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MEASURING THE SOFTWARE FUNCTIONALITY USING FAULT FACTORS

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***Abstract*— A Set of highly sated metrics based on design parameter are selected to measure functionality of software design. This paper claims the metrics based measure model of functionality named as "Fault Measurement Model" after the claim this paper has validated and validated the model using experimental tryouts.**

***Keywords*— Functionality, Fault Parameters, Design Characteristics**

I. Introduction

A systematic way to deal with Functionality in the software development life cycle is an imperative to secure the entire venture. An exact assessment of software Functionality relies upon blame parameters, which in turn relies upon the factor that can influence Functionality [1]. The development of software still pieces a matter of real rules, best practices and undocumented ace learning. In the much engaged software industry, customer weight influences Companies to go speedier the speed to pass on software things. Regardless of the way that timetables are as frequently as conceivable immovably confined [3, 5]; designers are required to weight the centrality of software Functionality against the likelihood of missing due dates. For meet the destinations to require the implementing the diminish the software Functionality in prior phase of development and significance of design stage as for Functionality.

A fault is basic issue a software error that causes disappointment [2]. Each fault attribute requires the utilization of at least one confided in instruments that are actualized in software Functionality [4, 6]. On the off chance that a module is not complex then the entire idea of module based software development comes up short. This paper is organized in such an approach, to the point that it initially depicts the Functionality to fault for process and portrays Functionality measurement show with their correlation establishment and additionally features information for statistical investigation effect of the created display that are critical for additionally consider[9, 10].

II OVERVIEW OF THE PROPOSED MEASUREMENT MODEL

Functionality and fault is an important theme of software, fault parameters have affected to Functionality at design stage. Software development process has given the seven stages for software development. Second stage, Design is important stage for software development process. Near about 60% efforts have done at design stage.

Expert has developed a Functionality measurement model that demonstrates the measurement method of software Functionality. The proposed model is shown in figure 1. The model establishes an appropriate impact relationship between fault factors and Functionality constructs and the associated design metrics. The accurate values of these metrics can be identified with the help of UML Diagram. The measurement evaluation is very supportive to get Functionality value of software design for low cost quality Measurement. Figure1 show the relation between fault parameters at design stage and Functionality.

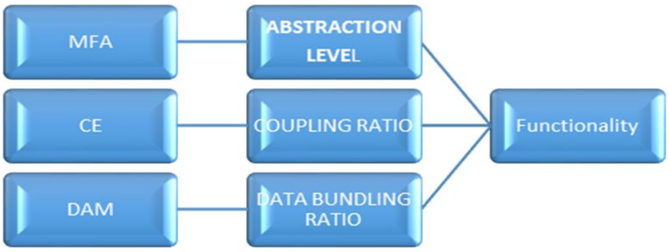

Fig 1 Fault parameters associated to Functionality

In order to develop set up a model for Functionality, multiple linear regression method has been used. Multivariate linear model is given below in "(1)" which is as follows.

$$Y=\alpha0 + \alpha1\ X1+ \alpha2\ X2+ \alpha3\ X3+\ldots\alpha\ nXn \qquad (1)$$

Where
- Y is dependent variable
- X1, X2, X3 ... Xn are independent variables.
- α 1, α 2,… α n are the regression coefficient of the respective independent variable.
- α 0 is the regression intercept.

The data have taken from [8] that have been collected through a number of projects. Basis of this techniques, the multiple linear regression Functionality model have been developed that is given in **"(2)".** Identified independent variables, namely Coupling Efferent, Measure of functional Abstraction, Direct Class Metric, and these metrics value have collected through more UML diagram. Fault parameters have collected from [7], such as Abstraction level, Coupling ratio, Data Bundling Ratio.

Table I Functionality data table

Project	Standard Functionality	MFA	CE	DAM
P_1	11.225	0	9	0
P_2	9.092	0.7	4	1
P_3	14.391	1	1	0
P_4	6.920	0	4	0.2

Functionality = 5.19 + 8.53 Abstraction Level + 0.671 Coupling Ratio - 4.75 Data Bundling Ratio **(2)**

Table II Model Table

Project	MFA	CE	DAM	Cal	Stand
P_1	0.93333	3.0	1.0	10.4143	10.667
P_2	0.72727	7.0	0.5	13.7156	13.469
P_3	0.79545	7.0	1.0	11.9222	11.339
P_4	0.86364	3.0	0.0	14.5698	14.391
P_5	0.73545	7.0	1.0	11.9222	11.225
P_6	0.81818	1.0	1.0	8.0901	9.189
P_7	0.78723	3.0	1.0	9.1681	12.656
P_8	0.94737	0.0	0.0	13.2711	14.391

Table III Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.998[a]	.995	.991	.209367
a. Predictors: (Constant), DAM, CE, MFA				

Table IV Correlation Table

Correlations

		CAL	**MFA**	**CE**	**DAM**
Pearson Correlation	**CAL**	1.000	.047	.288	-.773
	MFA	.047	1.000	-.756	-.413
	CE	.288	-.756	1.000	.355
	DAM	-.773	-.413	.355	1.000
Sig. (1-tailed)	**CAL**	.	.456	.244	.012
	MFA	.456	.	.015	.155
	CE	.244	.015	.	.194
	DAM	.012	.155	.194	.
N	**CAL**	8	8	8	8
	MFA	8	8	8	8
	CE	8	8	8	8
	DAM	8	8	8	8

Table V Descriptive Statistics

	Mean	**Std. Deviation**	**N**
CAL	11.63418	2.265447	8
MFA	.82599	.082904	8
CE	3.87500	2.799872	8
DAM	.68750	.458063	8

Table I presented the data and standard value of functionality, which provide the help to develop the equation. The standard value of functionality has taken from [1]. Table II; show that data index value of functionality. Table III: Developed equation is accurate or not, defines the table and given the proper justification. Table IV, and Table V describes the correlation and descriptive statistics about the proposed model.

III VALIDATION

Most Important part is validation of any proposed model. It is need to check the validity of proposed model. Table VI presented the performance for proposed model.

Table VI Validity Table

Project	**Cal Rank**	**Std Rank**	**$\sum d^2$**	**r_s >+0.736 or r_s > -0.736**	**Observation**
P_1	4	5	1	0.988	√
P_2	2	2	0	1	√
P_3	3	4	1	1	√
P_4	1	1	0	1	√
P_5	3	4	1	0.988	√
P_6	6	6	0	1	√
P_7	5	3	4	0.952	√
P_8	2	1	1	1	√

$$\rho = 1 - \frac{6\sum d_i^2}{n(n^2-1)}$$

Where d_i = difference in paired ranks and *n* = number of project

The Spearman rank correlation coefficient, r_s, is the nonparametric version of the Pearson correlation coefficient. Your data must be ordinal, interval or ratio. Spearman's returns a value from -1 to 1, where:
+1 = a perfect positive correlation between ranks
-1 = a perfect negative correlation between ranks
0 = no correlation between ranks.

IV CONCLUSION

In this article has developed a competent approach for functionality index through fault parameters at design constructs using the technique of linear line approach between quality factors and fault factors. This article also checks the validity of proposed model. That validation check on this model proves that proposed measurement model is extremely adequate, more effective in nature and helps the software industry in project ranking.

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