Chapter XI

Classifying Web Usage Behavior in the Workplace: An Artificial Neural Network Approach

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INTRODUCTION

The ubiquitous nature of the World Wide Web (commonly known as the Web) is dramatically revolutionizing the manner in which organizations and individuals alike acquire and distribute information. Recent reports from the International Data Group indicate that the number of people on the Internet will reach 320 million by the year 2002 (Needle, 1999). Studies also indicate that in the United States alone, Web commerce will account for approximately $325 billion by the year 2002.

In addition to being a channel for commercial exchange, the Web also provides employees access to the world’s biggest playground. This fact was highlighted in a recent Newsweek article whose headline read, “The Internet has brought distractions into cubicles, and now corporate America is fighting back” (Nelson & Cheney, 1987). Workplace Web users, however, may not view this as a potential problem. The sentiments of users on this issue were reflected in a succinct comment made by an employee in a recent interview with the author.

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Looking up a work-related news story easily leads to checking the baseball standings or a movie review. It will only take a couple of seconds, right? A couple of seconds is no big deal in the greater scheme of things.

The problem, however, is that seconds turn to minutes, then add up to hours. A study conducted in a manufacturing firm found that in a typical 8-hour working day, over 250,000 Web sites were accessed by a workforce of 386 employees. Of particular concern to the organization was the discovery that approximately 90% of the accessed sites were non-work-related (LaPlante, 1997). Recent research by the Aberdeen Research Group (Wu, Massart, & Jong, 1997) indicates that employees can squander anywhere from 30 minutes to 3 hours a day on non-work Web-related activity.

The cost of ignoring this phenomenon can be enormous. According to the Gartner group, such activities cost US companies approximately $50 billion in productivity alone each year. In addition, such usage leads to increased security costs, network overload, as well as the risk of civil and criminal liability. These issues have prompted organizations to show a growing interest in understanding and managing Web usage behavior in the workplace (Cronin, 1996; McWilliams & Stepanek, 1998).

So, how do organizations deal with this emergent behavior? Monitoring can vary from a laissez-faire attitude to the blocking of Web sites. However, Web surfing is a gray area, and an overzealous policy can be just as harmful as a nonexistent one. For instance, stringent blocking can hamper an employee’s use of a vital tool for business purposes. Thus, it’s not surprising that a recent survey found that approximately 73% of organizations have only acceptable usage policies or no restrictions at all (Yasin, 1999).

Recent literature on Internet security recommends that an organization’s Internet security program should focus on modifying user behavior (McBride, 2000) as well as user education (Yasin, 1999) to reduce the problem. However, a fundamental decision problem facing Internet security managers is how to identify the Web usage behavior of employees in the various functional and operational levels within an organization a priori. A review of the information systems literature indicates that there are no established guidelines, which implies that managers have to rely on their judgment to make such decisions. This can be precarious since such multi-cue judgments are inherently difficult for unaided human judges (Kleinmuntz, 1990).

This study proposes the use of an artificial intelligence based model (in terms of artificial neural networks and genetic algorithms) to assess and classify employees by their Web usage behavior. Based on an operational definition of Web usage behavior (Anandarajan, Simmers, & Igbaria, 2000,
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