e-Turist: Electronic Mobile Tourist Guide

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ABSTRACT

In the e-Turist project we developed a mobile application that provide experience comparable to that offered by a professional tour guide, but tailored to each individual tourist. The tourist can enter his interests (entertainment, active tourism, gastronomy, cultural and natural heritage), the available time and any special requirements he/she may have. Based on these and other data such as opening time, the application prepares a personalized sightseeing program. To this end, it uses a recommender system that combines the extensive knowledge on tourism provided by Turistica with state-of-the art intelligent computer methods developed at Jožef Stefan Institute. Afterwards, the application guides the tourist using the GPS, providing a multilingual written and voice description accompanied by photos. The tourist may comment and rate each sight, which is then used by the recommender system and tourism services providers to improve their services.

KEY WORDS

mobile application, sustainable tourism, recommender system, tourist attractions

Introduction

Tourism with a 3.3% growth forecast is one of the fastest growing industries in the world and has one of the largest multiplier effects on income and jobs. According to the UNWTO (2013) at the end of 2012, the world has already seen a billion international tourist arrivals. Despite the projected growth, which is due to the emergence and rapid growth of new destinations, we expect a sharp competitive struggle and loss of market share of traditional destinations, which includes Europe. Modern ICT technologies are one of the important tools in this competitive fight. The Government of the Republic of Slovenia defines tourism as a major economic and strategic sectors, creating new jobs and significant positive impact on balanced regional development. Slovenian tourism in the last ten years shows an increasing number of tourists and overnight stays as well as inflows from tourism. The economic downturn in 2010 affected the growth of tourist traffic, but the situation today is approaching the record year 2008. Foreign tourists play an important role, and their share is steadily increasing. Since foreign tourists are increasingly environmentally aware, the Slovenian Tourism also follows the principle of sustainable development.

Organized groups of tourists usually see only the most important, interesting and general pre-defined tourist attractions, being led by trained guides. For individual visitors, both domestic and foreign tourists and small groups (families, special interest groups) are also attractive sites that are less well known, but it may be of interest to them. Trained guides are not available for them or they do not even want to bother with such issues, therefore information on tours and attractions they have to look for themselves. Information is often difficult to obtain, as they are scattered across a tourist and professional publications and on different websites. Slovenia's attractions are well described in a high profile tourist guide (Krušič, 1996), but the guidebook cannot compete with the flexibility and timelines of a mobile application. Modern technology solutions particularly wish to encourage younger generation to learn more about the cultural and natural heritage of Slovenia. Tourism causes economic, social, cultural and ecological impacts and produce changes in a tourism destination. Mobile travel application e-Turist (e-Turist), will contribute to the sustainable development of tourism in Slovenia with the availability of a choice of tourist attractions and with the invitation to visit them. To some extend it should reduce environmental impacts of tourists. Herewith we are introducing the e-Turist mobile application.

Mobile travel applications and ambient intelligence

Mobile travel applications in Slovenia are not yet widespread. Perhaps the most sophisticated among them is mTurist (mTurist), which provides many descriptions of tourist attractions on the internet and by telephone. Access to the descriptions does not take place via a mobile application, but with a phone call, and therefore it does not offer the management and adaptation to the user, which is offered by the recently introduced mobile application e-Turist. Another such project is the Rural electronic guide Podeželski elektronski vodič (Bit Planota), which is not yet finalized, but is expected to offer guidance with the help of GPS. It will not exploit the significant advantages of mobile application of the e-Turist. Also, it is not meant to function throughout Slovenia as does to the application e-Turist. In addition to these two projects, there are also some less integrated solutions: plast ZgodovinaLJ (Zgodovinski arhiv Ljubljana) for mobile application Layar that displays the selected sites images from the history of Ljubljana, including the audio file to the sightseeing route of Ljubljana (Knavs 2007); Find your city Najdi svoje mesto (Bauer 2006) is the mobile guide of 50 locations in Ljubljana. In the world mobile travel applications are more widespread. Very close to our

project e-Turist there is the s.c. mTrip (mTrip) which provides guidance and proposed programs of tours, customized to the user. However, the latter feature, which has an advantage compared to the e-Turist, does not work in mTrip properly (Dines 2010); in addition, mTrip offers no guided tours of Slovenia and is payable.

