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Multi-Criteria Decision Making in the Evaluation of the Thematic Museums' Websites

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Abstract The scope of this paper is on presenting an evaluation model for evaluating and comparing the websites of thematic museums. The particular evaluation model has been used for evaluating the websites of thematic museums on olives and olive oil using a multi-criteria decision making theory called Analytic Hierarchy Process (AHP).

Keywords Websites of thematic museums · Multi-criteria decision making
Software evaluation · Inspection method · Museums of olives and olive oil
Cultural tourism

1 Introduction

Museums have traditionally been among the most popular tourists' attractions. Lately, cultural stakeholders are using the websites as a powerful tool for attracting tourist audiences. The usability and functionality of a museum website can only be confirmed through an evaluation experiment. The scope of this paper is on presenting an evaluation model for evaluating and comparing the websites of thematic museums.

The particular evaluation model has been used for evaluating the websites of thematic museums on olives and olive oil using an inspection method. Inspection methods are mainly conducted by experts that comment on specific evaluation criteria. The criteria used in the described evaluation experiment have been selected after a review of the criteria of the inspection models used for evaluating museum website. Furthermore, the proposed method use an elegant way of combining these

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criteria using a multi-criteria decision making theory called Analytic Hierarchy Process (AHP). AHP uses pair-wise comparisons between criteria and alternative museum websites. This process results in calculating a final value for each museum website and form a final classification of the websites of the olives and olive oil museums in Greece. The comparative study of the websites of the thematic museums of olives and olive oil in Greece can provide useful conclusions for software engineers and cultural stakeholders, in general.

2 Evaluation Experiment

AHP (Saaty, 1980) is one of the most popular MCDM theories. The choice of AHP amongst other MCDM theories is easily made as it presents a formal way of quantifying the qualitative criteria of the alternatives and in this way removes the subjectivity of the result (Tiwari, 2006). The basic steps of the method are:

1. **Developing a goal hierarchy**
 - (a) **Forming the overall goal:** The overall goal is to evaluate museum websites
 - (b) **Forming the set of criteria:** The criteria that are used are Usability(uc1: Currency/Clarity/Text comprehension, uc2: Consistency, uc3: Accessibility, uc4: Quality Content, uc5: User interface and metaphors, uc6: Overall presentation-Design, uc7: Structure/Navigation/Orientation, uc8: Interactivity & Feedback, uc9: Multimedia Usability, uc10: Learnability, uc11:Efficiency), Functionality(fc1: Multilingualism,fc2: Multimedia features, fc3: Services-Mechanisms, fc4: Web communities, fc5: Maintainability—Compliance—Reliability, fc6: Adaptivity/adaptability, fc7: Technical issues)
 - (c) **Finding the websites to be evaluated:** The websites that are evaluated are opt-1: Cyclades Olive Museum- Chelmis Olive Mill, opt-2: Olive Tree Museum of Vouves, opt-3: Olive Oil Museum of Thassos, opt-4: Olive & Oil Museum of Pelion, opt-5:Eggares Olive Press.
 - (d) **Forming the hierarchical structure:** In this step the hierarchical structure is formed so that criteria and the alternatives could be combined to pairs.
2. **Setting up a pair-wise comparison matrix of criteria:** In this step a comparison is implemented among the criteria of the same level. As, in this experiment, an inspection method is used, 4 human experts were used to make the pair-wise comparisons of criteria. The group of human expert was formed by 2 experts of software engineering and 2 archaeologists, so that different aspects of view could be taken into account.
3. **Calculating weights of criteria:** After making pair-wise comparisons, estimations are made that result in the final set of weights of the criteria.

4. **Ranking the relative importance between websites:** In this step, the relative importance between each pair of websites in terms of a criterion will be assessed in order to calculate a value for each one of the websites evaluated.
5. **Calculating AHP values:** Finally, an AHP value is calculated for each website and these values are used for ranking the websites. The calculation of the AHP values revealed that the best alternative was opt-2, which was rather expected as it is a complete webpage and, additionally, has VR tour of the museum. However, the distance from the second is not big. Indeed, the AHP value of opt-5 is also very high, which shows the good quality of the website. A medium website was considered opt-1 and the other two had very low AHP values which show that their quality should be improved either by enriching their content and/or improving their design.

3 Conclusion

AHP has not been used before in museum websites' evaluation experiments despite the fact that many experiments have been implemented for evaluating or comparing museum Websites. So taking into account the suitability of AHP for evaluating websites and the lack of such experiments for museums' websites, we have used AHP for the implementation of the evaluation experiment.

AHP provides a formal way of quantifying the qualitative criteria of the museum websites and, therefore, is considered ideal for being combined with an inspection method of evaluation. Furthermore, the method's ability in making decisions by making a pair-wise comparison of qualitative and quantitative criteria and also its ability to model expert opinion are other reasons of its selection against other alternatives for evaluating museum websites. Indeed, AHP not only gets the most important museum website but also ranks the websites that are evaluated by conducting pair-wise comparisons for all estimated alternatives. Therefore, AHP seems very effective for the evaluation of several websites of thematic museums and not just one.

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