Chapter 8
Preservation of Cultural Heritage in an Ethnic Minority Using Internet of Things and Smart Karaoke

Alberto Ochoa
https://orcid.org/0000-0002-9183-6086
Universidad Autónoma de Ciudad Juárez, Mexico

Roberto Contreras-Masse
Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Juárez, Mexico

Jose Mejia
Universidad Autónoma de Ciudad Juárez, Mexico

Diego Oliva
Universidad de Guadalajara, Mexico

ABSTRACT

This research describes an intelligent tool based on a karaoke system to represent the linguistic resources related to a social network for music and songs associated with a cultural bulwark: Otomí (a language spoken in México). This system employs a representation of the Dublin Core metadata standard for document description, composed by XML standard to describe profiles and provide recommendations to a group of persons associated with this social network. The novel idea of this research is the analysis (with an improved methodology) of each search to provide a recommendation based on petitions of each user in this social network, reducing the human efforts spent on the generation of a specific profile. In addition, this chapter presents and discusses some experiments to corroborate the impact of this research, based on quantitative and qualitative evaluations. This chapter introduces an innovative idea of how to help this type of ethnic group.

DOI: 10.4018/978-1-7998-4730-4.ch008

INTRODUCTION

Nowadays, there are large amounts of digital songs available for users in open music format via the Web. Most of these songs can be used by a device called Karaoke, an electronic instrument invented in Japan by Daisuke Inoue in the past century, that displays the lyrics of a song and the music track. The main advantage of open music is the minimization of promotion turnaround. Therefore, the Digital Libraries (DLS) have become the main repositories of digital documents, links, and associated metadata (Baeza-Yates, Ribeiro-Neto, 1999). A recommender system makes decisions by personalized information associated with users in order to learn by first-hand the references of a community and how recommendations are perceived. Customization is associated with the way in which content and services can be tailored to meet the specific needs of a user or a group of individuals through a social network. The system's feasible and objective recommendations based on the needs associated with a specification-centered human demand are not easy tasks. Everyone can experience this difficulty in trying to find a new song in a good indexing and retrieval system in a native language such as Otomi.

To create a proper search and conceptualize specific requirements based on specific restrictions is complicated, coupled with an extensive list of user requirements together with the requirements that must possess these requests, including long waiting times associated with query validation. A very low proportion of users are suitable to spend a few hours searching, finding new songs, where the target language appears. This functionality, the query specification, can be achieved by analysis of user activities, history, or claims information, to mention a few factors. In this chapter, a set of recommendations of karaoke music associated with a young community who spoke Otomi is proposed; the recovered songs are associated with a karaoke playlist. The main contribution of this paper is to provide a mechanism for user-based recommendation reducing human effort invested in profile generation. The chapter is organized as follows: We started to give an overview of the literature and concepts background, then the recommendation system and detail of its architecture and techniques. Finally, some quantitative and qualitative experiments to test and validate our system, along with a discussion of results and conclusions of our research are presented. Although in Mexico the official language is Spanish, about 57 dialects are mainly spoken by ethnic minorities throughout the country, as is shown in **Figure 1**. This means a lack of opportunities for people being monolingual, so the federal government has tried to safeguard minorities to try to give the same opportunity to spread their culture and gain new speakers to their language groups.

There are different efforts to achieve assimilation of ethnic minorities through their language, but there are no media in the oral part of the same, which is why new speakers do not have a large vocabulary of his mother tongue. One of the few alternatives is the use of books with stories, fables, and legends printed to textbooks for infants in the native language along with Spanish translation, as is shown in **Figure 2**. However, you cannot hear the correct pronunciation. We propose Web Radio and, in turn, a Smart Karaoke with the purpose of expanding knowledge of spoken dialect by indigenous groups.

Theoretical Foundations

The technologies associated with the semantic Web are characterized by providing efficient and intelligent access when you want to interact with digital documents on the Web. The standard-based metadata is used to describe information objects, and in turn, have two main advantages: the first is related to the computational efficiency in the process of gathering information and interoperability between distribution lists (DL) associated with the repositories of information. The second advantage is due to