Mobile applications that are adapting information to the user and his context (geographic location, day of the week, current weather) fall within the scope of ambient intelligence (Nakashima 2009). Ambient intelligence is directed primarily to serve the needs of people in their everyday environment, unlike traditional artificial intelligence which is looking for technical and algorithmic solutions to simulate human intelligence and other human characteristics to solve complex problems. It is user-friendly, light in nature, easily manageable and even commonplace. Its aim is to enable the use of advanced technology without any special knowledge in the most natural way. The ambient intelligence is a topical research area; European Union funds a dozen of to e-Turist similar projects and is exercised in practice. Research of ambient intelligence began in Philips laboratories in order to create a vision for the future of consumer electronics (Zelkha 1998). Today, however, in practice we are experiencing a boom of ambient intelligence in smart homes and mobile applications, although often not under that name. Therefore, we believe that now is the right time to place such an application for the use in the field of tourism in Slovenia.
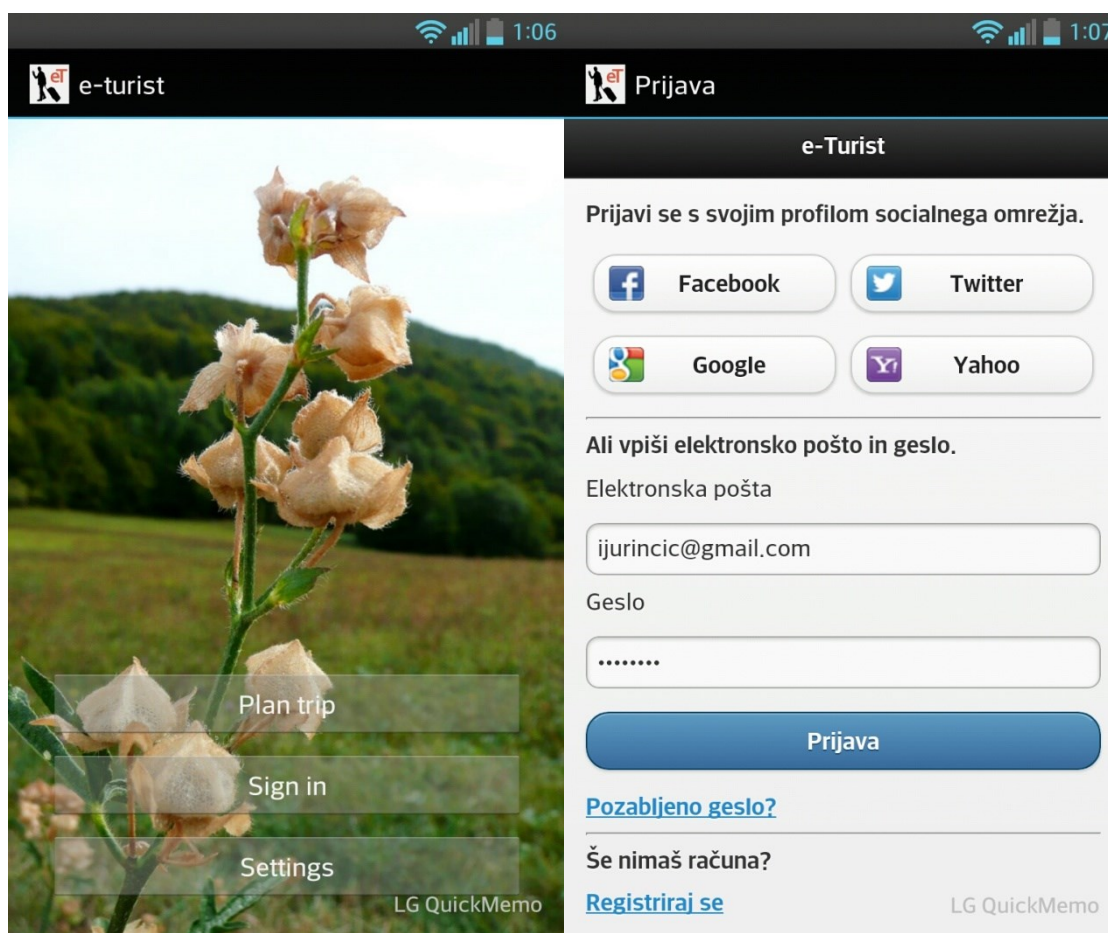

