Digitalizing of Sarajevo Mosques

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Abstract – *Over the centuries, various historians, enthusiasts and academician made records of mosques in Sarajevo. However, all of these records were plain and would not give us details that we need in order to understand history of building and destroying of mosques. This papers research data collected over the centuries when recording history of the mosques in Sarajevo and current efforts by Islamic Community. Furthermore, paper proposes new set of data to be collected and gives detailed list of all the mosques in Sarajevo region. Data collected with such level of details, allows us to better understand history of these building and to tell story about them in a new way. Finally, digitalization of such data, allows modification of the presentation form, easy update of data and endless multimedia usage.*

Keywords – *mosques, Islam, geocoding, database, Google Earth, Google Maps, Sarajevo, history.*

1. INTRODUCTION

Over the centuries, various historians, enthusiasts and academician made record of diverse data about mosques in Sarajevo. However, all of these records were plain and would not give us details that we need in order to understand history for all of these buildings. As of 2009 when this research started nobody had detailed list of all the mosques and all relevant data about them on single place. Various resources were available, some organized most spontaneous, but overall, there was no single place to find for all about these buildings. This inspired this research that aimed to collect and develop a detailed list of all the mosques in Sarajevo region.

2. HISTORIC RECORDS

Over the centuries there are very few detailed historic records about Sarajevo mosques. For example, Evlija Ćelebija made record about Sarajevo mosques saying only that city has 177 mosques. Evlija only mentions some of the most important mosques and few interesting stories [1]. Mula Mustafa Bašeskija mentions only sporadically some of the Sarajevo mosques [2]. More detailed references and lists were given by modern authors. Hamdija Kreševljaković mentions most of the Sarajevo mosques, but these references are related to other stories, often not specifically about mosques itself. Finally, Mustafa Mujezinović gives very detailed list of every single mosque in the city with first map of location of these buildings [3]. Slobodan Kudra in 2006 wrote a book about Sarajevo mosques, giving more information about existing and destroyed mosques, together with detailed map [7]. Unfortunately, due to rapid change in building, all of these records were outdated a few months after they were published.

3. OTHER MODERN RECORDS

Other modern records about Sarajevo mosques were given by Center for Islamic Architecture established in 1994 by Islamic Community in BIH [4]. Center took on responsibility to document and categorizes all Islamic buildings – primarily mosques. Database that Center created was managed by hand with no structured data storing. Data about each mosque were given in form of the building ID card that contained following data:

Figure 1: CIA - card for each building

Registration number, Total registration number, Muftijstvo, Medžlis, City / Location – Name of the city or location (if village), Official name (full name of the object), Local name (usually short name or nick name), Build (Date), Repairs (year of major repair, or recent one), Destroyed (when it was destroyed), Rebuilt (If destroyed, when it was rebuilt), Vafik (Built by), Picture, Drawing (original drawing of the building if they exist), Size of the object, Destroyed in 1992-1995, National monument (if location in National Monument), Description (Short description of the building).

Such data represented first true database of mosques. However, data was not structured or digitalized and existed in individual cards for each building. Moreover, there was no precise system for data entries, which prevented easy comparison. This prevented any researcher to run statistics and do data mining.

All of these data are not structured. Some fields collected are sometimes yes/no and sometimes with description. For example, 1992-1995 field sometimes says "yes" and sometimes put date 1992, and sometimes put multiple dates. Combination of fields *Destroyed*, *Rebuilt* and *Destroyed in 1992-1995* does not give structured way of presenting if the building was built and destroyed before the war, in the war or any other combination. We need here a better way to track information. This is particularly important to some buildings that were destroyed and rebuilt two or more times. Record data Medžlis and Muftijstvo represent location on the building based on administrative division by Islamic Community.

Overall, this model has two main flows. First one is that data are not structured and as such cannot be used to get any synthetic information. Solution is to structure data and digitalizes them fully. Second problem is that data collected will not give us full picture of the object history and information. Solution is that we need to redefine and introduce new data fields.

