A Transcoding Proxy Server for Mobile Web Browsing

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Abstract: Wireless networks have constraints such as bandwidth, processing power of devices and screen size. It is therefore required to develop frameworks to enable loading and showing Web pages appropriately on mobile devices. This paper proposes a Transcoding proxy server framework for transforming Web pages into appropriate formats for being transferred to and viewed on mobile devices using the Document Object Model (DOM) trees, a World Wide Web Consortium (W3C) specified interface that allows programs to dynamically access document structure, rather than the raw HTML markup and a Java implemented HTTP Proxy server system to Transcode the HTML document using Simplification and or Page Rearrangement.

Index Terms—Mobile, Transcoding, Server-side, Client-side, Proxy-based, Document Object Model, Simplification, Page Rearrangement

I. INTRODUCTION

Due to the proliferation of wireless networks, accessing the Internet using mobile devices than desktop Personal Computers (PCs) is common in our time. By embedding lightweight Web browsers into wireless handheld devices and a wireless connection, the mobile Web enables users to connect to the internet and perform many interesting and critical tasks such as accessing information, checking stock quotes and booking an airplane flight anytime anywhere [1]. The mobile Web has become crucial in our daily lives. “In April 2011, Opera mini had over 107.1 million users, a 4.6% increase from March 2011. Since April 2010, the number of unique users has increased 81.8%.” [2]. However, because most available Web pages are designed for desktop PCs in mind, it is inconvenient to browse these large Web pages on a mobile device due to various limitations, as noted by Chen; Screen size, Limited device memory, Limited processing power, and Limited bandwidth availability. Due to these limitations web browsing on mobile devices is like seeing a mountain in a distance from a telescope [3]. Therefore, it is necessary to provide methods and techniques for showing information properly regardless of the environment and display screen features.

Transcoding is a general concept of transforming content (text, image, voice, and video) or a program on the fly resulting in other formats [4]. There are a number of important parameters that are the key reasons for Transcoding. These consist of making Web pages more user-friendly and show them appropriately in different screen sizes, reducing size of Web pages in order to reduce network bandwidth and decreasing their loading time. These parameters could be used in order to compare and evaluate different Transcoding systems. Current Transcoding systems achieve these goals by either removing the non-vital parts of Web pages such as pictures and advertisements or moving some content from one page to a new page and creating a link in the initial page to the new page in order to reduce size and dimensions of Web pages [5].

II. RELATED WORK

Various mechanisms exist for Transcoding Web pages. In general, these can be classified by the location of the transformation engine, from server-side transformations to client-side transformations.

The server-side transformation implies that the content be transformed by the Web server and the clients receive the Transcoded content on their mobile device. WebSphere Transcoding Publisher is a representative Transcoding system and this uses an annotation based Transcoding approach. An advantage of server side Transcoding approaches is to achieve a correct conversion, but amount of Web pages offered by the Transcoding service is so limited in comparison with the bulky quantity of existing Web pages [4].

The proxy-based transformation implies that the content be transformed between the browser at the user’s side and the Web server. The Web server transfers Web pages to the proxy server and then the proxy server transcodes the content according to type of device mentioned in the user request. The resulting content is then transferred to the user. WebViews is a system that enables delivering Web content to wireless devices. WebViews is based on three components: a server, separate proxies for different markups and various clients [4, 5]. Web Intermediaries is a Transcoding framework that is based on a programmable proxy server that receives HTTP request from clients and generates HTTP responses suitable for being displayed on the requesting device. The proxy server is called Web Intermediaries (WBI) [6].

The client-side transformation implies that the content be Transcoded inside a browser. Opera Mini as an example enables client-side Transcoding which is called Small-Screen Rendering (SSR) in mobile browsers. Only a limited number of mobile devices are capable of using client-side Transcoding, as this needs to use the device itself for...
Transcoding, thus, the mobile devices need to be powerful enough to handle the transformation process. Moreover, this method does not reduce bandwidth usage, as the whole Web page is sent to the mobile device for the transformation process to be done [5].

III. OBJECTIVES AND METHODOLOGY

This research aims to develop a framework that employs easily extensible set of Transcoding techniques that will potentiata the mobile Web by improving usability and interoperability. It incorporates advantages of previous work on transforming inaccessible Web content into accessible Web content on the fly. Our key insight is to work with Java and DOM tree, a W3C specified interface that allows programs to dynamically access document structure, rather than the raw HTML markup. The Transcoding techniques of interest are Simplification, which presents users with only the important parts of the Web page by eliminating the nonessential parts, and Page Rearrangement, which changes the layout of the Web page to be suitable for voice browsers.

A Proxy server is located between the Client and Web server. The Web server transfers Web pages to the HTTP Transcoding proxy server that transcodes the content according to type of device that was mentioned in the user request. To analyze the Web page, it is first passed through an HTML parser that corrects HTML errors and then creates a DOM tree, made up of nodes that can be elements, text, and attributes, representation of the Web page, and using the Simplification Transcoding technique for eliminating the nonessential parts.

V. CONCLUSION AND FUTURE WORK

In this paper, we have examined existing solutions and architectures for Transcoding Web pages for mobile devices and designing a proxy-based Transcoding system, which is the archetypical architecture for Transcoding systems since originally Transcoding referred only to this approach. In the system we will focus on Web page customization and adaption on mobile phones to provide a better way to enable easy navigation and browsing of large Web page on mobile phones. In the future we are aiming to describe the design of the Transcoding system with an auditory interface to offer Web pages that support visual and auditory expressions at the same time by Voice XML for certain components.

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VII. REFERENCES:


Thoba Lose received his B.Sc. (Computer Science, GIS, and Mathematical Statistics) degree in 2010 from the University of Fort Hare and is presently studying towards his Honours in Computer Science degree at the same institution. His research interests include Internet Services and Applications, and Network Services.