

웹페이지를 위한 규모측정에 관한 연구

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An Empirical Study on the Measurement of Size for Web-Page

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ABSTRACT

Measurement is used to improve software process and to help calculating software quality. It makes software project to be control and help producing software. Measuring software scale becomes important target in software development. LOC is used to measure the size intentioned aspect and function point is used to measure the function intentioned aspect. This paper discusses measurement method using function point, which follows proposed rule, and degree of GUI (Graphical User Interface) accesses achieved by applying this measurement to web page. Applying proposed rules to web pages (specially that use much GUI such as shopping mall or auction site), there is advantage that calculate site changes on numerical value by measuring GUI degree when do site administration or update.

1. Introduction

Measuring software scale becomes important target in software development. LOC is used to measure the size intentioned aspect and function point is used to measure the function intentioned aspect. This paper discusses measurement method using function point, which follows proposed rule, and degree of GUI accesses achieved by applying this measurement to web page. Web environment is growing festinate by rapid growth of present Internet and development of web application.

Therefore, web page related works that designing, developing and maintaining becomes very important. Wish to apply function point scale measurement on web page in this paper and search GUI degree of relevant web page as a part of web-page scale measurement.

GUI embodies interface between computer and user through graphic. Nowadays, main operation system supports GUI compare to DOS interface of former days.

So, GUI has been getting emphasized on most application

programs. By proposing this idea of measuring GUI in Web page and using properly, we would like browser to make good use of computer with more convenience.

2. Literature Review

Allan Albrecht introduced the concept of function points to measure the functionality delivered by software in 1979. Function point is a measure of software size that uses logical functional terms business owners and users more readily understand. IFPUG (International Function Point Users Group) version and MarkII version are frequently used in software organizations. IFPUG version is a modified-version of the Albrecht's Function point. In the IFPUG version, the counting procedures of function point consist of the following seven steps. First, Determine the type of Function Point Count. Select the type of function point from the following three ones; (1) Development project function point count, (2) Enhancement project function point count and (3) Application function point

count. Second, identify the counting boundary.

Third, Count data function types. Data function types represent the functionality provided to the user to meet internal and external data requirements. Data function types are classified into the following two types: Internal Logical File (ILF) and External Interface File (EIF). Fourth, count transactional function types. Transactional function types represent the functionality provided to user for the processing of data by an application. They are defined as the following three types External Input (EI), External Output (EO) and External Inquiry (EQ). The defined of transactional functions are described as follows.

Fifth, determine the unadjusted function point count. As the result of third step and fourth step, the counts for each function type are classified according to complexity and then weighted. The total of all the function types is the unadjusted function point count. Sixth, determine the value adjustment factor. The value adjustment factor (VAF) indicates the general functionality provided to the user of the application. VAF is comprised of 14 general system characteristics that assess the general functionality of the application. $VAF = 0.65 + (total / 100)$. Seventh, Calculate the Final Adjusted Function Point Count.

$$FP = UFP * VAF.$$

3. Proposed rules

We propose the following five steps to apply measurement of size for function point analysis in web-application. It is based on IFPUG version. First, Determine the Transactional Function Types from Web page. They are defined as the following three types: External Input (EI), External Output (EO) and External Inquiry (EQ). The Transactional Function Types are described as Table1.

Table 1. Transactional Function Types in Web page.

Data Elements	EI	EO	EQ
Text Box	O		
Command Button	O		O
Radio Button	O		
Check Box	O		

List Box			O
Graphical Icon			O
Photographic Image			O
Message		O	

Second, determine the data function types from web page. Data function types are classified into the following two types: Internal Logical File (ILF) and External Interface File (EIF). Third, determine the unadjusted function points (UFP) from the result of first step and second step. Fourth, determine the value adjustment factor (VAF).

$VAF = 0.65 + (total / 100)$. Fifth, calculate the final adjusted function point count (FP). $FP = UFP * VAF$.