Another important source of data about mosques is given by web site run by enthusiast Denis Vrabac in the form of the web site http://www.dzamije.info [5]. This web site allows users to search for mosques and get basic info: Country, Municipality, City/Location, Name of the mosque, picture and relative location on the map of BIH. Importance of this web site is the first effort to digitalize data about mosques, including pictures and simple map.

Figure 2: Screen shot of the dzamije.info web site

Further work is done by another enthusiast; Mr. Senad Čoko that took pictures of the mosques and geocode them to the precise location using Google Maps [6]. This work is very useful, since it is first time to have precise location of the building on the real satellite map. However, besides picture and location no other data are entered.

At the end it is important to mention 3D models of the mosques that some enthusiasts are making. Following figure shows 3D model of Istiklal (locally Indonesian mosque built 2001).

Figure 3: Screen shot of 3D Istiklal mosque in Google Earth

4. NEW SET OF DATA AND NEW SYSTEM

When this research is started, one of the first tasks was to develop more precise list of data to be documented when recording information about mosques. Such data set, needs to include all relevant information and allow us to get detailed understanding of the history of the mosque. In other words, data set included all previous data types as well as many new once. Since this database is modeled for Center for Islamic Architecture, most of the data types were preserved, however, new once are added as well.

Each record has following data: Registration number, Total registration number, Muftijstvo, Medžlis, Official name, Local name, Type of the object (mosque, tekija, administration building,

graveyards, vakufs, other), Type of minaret (stone, wood, reinforced concrete, no minaret), Height of minaret, Type of mosque (dome or roof), National monument (Yes/No), Year when built, Size of the floor, Prayers (multiple selection), Description, Address, City, Municipality, Name of Vakif, Built by Sultan (Yes/No), Name of Mutevelija, Name of Imam, Pictures of the mosque, Latitude, Longitude, Web site. In addition to this data, separate form collects historic data about mosque construction, destruction and other similar events that includes: Name of the event, Date of event, Type (damaged, destroyed, removed, renovated, rebuilt again, regular maintenance), and Description of the event.

Once this new set of data is defined, new system is developed. System is developed using MS Access 2007 database. Choice of this database is used for its wide and simple use. Export of excel file is easy and further data migration and transformation can be done easily. Once all data has been entered, pictures are added to each record. Finally, geocoding location (latitude and longitude) values are entered. When performing this task, I have found out that 80% of all mosques have already been geocoded, primarily by Senad Čoko and in rare instances by other Internet users. Geocoded locations were easily got from Google Earth when zooming to approximate location of the mosque. Since mosque minaret left a shadow on the ground, it was easy to identify mosque with roof in dense city areas. Doom mosque were even easier to find on satellite maps. Database allowed for the first time to have systematic view of all the mosques. As of beginning of 2010, database has 233 mosques in Sarajevo Mufitjstvo.

5. STORY TELLING

Database gives digital version of each building ID card as presented on the following figure.
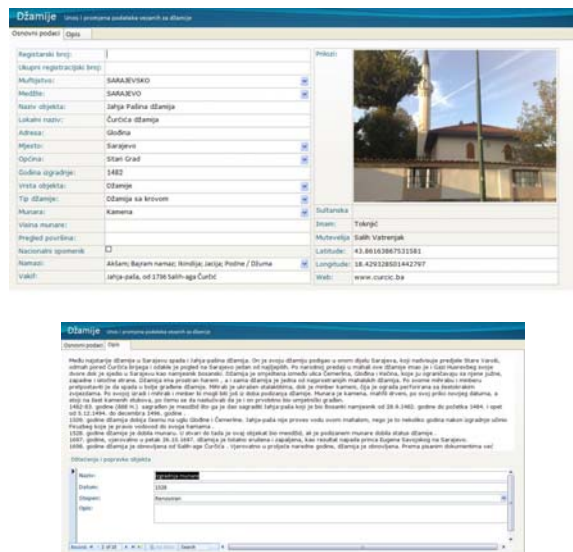

Figure 4: Database entry

So for example one of Sarajevo mosques, Jahja Paša mosque (locally called Čurčića mosque) we have following historic records that are entered in database and can be systematically analyzed. Following figure shows tabular view of the events sorted by year.

