The Impact of Multimedia Geographic Information System in Tourism

F. B. Unel, I. B. Gundogdu, and S. Yalpir

Abstract—**Geographic Information System, in which a lot of information is disciplined, is a technique that makes life easier. It is called Multimedia Geographic Information System (MMGIS) due to the association with geographic information of multimedia data such as text, audio, photo and video. The system which appeal both to the eye and to the ear yields cultural, scientific and popular benefits on the subject. In the era of mobile communications, multimedia information system, provided from the internet, will attract more attention from tourists, and it will be used easily.**

The tourism sector which has important cultural, economic and social aspects should be addressed at large. Promotion of countries and regions needs to be handled properly. The promotion may be best realized through the internet broadcasting and mobile phones. The system is expected to contribute to tourism sector by providing access to visual information easily, quickly, and in a quality way through mobile technology. In this context, attempts have been made to create MMGIS by handling Mevlana Mausoleum and the environment in Konya as a sample application.

Index Terms—**Tourism information system, multimedia geographic information systems (MMGIS), visualization, map, multimedia and mobil phone.**

I. INTRODUCTION

Information is a phenomenon that human beings need and is accessed any time in an easy way. Analysis, the right decision-making and printing out the results are also possible while easy and fast access to information is possible with the rapidly developing technology. However, an information system is needed in order to do them. A Geographic Information System which is associated with map and in which any kind of information may be included will make he users' lives easier by providing access to all kinds of data via the internet on mobile devices. Presentation of the information on this point is important.

Geographic Information System (GIS) is an information system by which graphic and non-graphic data are obtained with spatial-based operations, stored, analyzed and presented to the user in an integrated manner [1]. Rather than storing data on a computer, GIS is an information system which is designed in order to analyse these data and increase the right decision-making. According to Yomralıoğlu, T. 2002, there are five basic components of

GIS. These are hardware, software, data, people and methods which are factors that help in establishing an information system. Hardware is equipment connected to the computer and the computer. Software has software programs such as ArcGIS, MapInfo and NetCAD supported by GIS. Data are maps, attributes and multimedia data. People are builders of the system and its users. Methods are the laws, regulations and other official documents which are written for installing, updating and processing of GIS.

Multimedia is the presentation of different media elements like text, audio, image and video images on the computer by unifying them in harmony. Multimedia Geographic Information System consists of integration of GIS with multimedia, and it is the presentation of GIS data in multi media [2]. When multimedia data are combined with map, more technical and a coloured illustration emerges. Also there is an educational feature of multimedia. Because it is in different formats which are at the forefront of visualisation, the presented information easily occupies a place in the memory of people.

Nowadays, a new generation would like to see the information in a richer way because of the technology they use. MMGIS both achieves it in the presentation of knowledge and transmit it to the subject with a technical accuracy.

Multimedia which is very fast, cheap, accessible from anywhere in an unlimited way has become a giant industry in commercial, governmental and educational fields [3]. People easily book and shop through the internet. In addition, they participate in tours by deciding where to sightsee.

There are many areas in which GIS is used, for example Urban Information System, Cadastre Information System, Forest Information System, Soil Information System, Water Information System, Campus Information System and Tourism Information System. These Information Systems which are basically the same have applications in the World and Turkey, but with different themes. Tourism Information System is a system which is most needed for multimedia information among these systems because it is based on seeing touristic places. Such studies as Tourism Information System; 3D modeling [4]–[6], web-based [7]–[13], place selection [14]–[18], design and data collection [19]–[22], internet applications in GIS [23]–[24], multimedia GIS in internet [25]–[27] and the mobile information system [28]–[31] are encountered in literature.

Tourism can be defined as getting to know the World, seeing different places and tasting different flavors. When a tourist is fulfilling these activities, s/he spends money. Therefore, tourism sector is thought as a factory without a chimney. The role of tourism in the development of national

economies, international trade, and the social and cultural life makes it necessary to give high importance to tourism. So, studies and investments in this area has been accelerated [32].

II. MATERIAL VE METHOD

A. Multimedia Elements in GIS

Collections of geo-referenced images and videos (as opposed to individual pieces of image or video data) have proven very useful in multimedia research. Such collections are becoming increasingly popular and accessible thanks to photo-sharing services such as Flickr and Google PicasaWeb that have realized the need to tap into geographical information for search, sharing, and visualization of multimedia data [33]. Also researchers found that multimedia elements effectively supported the capture and communication of data, information, and knowledge presented in qualitative forms [34].