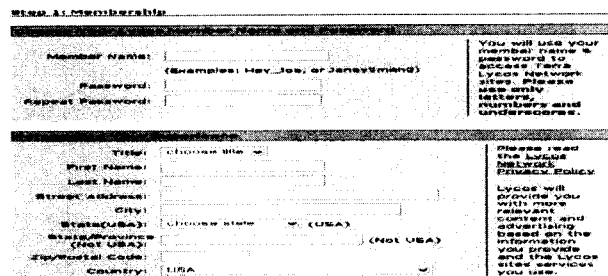


Figure 1. Registration screen of Lycos.com

Calculate number of data elements rules in screen of web page according to transactional function types of proposed rules. Calculated transactional function types of Figure1 according to first step of proposed rules. The result is shown in table2.

Table 2. Result of Transactional Function Type's Number

Data Elements	Number	Type
Text Box	9	EI
List Box	3	EQ
Graphical Icon	1	EO

4. Case Study

4.1 Function Point Analysis of YAHOO

In case study, the first screen of YAHOO.COM's Function Point value is calculated according to Proposed rules. As following in table3 calculation is proceeds in following five steps provided in proposed rules.

Table 3. Computational procedure of YAHOO.COM

PROCEDURE				
Step	Data Elements	EI	EO	EQ
Step1	Text Box	2		
	Command Button	2		
	Graphical Icon			101
	Photographic Image			9
Step2	Determine the data function types from web page. 114 elements of first Step are consisted of ILF			
Step3	Determine the unadjusted function points (UFP) from the result of first step and second step. Suppose that EI, EO and EQ's UFP are 3, 4 and 5. $4(EI) * 3 = 12$, $0(EO) * 4 = 0$, $110(EQ) * 5 = 550$ $UFP = 12 + 0 + 550 = 562$			
Step4	Determine the value adjustment factor (VAF). $VAF = 0.65 + (\text{total} / 100)$ Suppose that Albrecht's value adjustment factor is 10. $VAF = 0.65 + (10 / 100) = 0.75$			
Step5	Calculate the final adjusted function point count (FP). $FP = UFP * VAF$ $FP = 562(UFP) * 0.75(VAF) = 421.5$			

4.2 Function Point Analysis of EMPAS

In case study, first screen of EMPAS.COM's function point value is calculated according to proposed rules. As follows in table4, calculation is proceeds in following five steps provided in proposed rules.

Table 4. Computational procedure of EMPAS.COM

PROCEDURE				
Step	Data Elements	EI	EO	EQ
Step1	Text Box	3		
	Command Button	2		
	Check Box	1		
	Graphical Icon			121
	Photographic Image			8
Step2	135 elements of first step are consisted of ILF			
Step3	$6(EI) * 3 = 18$, $0(EO) * 4 = 0$, $129(EQ) * 5 = 645$ $UFP = 18 + 0 + 645 = 663$			
Step4	$VAF = 0.65 + (10 / 100) = 0.75$			
Step5	$FP = 663(UFP) * 0.75(VAF) = 421.5$			

4.3 Contrast YAHOO and EMPAS's Function Point

Table 5. Contrast Function Point value

	YAHOO.COM	EMPAS.COM
EI	4	6
EO	0	0
EQ	110	129
UFP	562	663
FP	421.5	497.25

As appeared in table 5, EMPAS.COM got higher FP than the YAHOO.COM. Through above result, EMPAS.COM gets conclusion that have more GUI graphical user interface) as $(497.25 - 421.5 = 75.75)$ than YAHOO.COM.

5. Implications and Conclusions

Scale measurement could be well explained by the function point analysis about changing some parts of web pages, or a whole scale measurement. Applying proposed rules to web page (specially that use much GUI such as shopping mall or auction site), there is advantage that calculate site change on numerical value by measure GUI degree when do site administration or update. But, measurer's subjectivity may be intervened during calculate complexity of function point, it can be reckless that calculate Function point by Transactional Function Types. Futures research that preventing subjectivity of project manager and calculating complexity between relational web pages.

6. References

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