Cases for the Web in Your Pocket (WiPo): Surviving Offline with Online Data

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ABSTRACT

Web data is abundant. However, situations remain where a user cannot access the Web, due to the likes of server unavailability, bad connectivity, or governmental controls. In this paper, several cases are considered where continual, uninterrupted Web access is impossible due to various constraints. For example, a tourist may travel to a mountainous region without net coverage, yet may want access to information on the scenery, or the most recent weather forecast they obtained before embarking. The authors previously outlined a general approach to cope with such situations, which they have termed “Web in your Pocket” (WiPo). WiPo assumes that the user has a smart device to which appropriate data, ideally in curated form, can be pre-loaded so that it remains accessible offline. The authors here present a proof of concept by studying how WiPo can be used in three distinct cases: tourism, health, and search and rescue. The authors demonstrate the vast potential of WiPo, and give consideration to the practical issues behind its implementation.

Keywords: Data as a Service, Information Provisioning, Offline Information Access, Online Data, Web in your Pocket

1. INTRODUCTION

Web data is both superabundant and growing at an unprecedented rate. It is also being used for an increasing number and variety of contexts and use cases, which can easily be verified in many applications in both the private and business domains. In less than 10 years we have become reliant on the “cloud” for our music, movie, and video demands, and increasingly businesses favor cloud applications and platforms over local installations. All of this, however, is conditional on the presence of a reliable and efficient Internet connection. While this is indeed the case most of the time in western, urban contexts, situations remain where a user or an application cannot

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access the Web, due to server unavailability, bad connectivity, or access restrictions. In this paper, we consider the case where Web access is (temporarily or permanently) unavailable due to various reasons, yet a user desires the most relevant and up-to-date Web data appropriate to their needs. To achieve this, we build upon the Web-in-your-Pocket (WiPo) architecture reported in Dillon et al., (2013a) and present a detailed proof of concept for its future application by studying how the WiPo concept can be applied to three distinct use cases.

WiPo is based on the concept of having access to a data service that has been configured precisely to a user’s needs and budget and that sources, curates, and delivers data in a subject-centric way. This tailored data service is available online, but can also be made available offline on both fixed and mobile devices (where the latter results in a “Web in your Pocket” or WiPo for short), along the lines of digital newsstands such as Zinio or digital notebooks such as Evernote. A key feature of WiPo is the ability to obtain digital updates of highly dynamic data as and when Web access is available. Unlike search engines, which pull information from the Web following an ad-hoc query, WiPo assumes some form of subscription-based or one-off service from which information can be obtained from various public (open) and private (closed) sources that follows a (more or less detailed) specification of what is desired and which has undergone some form of curation process.

As we have outlined in Dillon et al., (2013a) use cases can be distinguished by various dimensions, most notably by (1) the type of application, i.e., business or non-business, (2) data provision frequency, i.e., one-off data access or continuously refreshing/updating or something in between, and (3) data broadness, i.e., the number of data sources consulted (one or multiple). The cases considered in this paper have been selected as they provide a diverse range of applications that demonstrate these dimensions. The first case is the tourist who employs a private WiPo application, is interested in up to date data coming from a number of relevant sources, but who will then carry this data on a mobile device without further Web access. Next is a health application which is both business and non-business (potentially used by both medical practitioners and patients), requires regular data updates, and relies on a number of public and private data sources. Finally, the very specific case of Search and Rescue is considered. In this “business” application, data needs to be continually updated as Web access allows, where multiple, predominantly private, sources are employed.

The remainder of this paper is organized as follows. We first summarize relevant related work giving particular attention to well-established and relevant technologies on which WiPo is founded. Next we provide a brief overview of WiPo. These two sections are intentionally brief as a more detailed description is provided in Dillon et al., (2013a) and the reader is encouraged to read this. We then demonstrate the potential of WiPo through the consideration of three carefully selected use cases. The general characteristics of these cases are highlighted to demonstrate the flexibility and application breadth of WiPo. Following that we collect several considerations regarding an implementation of WiPo. Finally directions for further research and development of the WiPo concept are outlined, in particular in the direction of coping with today’s information overload.

2. RELATED WORK

The Web in the Pocket (WiPo) concept is in a broad sense comparable to the notion of a materialized data warehouse (Inmon, 2005) that is made portable and only intermittently connected to the primary data sources. Also related is research on search engines. Carfarella et al., (2011) examine how search engines can index Web pages, also referred to as deep Web sites, that to date cannot be indexed by traditional search algorithms. Building data marts or services on these deep Web sources is described by Baumgartner et al. (2010). Generally speaking, however, retrieval and indexing of documents from such sources is no longer the problem it
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