Multimedia are defined as photographs, video, text, or audio material that are used to express or communicate a viewpoint [34]. In addition, multimedia elements may be included into animation, panoramic image and graphic data which are prepared in Microsoft Office Excel. When multimedia is considered as presentation in different environments with different data formats, in future different elements may be also joined with multimedia (Fig. 1).
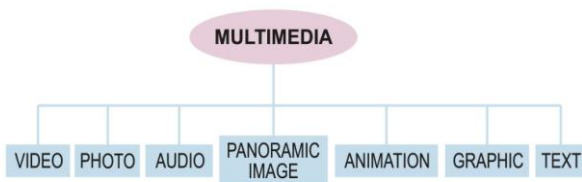

Fig. 1. Multimedia elements.

TABLE I: MULTIMEDIA DATA OF MEVLANA MAUSOLEUM

Multimedia data	Mevlana Mausoleum
Map	Cadastre map which showed Mevlana Mausoleum and its vicinity was used.
Text	Text information was given about the history of Mevlana Mausoleum.
Photo	Photograph of Mevlana Mausoleum from the rose garden was taken with a touristic purpose.
Video	The interior of Mevlana Mausoleum was shot with a camera.
Audio	The voice recording was made of a part of Mevlana's masnavi.
Graphic	The number of visitors is arranged per month.
Animation	A presentation from the introduction of Mevlana Cultural Center where Seb-i Arus Ceremony was held was attached.

B. Multimedia Data Of Mevlana Mausoleum

In our study, knowledge which will be presented by adding multimedia data to Tourism Information System is delivered to the user in different environments. Mevlana Mausoleum which is selected as the study area is quite important in terms of tourism.

The content of the multimedia data belonging to Mevlana Mausoleum is seen in Table I.

III. TOURISM

Tourism varies according to the purpose of the people, their social status, their ages, their jobs or health status (Fig. 2).
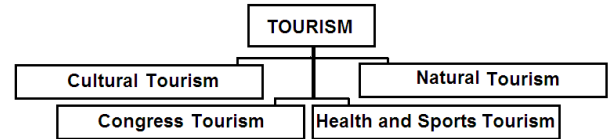

Fig. 2. Kind of tourism.

If this kind of tourism is is to be exemplified for Konya;

- A lot of works such as Alaeddin Mosque, İnce Minare Museum, and Mevlana Mausoleum exist as examples to cultural tourism.
- A lot of natural beauties such as Beyşehir Lake, Tuz Lake, Meke Salts ve Tınaztepe Cave exist as examples to natural tourism
- A lot of sporting activities such as rafting, off-road, paintball and healing thermal waters exist as examples to health and sports tourism.
- In addition, congresses which are made in science, education and other areas are examples of congress tourism in Konya.

Fig. 3. From MMGIS to mobile phone.

This situation has led to different branches of tourism and created ways of promotion. No matter which branch it is, tourism activity takes place in three stages:

1) Transport (road, air, rail and sea), transportation time, weather, essential schedules and sketches of road (googlemaps, Turkish Airlines, travel companies, meteorology etc. via links).
2) People who will benefit from the place and event according to the certain kind of tourism are given information about questions that come to their minds. Location information, records related to activities, ticket

purchases, reservations etc. informations and warnings as well as historical and cultural informations about the venue.

3) The presentation of information which is mostly mobile in needed veneus and stages of activities. For example, if it is within congress tourism, congress plan and a detailed description of the participants are presented. If it is a venue related to cultural tourism, a MMGIS work can be done in which a diffirent format of each veneu is presented. According to Fig. 3, in the process of the data reaching from MMGIS to mobile phone, only a MMGIS formation point was conducted in this study.

