Chapter VIII

Web Cost Estimation: An Introduction

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Abstract

Despite the diversity of Web application types, technologies employed, and the number of free templates available on the Web, we still have a considerable amount of Web companies bidding and competing for as many Web projects as they can accommodate. Bidding and winning a proposal does not mean that the project will be developed within time and budget. Cost estimation can help managers manage projects adequately and bid for projects based on realistic and feasible costs and deadlines. The objective of this chapter is to briefly introduce cost estimation principles, followed by a literature review of Web cost estimation. Then we compare this literature according to set criteria.

Introduction

One of the top current Web search engines claims over 3 billion pages on its index\(^1\). In December 2001, the number of Web sites on the Internet was 36,276,25\(^2\). This just gives a glimpse about the vastness of data available throughout the Web. The Web is being used as the delivery platform for numerous types of applications, ranging from e-

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commerce solutions with backend databases to personal static Web pages and even mystical Web sites where you can have an instant tarot reading!

The Standish Group’s Chaos report published in 2003 shows that out of the more than 40,000 completed IT projects they considered only 34 percent finished on time and within budget, with required features and functions (Morris 2003). The report suggests a set of success factors, including reliable effort estimates. According to the report: “If the measurement for success is based on cost and time, then having accurate estimates is essential to improving success rates.”

This chapter’s objective is to introduce Web cost estimation and to present previous work in the area, followed by a discussion of Web size measures, conclusions, and suggestions for future work.

### Web Cost Estimation

#### Introduction to Cost Estimation

Several techniques for cost and effort estimation have been proposed over the last 30 years in software engineering, falling into three general categories (Shepperd, Schofield, & Kitchenham, 1996):

1. **Expert Opinion:** Expert opinion has been widely used. However, the means of deriving an estimate are not explicit and therefore not repeatable. Expert opinion, although always difficult to quantify, can be an effective estimating tool on its own or as an adjusting factor for algorithmic models (Gray, MacDonell, & Shepperd, 1999).

2. **Algorithmic Models:** Algorithmic models, to date the most popular in the literature, attempt to represent the relationship between effort and one or more project characteristics. The main “cost driver” used in such a model is usually taken to be some notion of software size (such as the number of lines of source code, number of pages, number of links). Algorithmic models need calibration or adjustment to local circumstances. Examples of algorithmic models are the COCOMO model (Boehm, 1981) and the SLIM model (Putnam, 1978).

3. **Machine Learning:** Machine learning techniques have in the last decade been used as a complement or alternative to the previous two categories. Examples include fuzzy logic models (Kumar, Krishna, & Satsangi, 1994), regression trees (Selby and Porter, 1998), neural networks (Srinivasan and Fisher, 1995), and case-based reasoning (Shepperd et al., 1996). A useful summary of these techniques is presented in Gray and MacDonell (1997b).

An advantage of algorithmic models over machine learning and expert opinion is that it allows users to see how a model derives its conclusions, an important factor for