

Spatial Preferences Decision Tool For Historical Building Restoration

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Abstract - Historical buildings in Safranbolu is one of the most popular historical places in Turkey. These historical buildings determined by UNESCO that it should be preserved and transferred to future generations as a world heritage site. The purpose of this paper is to develop spatial preferences decision tool for historical building restoration. This tool will contribute to administrations of historical buildings to perform evaluation and find most deserve building for the restoration based on several factors. Evaluation factors data were collected through GIS software. Python programming language were used to develop the code of the tools. Multi criteria decision analysis MCDA used to evaluate preference. Final output will be the percent of house damage. The final tool will be among ArcGIS-ArcToolbox. The tool systematically assesses historical buildings for restoration. The tool demonstrate that it is able to accurately and rapidly estimate the preferences of historical buildings.

Keywords - Multi criteria decision analysis, decision support system, Historical buildings restoration, damage rate.

I. INTRODUCTION

Throughout the history of turkey, several civilizations inherited from Ottoman Empire stayed untill curen data. Turkish architecture is a representatio of richness of Turkish civilization history. Historical buildings in Safranbolu are one of most unique remained archaeological sites. The Turkish Houses are unique due to it hava multi-storey, different roof style and construction system of wooden roof.

These historical buildings determined by United Nations Educational, Scientific and Cultural Organization UNESCO. UNESCO recommend that it should be conserved and transmitted to upcoming generations as a world heritage site. However, in addition to owning these riches, it is necessary to systematicly and comprehensively record of surviving historical textures for future generations. Additionally, it is prerequisite to adhering the original form. For this sreason, relevant administrations have limited budget for historical buildings restoration. The main challenge is that restoration operations have limited budget. Developing preferences decision tool is urgent need.

The objective of this paper is to develop spatial preferences decision tool for historical building restoration. This tool will make it easier to find the most deserve buildings for the limited budget of administrations by autumatically calculating the percentage of deserve buildings for restorations based on their construction conditions.

II. METHODOLOGY

This methodology section explaining handling and managing spatial data. Processes involved in this research are presented in Figure 1.

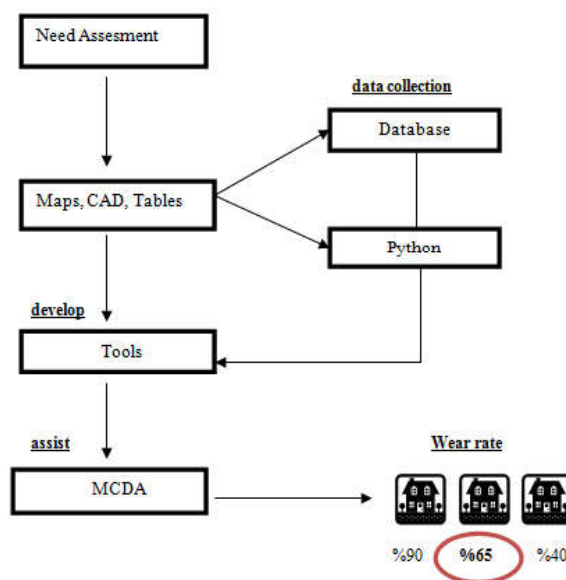


Figure 1 Research Methodology

ArcGIS toolbox using Pyhton language from the database of Safranbolu buildings used to develop the tool. The tool exhibited in Figure 2.

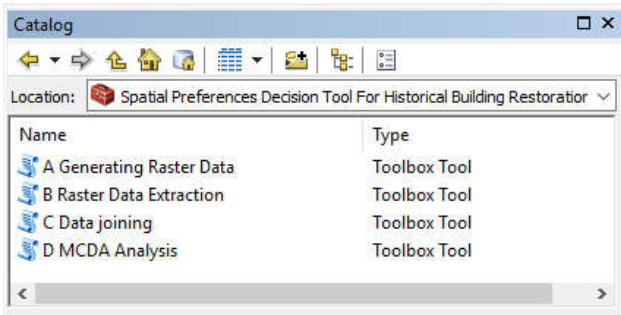


Figure 2 Spatial preferences decision tool for historical building restoration

Based on the consultation of local experts, primary factors were adopted. These factors are based on the construction stutes of buildings (Figure 3) such as walls of the buildings, number of floors, number of balcony and distance from transportation . houses close to tourist areas has been taken into consideration. Several historical buildings in Safranbolu in Eskişehir examined and location collected by using GPS and added in geodatabase. Based on evaluation parameters, the infrastructure of the selected houses were examined and the damage rates of the buildings were calculated and presented in Figure 4. damage rates based on MCDA.



Figure 3 historical house status

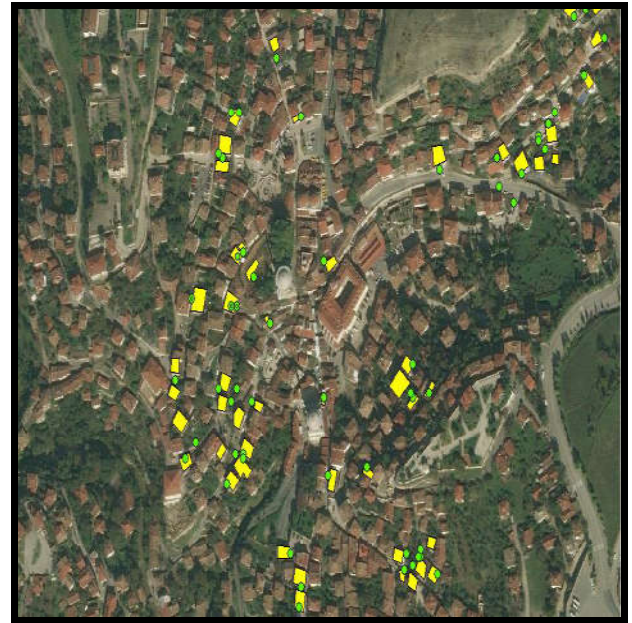


Figure 4 evaluated historical house

CONCLUSION

Safranbolu historical buildings determined by UNESCO that it should be preserved and transferred to future generations as a world heritage site. In the system, historical buildings attribute information and spatial information about objects in different layers have been transferred to the system. The final tool will be among ArcGIS-ArcToolbox. The tool systematically assesses historical buildings for restoration. The tool demonstrate that it is able to accurately and rapidly estimate the preferences of historical buildings.

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