

Yocoy: Mobile Multilingual Technologies for Overcoming Communication Barriers

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Abstract The coexistence of Western and Eastern languages and cultures poses a true challenge for global mobility and communication in business and personal life. In this paper, we will describe mobile software applications that are built on top of multilingual and crosslingual technologies for overcoming language barriers, e.g., between English and Chinese, or German and Chinese. The mobile applications are interactive language guides, culture guides and country guides. They support automatic translation and dialogues between people and link the language part with information needed in a specific situation. Furthermore, users can integrate pictures into their phrases for extending the descriptive capabilities of the dialogue component. Semantic search facilitates access to words, phrases and information content.

Keywords mobile applications · language guide · travel guide · translation

1 Introduction

Traveling to China would be so much more enjoyable if we could understand Chinese people, signs, menus, customs and culture. This way the stay abroad would also be more secure and more effective. Globalization and affluence lead to increased mobility. Although Asian

regions have gained economic importance in the last two decades, Asian languages cannot be learned easily by Westerners and Western languages will remain hard to learn for Asians. Traditionally travelers resort to phrasebooks and dictionaries if they do not have a dedicated interpreter at their disposal. Searching through a printed book during a direct interaction with local people can be disruptive and the book often does not suffice for getting the pronunciation right. Digitized versions of such printed books, as they offered as mobile apps or web services, permit efficient string search and voice output, usually of prerecorded words and phrases. These products do not yet utilize the power of language and knowledge technologies for additional functionality. Language technologies have developed very fast in the recent years and have been applied to machine translation, dialogues systems and search technologies [1,2]. In this paper, we will present mobile applications developed by Yocoy Technologies GmbH (Yocoy)¹, which incorporate technologies for translation, dialogue and semantic search.

One ambitious but conceptually straightforward application of advanced language technology is the combination of speech recognition and automatic translation for unrestricted dialogue translation. The first products of this type have entered the market. The technologically most advanced example is the app Jibbiggo. The product delivers amazing results, even in its bidirectional English/Chinese version. Nevertheless, the error rate is still too high for secure dialogues in critical situations, because neither speech recognition nor machine translation is mature enough for large-coverage reliable applications. Errors of both technologies add up and

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often combine into unpredictable and inexplicable output.

The philosophy behind Yocoy technology is to extend digital phrasebooks into powerful instruments for understanding people and culture without the handicaps of unrestricted speech-to-speech translation. These mobile apps are language guides, travel guides, country guides and city guides for countries such as China, available in the Apple AppStore. In comparison to the existing language and travel guides, the Yocoy products support dialogues between two languages with translation in both directions. The following technologies enhance the usability of the products:

- selections of phrases according to situations and sub-situations, permitting an intuitive selection among thousands of phrases and topics with just a few clicks;
- extension of phrases by sentence templates allowing the user to formulate millions of different sentences that are all translated without errors;
- output by speech synthesis;
- embedding of pictures into sentences to gain additional expressivity;
- combination of translation, travel assistance, knowledge about country and country, intercultural advice and useful hints into one app;
- interconnecting these different components so that relevant background information is offered when a sentence is selected and vice versa.

The Yocoy products are interactive, multimodal and multimedia. The benefits of the Yocoy products for the customers are *comfort*, *security* and *fun*. The comfort is supported by easy search and navigation functions. Security is realized via the helps for the emergency situations such as reliable communication in critical situations, location-adaptive advice in emergencies and notification of services. For the fun part, the Yocoy products provide information on food, local customs and life style, give support of small talk, flirt and intimate conversation and offer education on culture, language and geography.

2 Yocoy Products

Yocoy currently offers 22 products through the Apple AppStore. They fall into four major product lines:

- *i-You English/German to Chinese phrasebooks*²: a talking language guide which supports situation-based crosslingual dialogues;

² <http://itunes.apple.com/us/app/i-you-phrasebook-english-chinese/id356347689?mt=8>

- *yochina: language, travel and culture guide for China*³: an integrated travel assistant for China which combines language, travel and culture guides;
- *China Taxi-Book: language and city guide for China*⁴: a city guide accompanied with Yocoy talking dialogues for on the way, in particular for conversations with Chinese Taxi drivers;
- *China Smart Dining: language and food guide for China*⁵: a food guide accompanied with Yocoy talking dialogues for restaurants, e.g., ordering dishes and drinks in Chinese.

The users of the Yocoy apps are from more than 100 countries. Most of them are in the US, Germany and Australia. All apps share some central functions such as crosslingual dialogue, multimodal interaction and semantic search. Among them, yochina is an example that combines almost all functions provided in the other apps (see Figure 1).