Figure 1:   Application e-Turist   Figure 2: Sign in

Methods and data

In the project e-Turist we have developed an application for mobile phones that provide experience for individual tourists and small groups which would otherwise had to lease a qualified guide. Tourist enters his interest (entertainment, active tourism, gastronomy, cultural and natural heritage) into the application, the time available for the sightseeing, the transport options (car or walk) he has and any mobility impairment. On the basis of this and other data, such as weather (bad weather is less suitable for the open air tourist attractions) and the date and time of visit (Sunday some museums and restaurants are closed), the application prepares a program adapted to the individual tourist's demand. For this purpose, the application is using the recommender system, which states the art methods which determine which sites are most consistent with the interests of tourists. We expect that such application will bring visitors to the less visited sights and relieve the most popular attractions and promote sustainable tourism. The final decision on the program of eventual visits will of course still depend on the tourists, which can arbitrarily change the proposed program of visit.

The e-Turist application consists of mobile application used by tourists, server for data management and web application for data entry, which is used by tourism operators. The main and innovative part of the application and its main advantage over competitors is the recommender system for the sightseeing program, based on the latest research findings in this area.

All capabilities of the application e-Turist are available in authentic native applications for different mobile platforms and as web applications which works in the browser on any platform. The applications are compatible with mobile phones and tablet computers. Web application is using the following technologies: HTML5, CSS3 and JavaScript, which queries via dynamic AJAX (Asynchronous JavaScript and XML) access data saved in JSON (JavaScript Object Notation), which are provided by server.

The major limitation of web application is the inability to access the phone hardware, especially the GPS, and the need for a permanent internet connection. These restrictions have been abolished with the native applications. Native applications have been developed for the Android platform, iOS (Apple iPhone), Windows Phone and BlackBerry. Most important is the Android platform, which has the largest market share among smartphones with 61.0%, and iOS, with 20.5%. BlackBerry with 6.0% is currently the third most widespread platform. A market research company IDC estimates that by 2016 the market share of Windows Phone will grow significantly and will catch up with iOS, therefore this trend cannot be neglected (IDC 2012).

The mobile application is independent from the network layer. This is provided with the support of IPv4 and IPv6 standards. The application uses the implementation of network protocols, embedded in selected mobile platforms that support both standards. A more complex technical problem in the development of mobile applications is related to the use of maps. We used the web version of Google Maps that allows us to use them without a constant Internet connection.
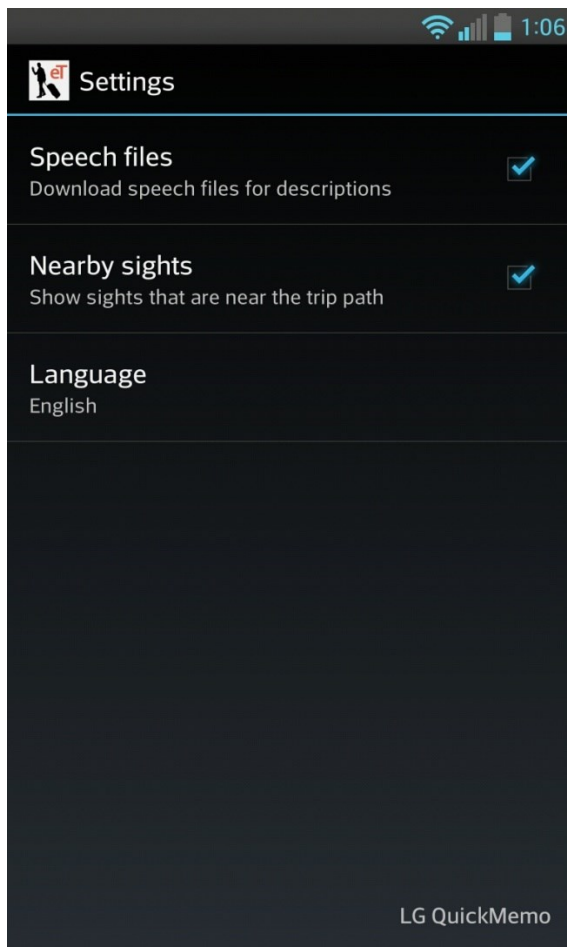
Figure 3: Settings   Figure 4: Pick location

Server and a web application for travel professionals

e-Tourist uses a web server, which is required for the operation of web application for tourism operators and tourists;

- application server where the application serve tourists needs; and
- a database which stores the information about the tourist attractions.

