UI Technologies for CAD Software Development: Evaluative Approach of Componentry Applications

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Abstract – Decision-making criteria for alternative choice of perspective concepts declaration of user interfaces (UI) for software development compute-aided design (CAD) have been proposed.

Keywords – user interface, UI, usability, CAD, Software.

I. INTRODUCTION

The user interface is one of the most volume and most time-consuming part of the design of any computer aided design system. Thanks to the convenience and well-thought interface greatly increases the designer’s efficiency and speed of the tasks development. The purpose of this research are: to define and to describe the criteria for peer review of the declaration of user interfaces to simplify the definition of preferred user interfaces programming technologies [1,2] for CAD software, determine the level of their readiness to use based on weighted criteria established for peer review.

II. CRITERIA OF ANALYSIS

Research focuses on define the list of criteria (Table 1) for peer review of the languages declaration. Criteria are grouped under the terms of the category. The weights of importance are set for categories and criteria and set their distribution of influence over the decision. When selecting a list of specialized programming languages and descriptions of the user interface software, there is a sense to divide them into two groups: 1) those that were widely used and supported by developers, and 2) those that have applied a narrow focus or obsolete development. Similar previous research [2].

Optimal approach to solving problems of choice of tools to design CAD software on level descriptions of user interfaces are to reach the four conditions (fig.1).

To determine the final figures should use the average geometric mean:

\[ z = \left( \prod_{i=1}^{n} x_i^n \right)^{1/n} = \exp \left( \frac{1}{n} \sum_{i=1}^{n} \ln x_i \right) \]  

(1)

Then, for categories of parameters based on Table 1:


(2)

Defining value in categories (with taking into account the percentages ratio) then will be:

\[ \bar{Q} = \frac{X^3 + V^3 + G^6 + T^4 + U}{n} \quad \bar{P} = \frac{L + B^4 + O^4 + N^4 + H}{n} \quad \bar{R} = \frac{D^2 + C^7 + M^5}{n} \quad \bar{Y} = \frac{A^7 + E^3 + I^7}{n} \]  

(3)

List of analysis criteria with weights ratio (%): 1) eXtendable elements (X)=25; 2) eFfects (F)=10; 3) Visual detailing (V)=10; 4) vector Graphics(G)=30; 5) self-Test(T)=20; 6) aUtoutine(U)=5; 7) Licence (L)=5; 8) availability (B)=20; 9) Server(S)=20; 10) ObjOrientedProgramLanguage (O)=35; 11) eNvironment(N)=20; 12) Deployment (D)=35; 13) Compatibility(C)=35; 14) Macro(M)=30; 15) Associate(A)=40; 16) Events(E)=15; 17) specification(I)=45;

So the arithmetic average weighted index of readiness for CAD software development integration of user interface markup language is:

\[ z = \sum_{j=1}^{17} a_j \cdot x_j / \sum_{j=1}^{n} a_j \]  

(4)

where \( a_j = [0.45, 0.17, 0.23, 0.15] \) - weighted ratio of category summary. Summary evaluation function:

\[ \bar{Z} = \bar{Q} \cdot 0.45 + \bar{P} \cdot 0.17 + \bar{R} \cdot 0.23 + \bar{Y} \cdot 0.15 \]  

(5)

Results of summary calculations of analysis criteria ratio presented on fig.1.

Fig. 1 Diagram of ratio in criteria categories evaluation of user interfaces

III. CONCLUSION

The review of features of modern programming languages for user interfaces software development made it possible to create a weight ratio in the group categories of factors for decision-making in alternative choice of programming technologies in the application of CAD software development.

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