

Methodology for Development of Mobile Learning System Multilingual User Interface

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Abstract: This paper describes the methodology for creating multilingual user interface system for mobile language learning by using a specialized on-line module and translators in various languages. The proposed methodology was used in developing the system for mobile language learning named FLAGMAN. The system supports seven languages: Bulgarian, English, German, Spanish, Greek, French and Portuguese. The system has been tested and works successfully on desktop computers as well as on various mobile devices.

Key words: Methodology, Mobile Learning, Mobile Learning System, Mobile-Assisted Language Learning

INTRODUCTION

The development of mobile and communication technologies enable more systems for mobile learning to be realised and successfully used. Global organisations such as United Nations [3] and UNESCO [8] also pay attention on mobile learning. The expectations for this year are that the global market for e-learning (part of which is the mobile learning) will exceed USD 107 Billion [7].

At the same time, the globalisation of the world economy increases the need to know and use foreign languages. It is believed that in 2017 the main users of mobile learning products and services will be China, USA, Indonesia, India and Brazil [7].

The use of the possibilities provided by mobile training for the purposes of language learning is called Mobile-Assisted Language Learning (MALL) [9]. It may be represented as a section between the Mobile Learning and Computer-Assisted Language Learning (CALL) (Fig.1).

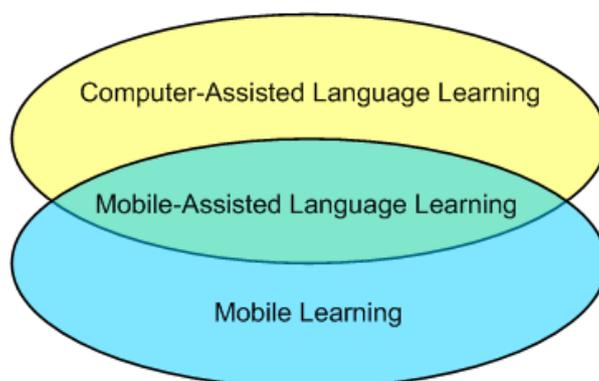


Fig. 1. Mobile-Assisted Language Learning

The literature review shows that existing systems for mobile learning have a number of limitations in their functionality:

- Some of these systems are specialised (for example for training in mathematics) and support a small number of languages [4, 6].
- Other systems use the power of online translators such as Google Translate, to provide multilingual support [2].
- Some systems (for example Nokia Life) support 18 languages, but they are SMS-based and limited to use in some countries [11].
- There are number of methodologies for designing and developing e-learning courses [3], to develop mobile web-based applications [10] and for the evaluation of mobile learning [5] but there is no methodology how to develop a multilingual mobile user interface.

This report describes the methodology for development of multilingual user interface for mobile language learning system by using a specialised on-line module and translators in various languages.

LAYOUT

In the process of development of the system for mobile language learning there are two very important problems associated with multilingual support:

- **Learning content development** on any of the supported languages. This task includes creating text content, media files, tasks to accomplish and tests. The task must be performed by language teachers.
- **Development of a multilingual user interface** on all languages that will be supported by the system. This task includes translation of the interface and system messages. The task must be performed by the relevant language specialists in cooperation with system administrators. An appropriate methodology must be developed before the start of the implementation of activities under this task.

Methodology for Development of Multilingual User Interface

There are different variants for realisation of the text translation from professional translators. One option is to use a file that contains the entire text of the interface and system messages. This file is sent to translators, who then return files which contain translation in appropriate languages. These files then are used by the developers of the system to provide multilingual interface. Disadvantages of this option are that the translators cannot understand in what context is used certain expression, developers have no information how much is translated and may have to wait for the whole translation.

Another variant for the realisation of the translation is by providing online access to translators to the system. The translators can choose what to translate and clearly see each expression in what context is used. This second option is used in the proposed methodology. The methodology includes the following steps:

- Determination of the languages that will be supported by the system.
- Forming teams of translators for each particular language.
- Training of translators how to use the system and the corresponding online translation module.
- Registration of Translators in the system for mobile learning.
- Use online tools to translate with abilities to choice the text to translate, to correct and to save work. This stage includes the following sub-stages:
 - Choose the language from which to translate the user interface and system messages.
 - Choose the language in which the translation will be done.
 - Translation of the user interface and system messages in the appropriate language.
 - Check the translation and making corrections, if necessary.
- Testing the multilingual interface using a variety of devices (PCs, mobile devices) and making corrections, if necessary.
- Creation of online glossary of selected terms on the respective languages.
- Writing system's user guides on selected languages.

1. The Use of the Methodology

The proposed methodology was used during the development of the system for mobile language learning named FLAGMAN [1]. The system is entirely online based and it is built in classic three-tier architecture.