Fig. 1 yochina: language, travel and culture guide for China

2.1 Multimedia Crosslingual Dialogues

In comparison to existing language guides, Yocoy language guides exhibit three additional unique features: 1) the crosslingual dialogue function, 2) template-based language generation and 3) Multimedia phrases. The crosslingual dialogue function allows users and their partners to express wishes and requests, ask questions and give answers in their own languages and translates

³ <http://itunes.apple.com/us/app/yochina-language-travel-culture/id401123365?mt=8>

⁴ <http://itunes.apple.com/en/app/china-taxi-book/id445493942?mt=8>

⁵ <http://itunes.apple.com/app/china-smart-dining/id498938076>



Fig. 2 Yocoy crosslingual dialogues and sentence templates

the expressions in both directions. Therefore, the users of Yocoy language guides such as i-You and yochina can do conversations with Chinese people. The template-based language generation provides sentences or phrases with slots into which users can fill with their own words or phrases. With these sentence templates in combination with our rich embedded dictionary, the language guides can generate millions of sentences. Figure 2 depicts a crosslingual dialogue with an English speaker and a Chinese waiter in a restaurant. The English speaker chooses "chopsticks" as the requested object for filling the sentence template. The sentence is translated into Chinese texts enhanced with transliteration "Pinyin" and speech output. The Chinese waiter can select an answer which is translated back into English. Given the Pinyin and the speech output, Yocoy users get an opportunity to learn simple Chinese phrases including their correct pronunciation.

Figure 3 shows one example which integrates texts with corresponding images, namely ordering a Peking Duck dish in Chinese.

2.2 Semantic Search

For a search query, yochina finds semantically related words, phrases, general topics or recommendations and



Fig. 3 Yocoy multimedia phrases

travel and country information. In yochina, both the language content and the travel content are indexed with semantically related terms and annotated with categories and topics. Figure 3 shows that the query term "business card" triggers phrases for exchanging business cards and contact information and also information about greeting behavior in Chinese business meetings.

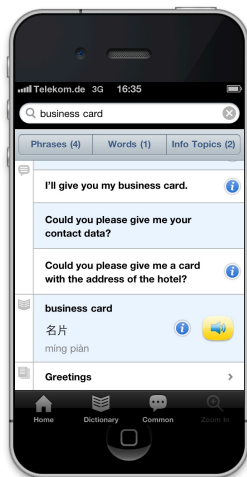


Fig. 4 Yocoy semantic search

2.3 Linking between Communication and Information

Existing language and travel guides do not link the language part with the information part. However, in intercultural communication, it can be highly useful to get relevant information about customs and expected behavior or to be alerted to possible mistakes. In yochina, information and communication are intelligently interconnected. When the user reads about how one should introduce oneself, the appropriate sentences used in introductions can be directly accessed from there. When the user selects phrases about a lost passport, yochina offers advice and relevant addresses of police and embassies. yochina also provides a large selection of useful information on country, cities and culture enriched by pictures, maps and special tips. In addition, the user receives comprehensive intercultural advice, e.g. on what to say, wear, do and expect in numerous situations. Information on appropriate gifts for a business partner, the dress code for a funeral and touchy issues to avoid an approach with special care? Add some trivia for the curious such as the answer to: Do Chinese really eat dogs?

3 Conclusion

Yocoy technologies provide a general and scalable framework that supports crosslingual dialogues, semantic search and navigation as well as multilingual and multimedia communication. The framework is easily adaptable to new contents (local food or clothing), new languages and new regions. Based on this framework, we could develop specialized products for specific goals such as language guides, food guides, taxi guides or city guides. We could also combine several functions into a single product such as yochina, an integrated software of phrase-

book, travel guide, culture guide and dictionary. In ongoing research and development, Yocoy is working on future extensions to these products utilizing additional technologies such as speech input, a specialized accurate automatic translation mode and location-sensitive services.

References

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Company Profile



Yocoy Technologies GmbH is based in Berlin, founded as the 50th spin-off company of German Research Center for Artificial Intelligence (DFKI)⁶ in 2007. The mission of Yocoy is to overcome language barriers between people, between people and information and between people and technology. Yocoy has developed language, culture, country and city guides as mobile applications.

Author Profiles

Dr. Feiyu Xu studied Translation and Computational Linguistics in Shanghai and Saarbruecken. In 2007, she obtained her PhD in computational linguistics. In 1998 she joined DFKI where she led several projects in language technology. She is a co-founder and managing director of Yocoy Technologies GmbH.

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⁶ <http://www.dfki.de>