant to national economy. However, on long-term horizon based on these projections the tourism contribution to the GDP may note an increase of more than 1%.

However, budget expenditures allocated for tourism promotion in Macedonia are very modest. Yet, the budget is constantly increasing yearly, from approximately €100000 in 2005, to €130000 in 2012 (Government of Macedonia, 2012). In the other hand, being ranked low on the list of the most attractive destinations for travel and tourism, illustrates the need for tourism improvement. Namely, Macedonia was ranked as 83rd out of 130 countries in 2008 (Blanke & Chiesa, 2009) with a slight improvement in 2011 being ranked

at 76th place out of 139 countries (Blanke & Chiesa, 2011). It is worth noting that majority of countries in the region are significantly better ranked: Slovenia - 33rd place, Croatia - 34th place, Montenegro - 36th place, Bulgaria - 48th place and Albania - 71st place. From neighboring countries, only Serbia, and Bosnia and Herzegovina are ranked lower than Macedonia.

In order to strengthen tourism competitiveness of Macedonia, the first national web tourism portal (www.exploringmacedonia.com) was created in 2005 as a public-private partnership between an international donor and the Ministry of economy. In this regard, several other private initiatives act as additional tourism portals, thus supporting country's tourism profile, like: www.go2macedonia.com, www.simplymacedonia.com, www.macedonia-lovesyou.com, www.macedonia-timeless.com etc. Despite the existence of variety and most probably, sufficient number of web-portals that promote Macedonia as attractive tourist destination, so far none of them act as tourism recommender. Moreover, Table 1 supports the noted conclusion by giving a glance of poor visits to particular sites referred by search engines in a three-month period. Surprisingly, the both web-portals labeled as national are placed at the bottom of the table.

Table 1. Traffic statistics for selected web-sites

Web-site	Traffic rank
www.macedonialovesyou.com	18.824.372
www.simplymacedonia.com	14.670.989
www.go2macedonia.com	14.010.522
www.macedonia-timeless.com	1.690.753
www.exploringmacedonia.com	1.360.389

Source: Authors' note based on www.alexa.com

The forth mentioned advantages produced by recommenders fully justify the urgency and necessity of their design in Macedonia. Specifically lead from the fact that they assist tourists and visitors in planning and creating their trip and holiday in more sophisticated way.

5. Conclusion

Based on fact that tourism is defined as one of the most economically-oriented industries in the world, it enhances and strengthens national economies. With regards to Macedonia, tourism is identified as an industry which might contribute to: enhancing foreign export demand for domestic goods and services, generating foreign currency earnings, new employment opportunities within the country, repaying the foreign debt, increasing the national income etc. Additionally, it is worth noticing that travel and tourism

economy in each country incorporates broad spectrum of tourism-oriented activities and results with multiplicative impacts.

The paper presented an analytical approach of positive results in developing tourism recommendation systems, thus emphasizing the necessity for their introduction in Macedonia. Tourism recommenders may serve as a guideline for tourists and travelers in the line of identifying ideal trip and holiday. So, development of such software module may generally contribute to increasing the awareness of tourist destination that is capable of fulfilling travelers' preferences, and respectfully in raising net tourism income.

Furthermore, a successful launch of a web-based recommender at national level is in the line of supporting the economy through improvement of tourism supply in more qualitative manner. Since such portal will indicate the motives, preferences and reasons for traveling to Macedonia, it might be of high importance to all key-tourism actors in the process of identifying measures and implementing activities necessary for creating comprehensive tourism policy. Finally, the paper may alarm the relevant tourism-actors in Macedonia, that the time has changed and that on-line experience has shifted from searching and consuming to creating, connecting and exchanging.

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