The purpose of the development of this mobile learning system is to allow creation of training courses for language learning, to provide access to them anytime, anywhere via

mobile devices and to support professionals in the tourism sector to learn the language of their customers using smart phones, tablets or notebooks.

The system supports five groups of users depending on the functions they perform: administrator, teachers, translators of the interface and system messages, learners and guests. The system supports seven languages: Bulgarian, English, German, Spanish, Greek, French and Portuguese.

The system for mobile foreign language learning allows online translation of the user interface and the messages of the system modules. The specific in the translation process is that it can be carried out using both PCs and mobile devices.

The Figure 2 shows a UML Use Case diagram that clearly and on high abstract level presents functions of the translator, which the system for mobile learning supports.

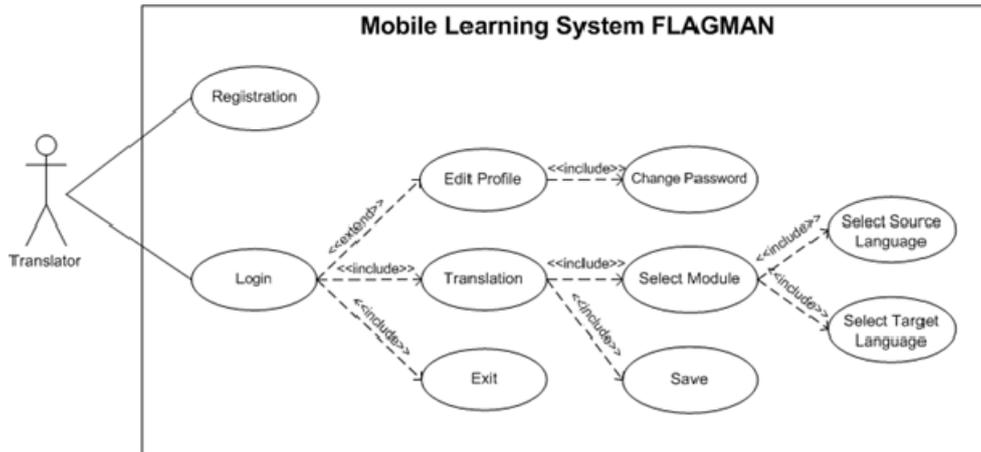


Fig. 2. Translators Use Case Diagram

The algorithm of work of the translator is the following:

- In order to translate the interface and system messages into a certain language the translator must login and select the "Control Panel" link.
- Then in the "User management" the section "Translate System Messages" must be selected (Fig.3).

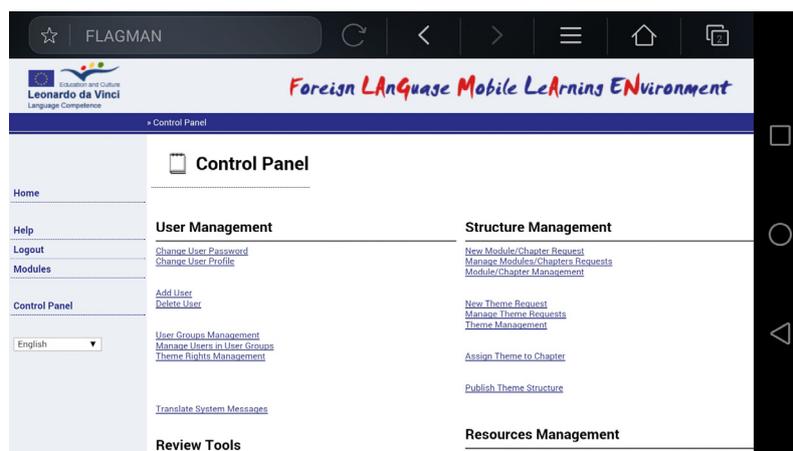


Fig. 3. Screenshot of the Control Panel of FLAGMAN

- From the list of languages in the main system menu must be selected the source language from which the translation will be made (for example English) (Fig.4a).
- After that, from the drop down menu "Translate to" must be selected the target language (for example Español) for translation (Fig.4b). In this way with the help of the two drop-down menus the translator has a pair of languages - language, from which he/she will translate and a language, to which he/she will translate.

• From the drop-down menu "Module Name" must be selected the system module (for example `publish_media`), whose messages will be translated. The translator will get help screens, showing the text elements of the user interface and the cases, in which the mobile learning system generates the module messages. There are two fields below these screens: a message in the language, from which he/she translates and a field to enter the translation in selected language (Fig.4b). If the translator has difficulties in translating a given text he/she can check its usage in some of the help screens.

