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Estimation Techniques

CS-C3150 Software Engineering

In any organisation it is very important to provide estimate of effort, cost, resources etc required to complete a project before its approval. Project management is of utmost importance because most of the projects have budget or time constraint. To make estimate of software cost and effort required, two main techniques are followed: *Experience-based techniques* and *Algorithmic cost modelling*. The main difference between the two categories is of who does the estimation. In the first category the estimation is done by an expert or a set of experts while in the second category it is done by using an algorithm. The estimates are more accurate when you have a good understanding of the software being developed and some architecture is predefined.

Estimate-based Technique

The experience-based technique relies on the historical data and the expert judgments of people. In an agile method, the judgment is generally given by the developers. In this technique, you identify the different components and deliverables to be produced and delivered to the customer. This essentially breaks the whole development procedure into smaller sub-tasks. You calculate the effort needed to complete them individually and sum them to get the total effort required. The difficulty with this technique is that it isn't of much help if you do not have the experience of working in similar projects. Software development techniques changes very quickly and if you aren't familiar with them then it becomes difficult to accurately estimate the effort required.(Sommerville, 2016)

Algorithmic-based Technique

Algorithmic-based techniques are based on formulaic approach to estimate the effort based on many different parameters like project size, difficulty, etc. Unlike an estimation-based technique where you estimate the effort for each task, in the algorithmic-based technique, you estimate different parameters and feed them into a formula. Most of the

algorithmic-based estimations are based on a simple formula: Effort = A x size^{B} x M where **A** is a constant, **size** is an assessment of the code size, **B** is the complexity of the project and **M** is a multiplier reflecting product, people attribute, etc.(Sommerville, 2016) One thing to remember about this estimation technique is that if you give garbage in, you get garbage out. Generally in the early stages, it is difficult to estimate some parameters and it seems very convenient to guess them. Based on your guess you get some output that looks very precise but the degree of uncertainty is very high and you fool yourself.(Casper, 2015) In the experience-based technique, however, the experts can factor in the difference between previous experiences and requirements of the proposed project. They are also able to factor in the project impact caused by new technology, architecture, etc which makes the uncertainty in estimations less. Other difficulties using the algorithmic-based technique include the value of parameters B and M being purely subjective which may vary from person to person. While using algorithmic-based technique it is better to compute a range of estimates rather than just one.(Sommerville, 2016)

The main method that agile and waterfall companies use for planning and feasibility analysis is the experience-based method. Both agile and waterfall-based companies use both kinds of estimation techniques according to the suitability.(Ceschi et al., 2005) There is no single method that works best for any particular kind of development environment. Estimation is something that is carried out during the whole development cycle. During the early stages, however, using an experience-based technique might give better results. In later stages when certain architecture has been fixed like a programming language, framework, etc it becomes beneficial to use the algorithmic-based technique because it is easy to modify input data and generate estimations quickly.

Planning Poker

Planning poker is an interesting kind of experience-based estimation technique which involves the participation of all the developers involved in the project. The objective of this method is not to come up with a perfect estimate but to arrive at a valuable estimate cheaply. This happens in a meeting where the product owner becomes the moderator and rest of the team becomes the estimators. At the start of the meeting, a set of cards with numbers written on each of them is given to each estimator. The moderator reads out the description for each

story or theme and then the estimators selects a card to represent his/her estimate.(Cohn, 2018) If the estimates differ, the maximum and minimum estimates are debated upon until the estimates converge. This way planning poker brings together different expert opinions to do the estimation. The lively discussion reveals several important factors which others may not have considered. This enables the developers to better understand the requirements which increases the accuracy of the estimate. This method proves to be fruitful in agile environment where the user stories are often vague.(Cohn, 2018)

References

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