IV. APPLICATION

A. The Study Area

Mevlana Mausoleum is handled as the study area (Fig. 4). Mevlana Museum which has a significant potential in terms of history, cultural and belief tourism in Konya is one of the World's most important museums [35]. Mevlana Mausoleum is visited by domestic and foreign tourists every year. The year of 2007 was accepted and celebrated by UNESCO as Mevlana Year. Mevlana Celaleddin Rumi whose date of death was on December 17, 1273, means "wedding night", is commemorated with Seb-i Arus Ceneromy every year. Again this year, which is 740th reunion night, Seb-i Arus Cereromy is conducted by whirling dervishes.
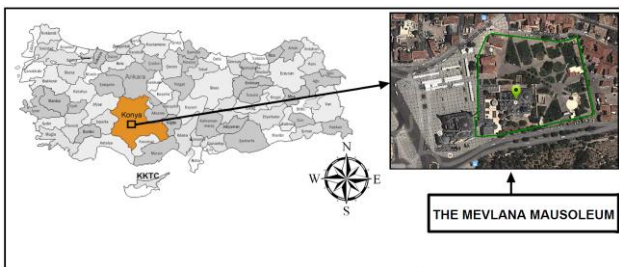

Fig. 4. The study area.

B. System Design

The system should be designed before a GIS is made. Fig. 5 shows the design steps. The answers to the questions- "which data must be collected?" which format and accuracy will be used to obtain data?", "which data will be associated with each other?" and "how will the presentation of data be realized?" will be given in conjunction with design of the system. These preparations help to remove potential problems which will arise in the future. At the same time, the preparations will give hints as regards where to start.

After data in the application are collected, data editing can be performed. These editings are procedures such as extracting unnecessary information, finding missing data, standardization of data and conversion of presentation format of multimedia data. Of the multimedia data, the photo was arranged in jpeg (*.jpg), the video in avi (*.avi), the audio in Windows Media Audio (*.wma), the graph in Microsoft Office Excel (*.xls) and the text in Microsoft Office Word (*.doc).

The relationship between attribute-multimedia data and map is fulfilled with a common ID (identification) number.

Attribute and multimedia data are related with ID numbers which are determined among themselves.

C. Mevlana Mausoleum in MMGIS

In the study, NetCAD 5.1 GIS and ArcGIS 9.3 programs were used. Geographic data elements which are handled as *polygon* island/parcel, building are shown on the cadastre map in NetCAD.

The map which is arranged in NetCAD is transfered to ArcGIS enviroment. Attribute data which are prepared in Microsoft Office Excel are related with the map. File names and file extensions of multimedia data were written within file of the attribute data. A photograph of Mevlana Mausoleum and the informatin in which multimedia data are present are shown in Fig. 6.
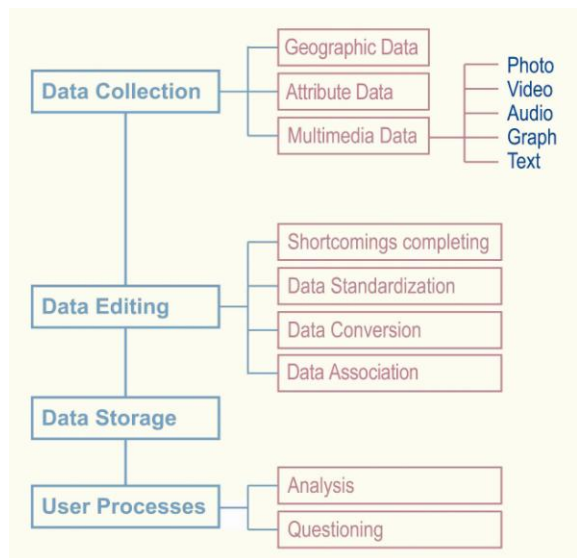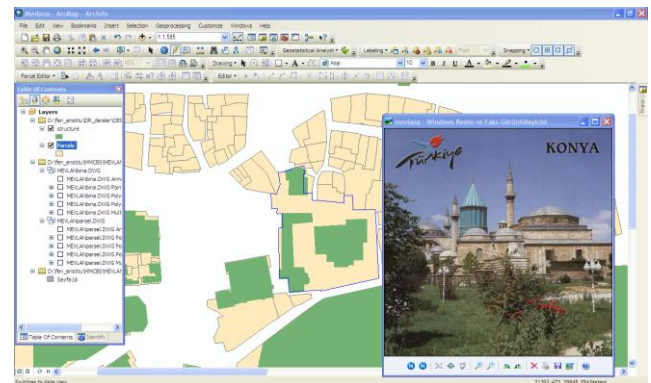

Fig. 5. System design.

