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An experimental study on the conversion between IFPUG and UCP functional size measurement units

Key words: Software engineering, Requirements analysis, Functional size measurement, Use cases analysis, Object oriented, Function point analysis, Use cases points

The use of functional size measurement (FSM) methods in software development organizations is growing during the years.

Main FSM methods do not include specific rules to measure the software functionality from its Use Cases analysis (object-oriented techniques).

Therefore, one of the main issues for those organizations willing to use the OO functional measurement method is how to convert their functional size portfolio from the previously adopted FSM method towards the new method.

The objective of this research is to find a statistical relationship for converting the software functional size units measured by the standardized International Function Point Users Group (IFPUG) function point analysis (FPA) method into the Kramer-Smith's Use Cases Points (UCP) method, and vice versa.

Methodologies for a correct data gathering are proposed and results obtained are analyzed to draw the linear and non-linear equations for this correlation. Finally, a conversion factor and corresponding conversion intervals are given to establish the statistical relationship.

Fig. 2 shows the data plotted and the regression equation obtained:

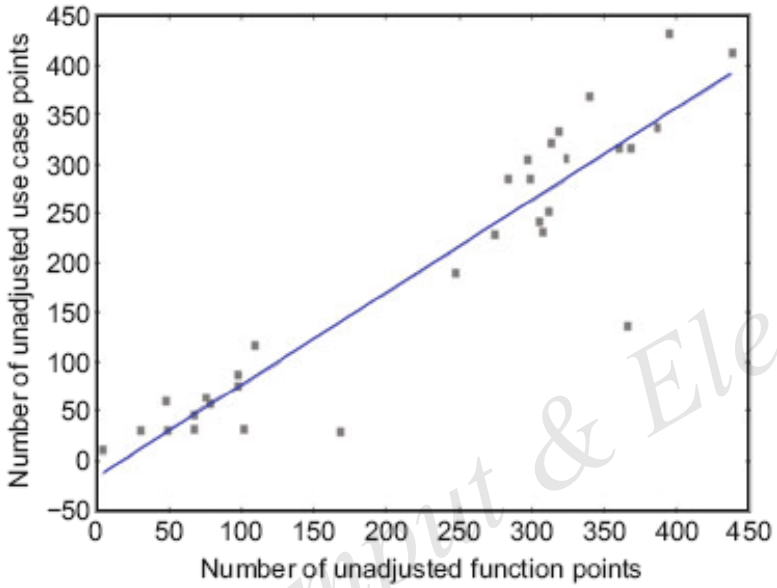

Fig. 2 Linear equation for sample U1-I1-MK

Table 4 shows the statistical indicators calculated at a confidence level of 95%:

Table 4 Statistical indicators for non-linear equations

Sample	σ^2	S_e^2	Interval(a)	Interval(b)
U1-I1	0.08	0.001	(0.24, 9.67)	(0.59, 1.24)
MK	0.49	0.18	(0.69, 21.85)	(0.19, 0.98)
U1-I1-MK	1.08	0.19	(0.28, 3.86)	(0.69, 1.20)

In conclusion, we appreciate that these two variable units of measurement are quite aligned, and a first possible conversion would be suggested:

$$UCP \cong I$$

This means that one IFPUG FP would be approximately equal to one UCP, with a 25% error range.