The data about the sightseeing and the opinions by the tourists are also stored in the same database. Open source technology is used wherever it was possible. The server and the web application both support IPv4 and IPv6 standards which are supported by the major part of similar software. The server is connected to the Jožef Stefan Institute network in Ljubljana.

Descriptions of tourist attractions are converted into speech on the server. A speech synthesizer Govorec (Amebis) is used for Slovenian language. The application supports also English, German, Italian language. It is also possible to upload the audio files with several descriptions on the server.
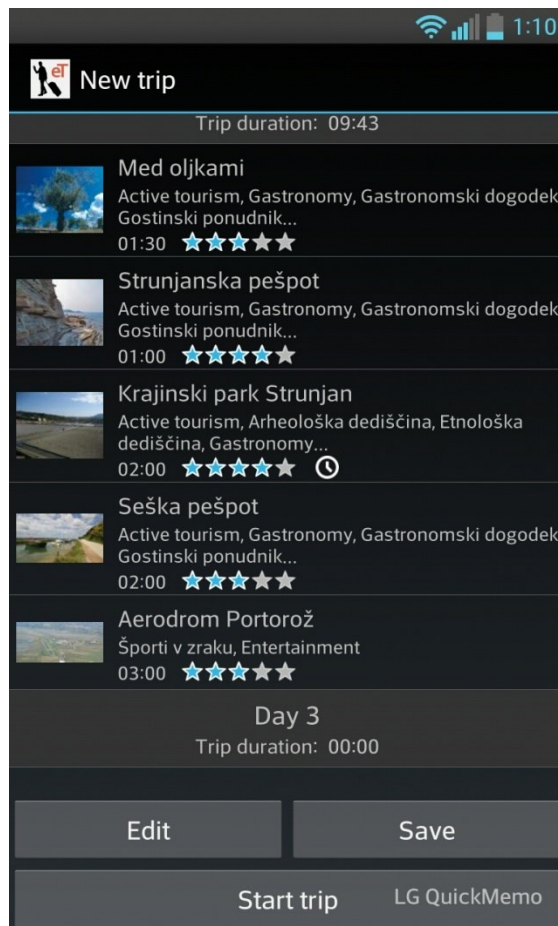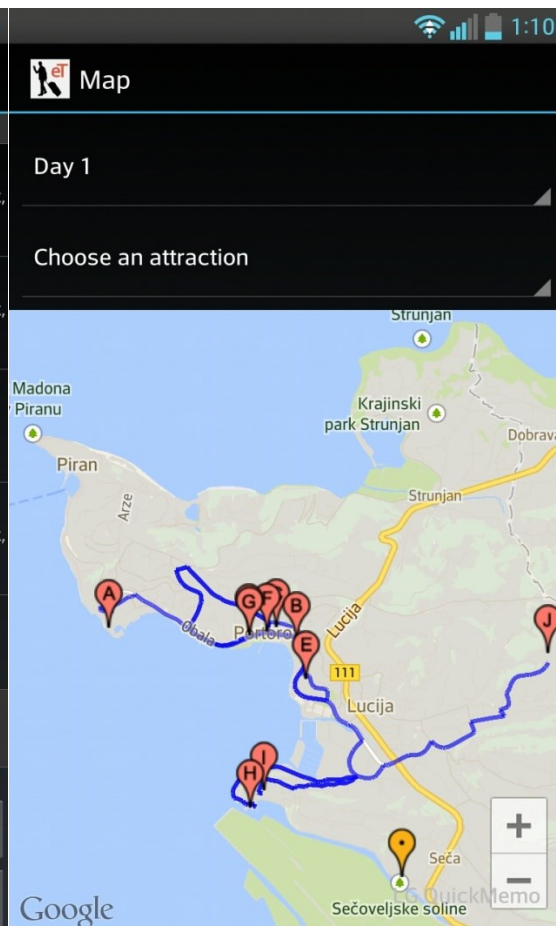
Figure 5: Final program of the trip   Figure 6: Map