Figure 5: Historic records about mosque

Once data is digitalized, it provides us with ability to perform various statistics and develop multimedia files for story-telling. In terms of statistics, we can learn that the biggest number of mosques built in a single year in Sarajevo was during 1602 (12) and 1528 (10), in spite of predominant thinking that recent years are marked with the biggest increase in mosque construction. Here we have to have in mind number of Muslims in Sarajevo at that time in order to ponder analysis at the present time.

Moreover, we can develop all kinds of graphs and analysis with digitalized data that will let us tell various stories. Following graphs represents cumulative number of mosques over the history (destroyed mosques are taken out of the count).
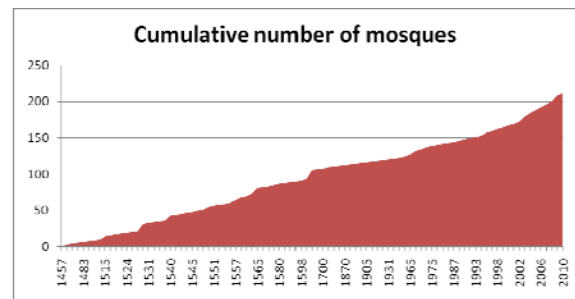

Figure 6. Cumulative number of mosques

The following figure represents number of mosques per municipality.
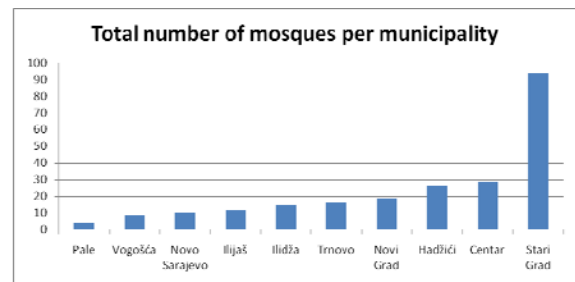

Figure 7: Total number of mosques per municipality

We can also calculate that 43 mosques are with wooden minaret, 37 with stone minaret (old type),

85 with modern reinforced concrete minaret and others without minaret at all. Using Google Earth, we can make presentation of location of the mosques on the satellite map. Since each building is geocoded, we can make nice presentations. The following picture is a screen shot from Google Earth that shows locations of all mosques in Sarajevo region.
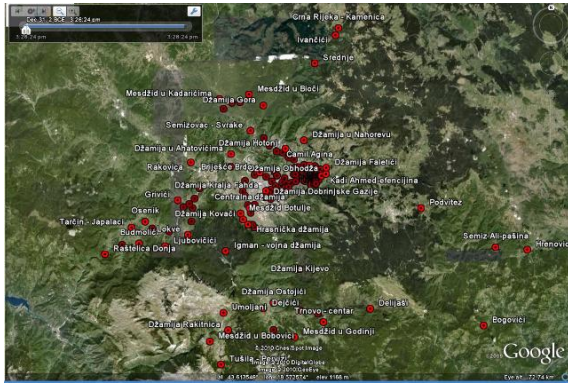

Figure 8: Google Earth with mosques in Sarajevo region

Finally, using the same technology Google Earth, we can make video animation of building and destroying mosques in Sarajevo region. This video animation is available off the project web site http://www.dzamije.ba and on YouTube.

6. CONCLUSION

This research gave a brief overview of information about Sarajevo mosques and type of data collected over the history. As technology for preservation and recording of historic events is becoming more sophisticated so our understanding of the history behind these building is growing. We have seen that research by one person can be continued by others more easily once data is digitalizes. Database developed can be update by others and data from database exported for other research purposes. Furthermore, this database system proposes new data types that need to be documented in the future about each mosque. Finally, it gives examples of data usage and story-telling one can do with this data, from simple graphs, chart to sophisticated maps and video animations to 3D projections.

ACKNOWLEDGEMENT

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