Estimating Software Size with UML Models

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ABSTRACT

Function points have been used for more that 25 years for estimating software size and building productivity models. Today, three methods to do it are accepted as ISO standards. The theory behind this type of measurement is more explicit but none of these methods have yet been fully automated. All of them still require the involvement of an expert in order to be used correctly. Why is it so difficult to implement those methods? In our opinion, the main reason lies in the fact that each method has it own vocabulary and its own way of modeling software. The research work presented here has been realised mainly through two doctoral theses, one trying to automate the measure from a UML perspective with ontological tools and the other to add an objective measure of complexity to a standard measure in COSMIC-FFP in order to reach a higher level of confidence with those measures. So far, it can be concluded that, from UML use-cases and Actor-Object sequence diagrams of a system application, the number of messages exchanged correspond to the number of function points according to the COSMIC-FFP method. Going farther and adding the number of conditions or decisions to be applied according to UML version 2.0 would add more precision taking into account the complexity of the processes.

Categories and Subject Descriptors

D.2.8 [**Software Engineering**]: Metrics – *complexity measures, product metrics.*

D.2.9 [**Software Engineering**]: Management – *productivity.*

General Terms

Measurement, Management.

Keywords

Software size estimation, function point, UML use case, UML sequence diagram, productivity model

1. INTRODUCTION

Functions points have been measured now for more then 25 years. From the original concepts of Albrecht [3] , it has evolved toward a more comprehensive group of methods until becoming ISO methods. But these methods have still remained buried in the opacities of experimental methods and limited by their own group of users not really involved in the dynamic of software engineering development. Figure 1 shows the evolution of these methods to become ISO methods.

Each one of these measurement methods has its own vocabulary and proposes its own way to model the software to be developed. When we know that the OMG Group has made a well-supported effort for more than 10 years to develop a standard to model software according to UML 1.0 and now UML 2.0, it is quite difficult to understand why those methods have not yet been reworked or have not taken any step toward conforming or adapt to this new standard for modeling software.

Figure 1 : Chronological Diagram of the Evolution of Size Software Measurement Methods