Recommender system

Recommender systems have been spread in recent years – well known users include online retailer Amazon, video on demand service Netflix … The named systems use two basic approaches: comparison with other users and user preference in the past. The e-Tourist project uses a combination of both. We can present this with an example. We have to prepare the sightseeing program for John Doe and his family. With the first approach, we try to find users who have already been where John wants to go in the past and which have had a similar interest and opinion on tourist attractions. We assume that John would like to visit attractions that have been highly rated by similar users. With the second approach, we compare attractions similar to those John liked in the past. We have also using evaluations made by tourism experts, based on the cultural significance of sites as well as on principles of sustainable tourism and other values. These professional evaluations are important until we do not have enough information about John and other users to be able to incorporate their personal opinions. The final step of the user is to prepare the final program considering the attractiveness of sites, geographical distance between them and the time available for the sightseeing. This is an optimization problem for which we have used one of well-established optimization algorithms.
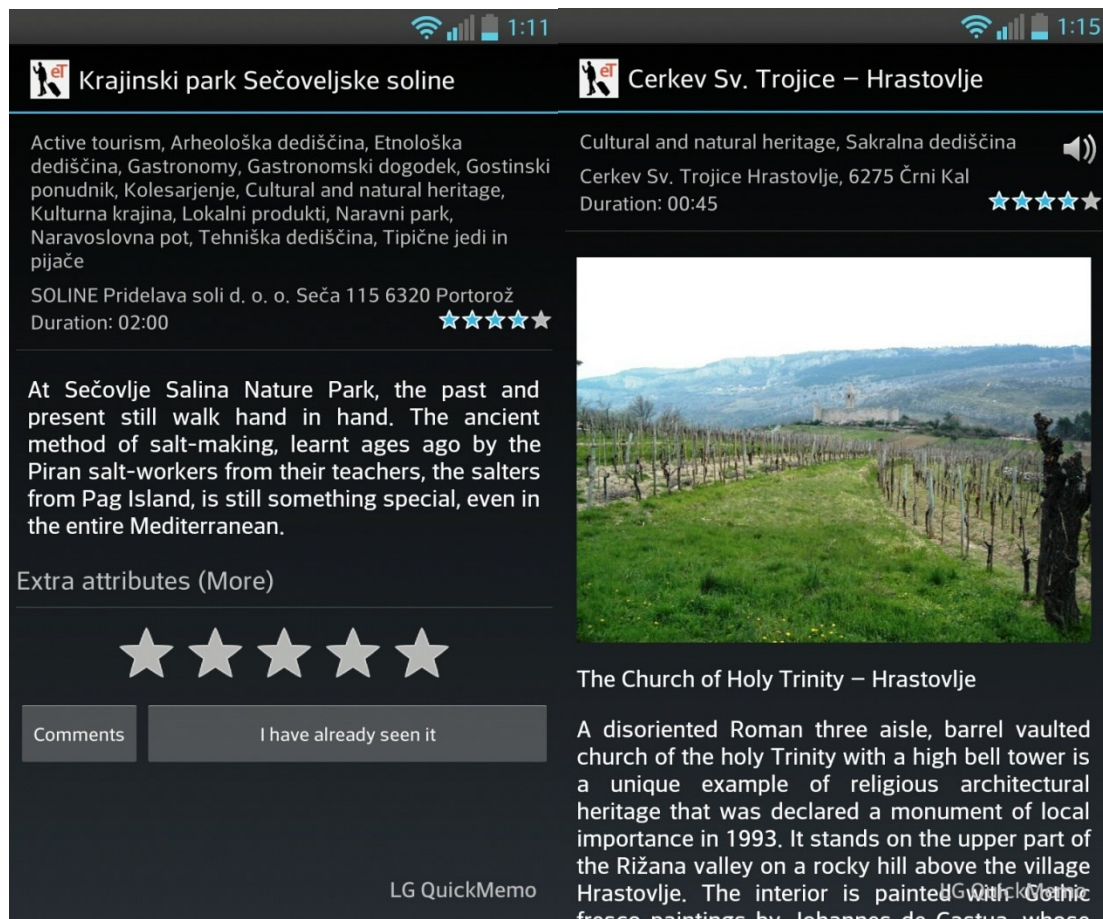
Figure 7: Basic informations   Figure 8: Photo and description

