MODEL TO QUANTIFY CORRECTNESS AT REQUIREMENT PHASE FOR THE SECURE SOFTWARE

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Abstract: The quality of software system has depended on the software design. However, a number of contributions have so far highlighted the theme of correct requirement into its implementation and developing it. This paper presents the requirement and significance of correctness at initial phase and the statistical evaluation establishes correctness as a manipulate factor for traceability and completeness. Correctness is completely affects the low level parameters of software quality attributes

***Index Terms* -.** Quality factors, Requirement stage, Correctness, Traceability, Completeness , Quantification Model

I INTRODUCTION

Correctness is necessary parameters for the software quality. The impact criteria of correctness on software system may result in reduced software fault. Correctness defines simplicity and low fault in software system. Correctness of software system can be divided into four parts i.e. completeness, traceability [4, 2, 8].
Software deficiency is technical issue which are associated to correct design capability. The aim of the article is to present the solution of correctness problem at design stage. Internal property of design as cohesion, coupling, and inheritance associate to external low level quality attributes. Experts aware that high-level quality factors (Correctness) are influenced to completeness and traceability.
Author Dromey's proposed a framework for evaluating Requirement determination, design and implementation phases [7]. The high-level software properties for the implementation quality model include: Correctness evaluates if some basic ideology are violated, with functionality and reliability as software quality attributes [1, 7]. McCall introduce his quality model to automatically and quantitatively evaluate the quality of software [5].
The proposed model effort to qualitatively define the correctness of software by a predefined set of attributes.McCall's quality model represents a hierarchical structure of correctness, each of which contributes to the total quality [6].
The model starts with the software's property, i.e. the high level property (correctness) that represents basic high-level needs for software development process. In order to evaluate the correctness index with the help of highly correlated indexes of traceability and completeness.

II MODEL ESTABLISHMENT

Study of quality model, we found that Correctness are an essential attributes which impinge on the traceability and completeness. Completeness and traceability have been considered as a basis to develop the correctness index value.
Figure 1 shows correlation establishment among Correctness, Completeness, and Traceability. The ultimate responsibility of software system is to provide correct software, no faults existence. Therefore, starts to develop the model used the standard values (SV) of low level attributes of correctness. The standard values have used from [3,8]. Equation 1 then we calculates the mean value of low level factors, as standard values of correctness. Table 1

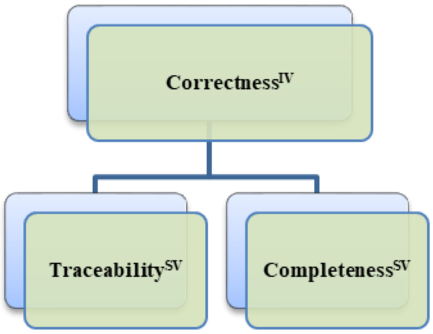

Fig 1 Relationship between low level factors

Table 1 Correctness Index Value

Project	Traceability	Completeness$^{S\ V}$	Correctness $^{Index\ value}$
P_1	0.893	0.781	0.8370
P_2	0.891	0.887	0.8890
P_3	0.957	0.890	0.9235
P_4	0.877	0.824	0.8505
P_5	0.765	0.740	0.7525
P_6	0.838	0.742	0.7900
P_7	0.777	0.838	0.8075
P_8	0.897	0.793	0.8450
P_9	0.737	0.878	0.8075
P_{10}	0.833	0.835	0.8340

III STATISTICAL ANALYSIS

After calculate the standard value of correctness, we did the observed about correctness at design level by multiple liners approach. Multiple linear regressions are the most common form of the regression analysis. As a predictive analysis, multiple linear regressions are used to describe data and to explain the relationship between one dependent variable and two or more independent variables.In this observation, completeness and traceability are work as a independent variables and correctness work as a dependent variable in equation. Table 1 presents the calculation for correctness model. Multiple Linear Regression examination consists of more than just appropriate a linear line during a cloud of statistics points. It consists of three stages: 1) analyzing the correlation and directionality of the data, 2) estimating the model, i.e., fitting the line, and 3) evaluating the validity and usefulness of the model. Table 2 gives the Correlations between dependent and independent variables. Table 3 presents the index value of correctness through multiple linear approaches. For Model development used the multiple linear equation are shown in equation 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.

Y=α0 + α1 X1+ α2 X2+ α3 X3+…….. αnXn **equation (1)**

Table 2 Model Development Table

Project	Traceability	Completeness	Correctness
P_1	0.9130	0.783	0.8370
P_2	0.7970	0.681	0.8890
P_3	0.8570	0.819	0.9235
P_4	0.9543	0.924	0.8505
P_5	0.8650	0.834	0.7525

Correctness = 1.04 - 0.06 *Traceability - 0.168* Completeness **equation (2)**

Table 3 Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.999[a]	.999	.998	.000498
a. Predictors: (Constant), Completeness, Traceability				

Table 4 Validating Table

Project	Traceability	Completeness	Correctness Standard Value	Correctness Calculated Standard Value
P_1	0.893	0.781	0.855212	0.84
P_2	0.897	0.887	0.837164	0.83
P_3	0.957	0.89	0.83306	0.852
P_4	0.877	0.824	0.848948	0.85
P_5	0.765	0.74	0.86978	0.7525
P_6	0.838	0.732	0.865064	0.79
P_7	0.777	0.838	0.852596	0.8075
P_8	0.841	0.822	0.851444	0.845
P_9	0.811	0.781	0.860132	0.8075
P_{10}	0.941	0.822	0.845444	0.834

IV STATISTICAL SIGNIFICANCE

In order to apply 2t test for check the validity of standard value of multiple linear approach and mean observed value of correctness. Table 4 gives the all details about the proposed model. Statistical significances highlighted the basic information of proposed model. 2 t tests used the two types of hypothesis in this research work.

Null hypothesis (H0): There is no significant difference between correctness value of multiple linear approaches and mean observed value of correctness.**H0: $\mu 1-\mu 2$** = 0
Alternate hypothesis (HA): There is significant difference between correctness value of multiple linear approaches and mean observed value of correctness.**HA: $\mu 1-\mu 2 \neq 0$**

In the above hypothesis µ1 and µ2 are treated as sample means of population. Mean value and Standard Deviation value have been calculated for specified two samples and represented in table 5. The hypothesis is tested with zero level of significance and 95% confidence level. The p value is 0.042. Therefore alternate hypothesis is accepted and the null hypothesis is discarded. The developed equation used for correctness is accepted.

Table 5 2 T Test Table

	Mean	N	STANDARD DEVIATION	STANDARD ERROR MEAN
Correctness value of multiple linear approach	.85188	10	.011522	.003644
Mean observed value of correctness	.82085	10	.031634	.010004

IV CONCLUSION

Software correctness is important issue and affected through namely completeness, traceability and their significance on correctness estimation at requirement phase has been tested and justified. The developed calculated value to assess correctness of software system is extremely reliable and correlated with requirement artifacts. Correctness index value has been calculated in two forms 1) By statistical mean 2) By Multiple linear approaches. The proposed model of correctness is based on low level characteristics of correctness. . In future research the researcher can also evaluated or calculated the completeness , traceability and correctness at design phase for the secure software also .

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