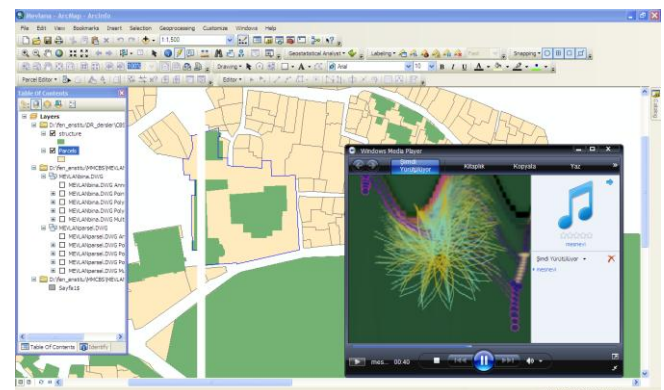Fig. 6. A view of Mevlana Mausoleum from the rose garden in ArcGIS.

Fig. 7. A part of Mevlana's masnavi in ArcGIS.

Photo taken from the rose garden of Mevlana Mausoleum was saved as mevlana.jpg. and mevlanamuzesi.mpg video which was shot with a camera in the interior of Mevlana Mausoleum. The audio about a part of Mevlana's masnavi was saved as mesnevi.m4a. They are opened in ArcGIS (Fig. 7).

The number of visitors which was designed per month is given as graphic in Microsoft Office Excel. The file is saved as mevlanavisitor.xls and opened in ArcGIS (Fig. 8).
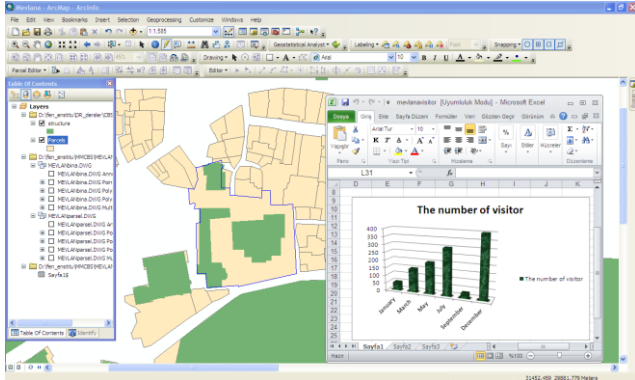

Fig. 8. Graph of the number of visitors in ArcGIS.

A text giving information about the history of Mevlana Mausoleum was written in Microsoft Office Word, and the file called mevlanaturbesi.doc was opened in ArcGIS (Fig. 9).
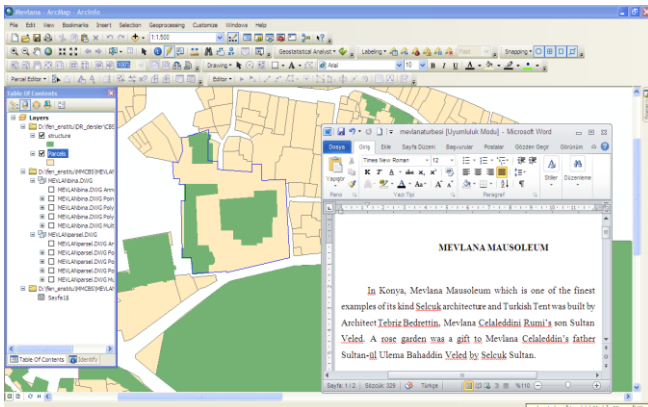

Fig. 9. About the history of Mevlana Mausoleum in ArcGIS.

V. CONCLUSION

All kinds of information in different environments are needed in information systems which are created with a definite theme. For example, map information, a photo or video images are needed. Moreover, istatistical data may be needed to be converted into graphic data. Also the accuracy, reliability and update of these data are important. Otherwise, it may be difficult to make correct decisions.

Multimedia Geographic Information System of Mevlana Mausoleum was produced in this application. Through MMGIS, domestic and foreign tourists are able to access to all kinds of information multimedia-assisted. Also mobile phones will accelerate access to multimedia data. Our age is the age of communication.

As well as map and attribute data, multimedia data are also added to Geographic Information Systems. Multimedia data incorporate variation, visualization and reality into GIS.

The desire to obtain more information is aroused by demanding user's attention. It also gains integrity to GIS.

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