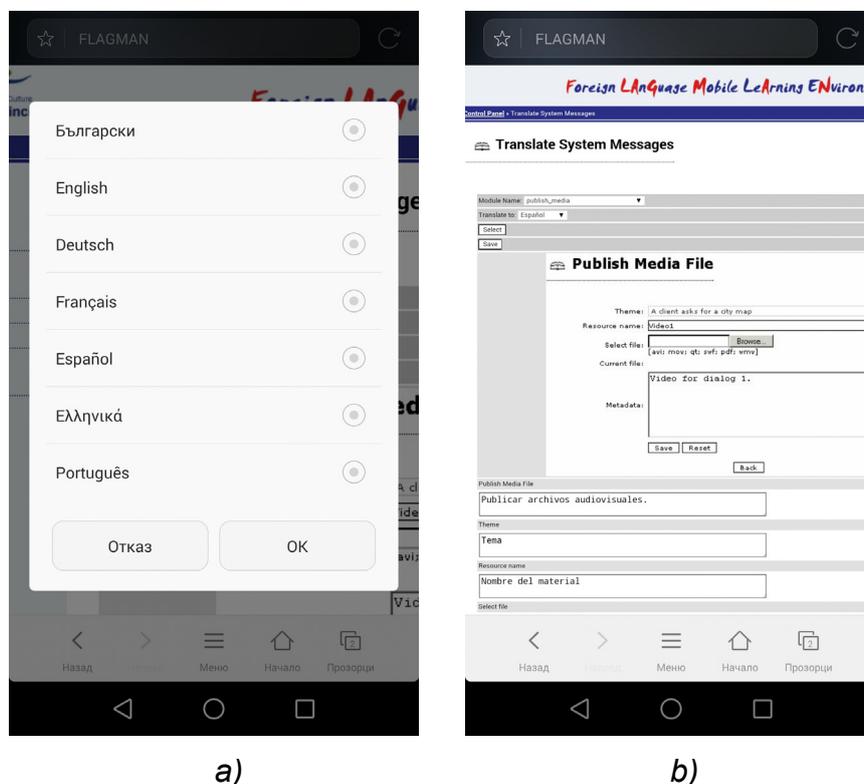
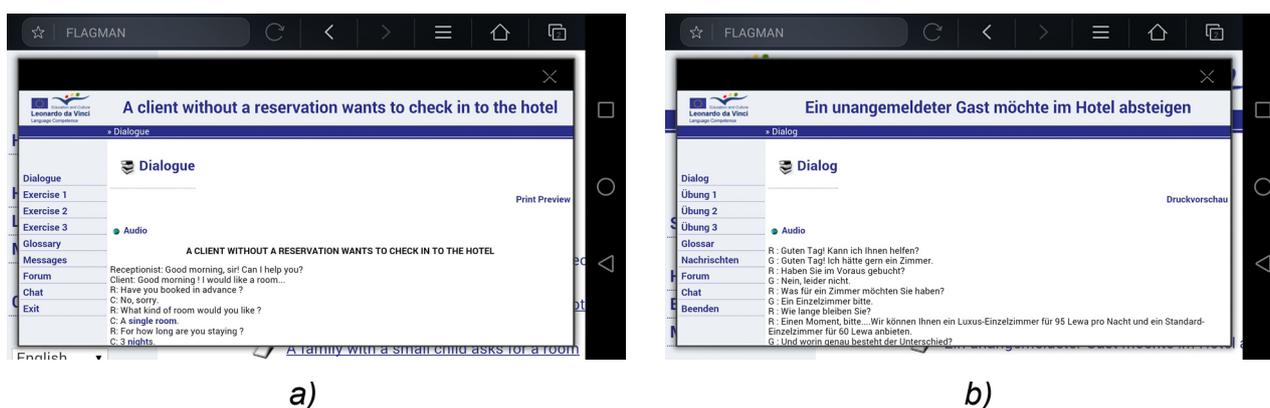


Fig. 4. a) Screenshot of panel for selection of source language;
b) Screenshot of panel for selection of target language

• After the translation of all text elements of the interface and module messages, the translator must save the result.
• The last two steps must be repeated for all other system's modules.

The final result of the work of translators can be seen in Fig.5. It shows the exercise on language chosen by the learner. The text of the dialogue, all exercises, tests and the menu are displayed in the selected language. Some exercises have audio files, which are also recorded on each of the seven languages.



a) Screenshot of an exercise on English;
b) Screenshot of the same exercise on German

CONCLUSIONS AND FUTURE WORK

The methodology has been successfully used and the user interface of the mobile system FLAGMAN and the learning content is translated in seven languages: Bulgarian, English, German, Spanish, Greek, French and Portuguese. Thus the system provides ability to create and edit learning resources suitable for foreign language learning.

The number of published resources till now is 3973 and the number of published themes is 939. Twenty audio records in all seven languages are published in the system and added to respective dialogs. Multilingual glossary (500 words) is published in the system.

The system has been tested and works successfully on desktop computers and various mobile devices running under the operating systems Android, Apple OS and Microsoft Mobile.

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The paper has been reviewed.