Conclusions

The success of the mobile application e-Turist depends on the usefulness for tourists and the wider public. Today the main sources of tourist information for individuals and small groups are represented in publications and are available on the Internet. Both media cannot be compared to mobile application e-Turist, which in fact contains comparable information, but serving tourist in a custom-like mode serving tourist (in the right place and at the right time). Fast spreading use of smartphones, in some countries already exceeding 50% of the residential population (Alexander 2012), shows that on the online market more than 50 billion applications downloads were recorded (MobileStatistics, Google 2012). It is clear that the access to information is increasingly popular. The key factor of popularity is a friendly user interface.

e-Tourist contains only features which are essential for the application and is focusing primarily on intuitiveness and speed. The application will be available online (Google Play, App Store, Windows Phone Marketplace, BlackBerry App World); the promotion will take place in tourist information centers in the region Heart of Slovenia ("Srce Slovenije") and in the municipalities of Slovene Istria and in several public media.

Usefulness of the mobile applications e-Turist will grow according to the distribution of the application on tourist`s smartphones. Inclusion of several tourist places of interest brings the possibility to recommend for a visit selected and into the application inserted places of interest. This would mean that with the increase of the number of users application will benefit on plurality of information and will therewith be a benefit for all tourism stakeholders.

Requirements for the expansion of e-Turist outside the region Heart of Slovenia and Istria will be provided - seeking overall design and openness to new contents. Tourist experts working in information centers, who will be entering selected tourist attractions, will use the carefully prepared guideline to enter data on tourist attractions. In addition, the authors of the application will increase the usability of the application by providing experts with anonymous data about the behavior of visitors and their interests (which will be the hidden part of the mobile application).

The use of application in Slovenia will be promoted on the websites of project partners and of tourist information centers in both regions. Finally, we will actively seek to connect with Slovenian tourist cities and destinations that are already working to digitize tourist facilities (eg, the project mTurist which already has a touristic content, but does not have the right mobile application).

Tourism represents a powerful economic development potential, which offers opportunities for many new jobs, enables the shift from primary and secondary to the tertiary sector. Cultural and natural heritage are placed in a profitable use. To effectively achieve these goals a high quality tourism offering is essential. The discussed application strengthens tourism awareness and knowledge on both side: on the side of the suppliers and of the tourist. This is finally a necessary prerequisite for the sustainable competitiveness of tourism. The application e-Turist is a supplement to the Slovenian tourism existing potentials and is with its high-tech solution a direct contributor to some of these of the above mentioned goals.

References

Alexander, A. (2012). Smartphone usage statistics 2012, http://ansonalex.com/infographics/smartphone-usage-statistics-2012-infographic/

Amebis, Institut Jožef Stefan: Govorec, http://govorec.amebis.si/

Bauer, M., Šalehar, M. (2006). Najdi svoje mesto - Find your city.

Bit Planota: Podeželski elektronski vodič - Rural electronic guide, http://www.fundacija-bitplanota.si/p1-projekti/pev.html

DFKI, Modular Architecture for Research on speech sYnthesis (MARY), http://mary.dfki.de/

Dines, S. (2010). San Francisco Guide – mTrip: Not quite ready for prime time, trying to do too much? Or both?

e-Turist, http://www.e-turist.si

Google (2012). Google I/O 2012 day 1 presentation

IDC. (2012). Android expected to reach its peak this year as mobile phone shipments slow, according to IDC.

Knavs, M. (2007). Avdio sprehod po Ljubljani, http://www.audiowalk-ljubljana.com/

Krušič, M., Skoberne, P., Zupan, G., Gosar, A., Jeršič, M., Mikuž, J., Jeklic, S., Kaufman, M., Hafner, A., Bitenc, P., Knific, T. (1996). Slovenija: Tourist guide, Mladinska knjiga, Ljubljana.

MobileStatisics, http://www.mobilestatistics.com/mobile-statistics/

mTrip, http://www.mtrip.com/

mTurist, http://www.mturist.si/

Nakashima, H., Aghajan, H., Augusto, J. C. (2009). Handbook of ambient intelligence and smart environments.

Netflix, Netflix prize, http://www.netflixprize.com/

PhoneGap, http://phonegap.com/

UNWTO, http://www.unwto.org

Zelkha, E., Epstein, B. (1998). From devices to ambient intelligence, Digital Living Room Conference.

Zgodovinski arhiv Ljubljana: ZgodovinaLJ – Prikaz zgodovine ljubljanskih trgov in hiš, http://www.layar.com/layers/zgodovinaljubljane/