A Chatbot for Image Recommendation in Mobile Language Learning

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Abstract: Mobile language learning applications have already shown great promise and have played a significant role in how language learners learn foreign vocabulary. Many mobile language learning applications such as mobile apps, computer programs, chatbots, and electronic dictionaries are developed to support vocabulary learning. Finding images to represent a word, considering the learning contexts, is challenging. Therefore, this article describes the development of a chatbot to provide foreign language learners with images to represent a word to memorize using Telegram messenger platforms. Using Python, Microsoft Azure services, and the Telegram API, this chatbot has been designed to provide five relevant still images from the image search engine to get the images to represent a word immediately. This minimizes learners' time spent searching images and optimizes the planning for their learning activities. This chatbot, AIVAS-iBOT (Appropriate Image-based Vocabulary Acquisition System- Image BOT), was also deployed in Skype and hence could be accessed from Telegram and Skype.

Keywords: AIVAS-iBOT, chatbot for language learner, image recommendation, vocabulary acquisition

1. Introduction

Mobile language learning, known under the umbrella terms mobile learning or ubiquitous learning, has shown promise in delivering close integration of language learning with learners' communication needs and cultural experiences. Because of this, learners can use smartphone functionalities to record experiences and listen to audio at any time, which encourages spontaneous interaction.

Foreign vocabulary learning using mobile language learning has been prevalent in recent years, especially in Asian countries such as Japan, China, Hong Kong, Thailand, and Taiwan. Vocabulary learning research indicated that foreign words are easy to memorize when it is represented with an image. It is because images have a significant role to play in our memory. Hence it is said that a picture is worth a thousand words. Many language learning textbooks extensively use images to create the learning content. Many language teachers and language learning apps use a combination of images to improve language learning. However, finding relevant images for a word that could be used as educational resources takes time and effort for the learners.

Educational chatbots have gained interest in the past years due to the advanced artificial intelligence algorithms used in searching content and recommending relevant content to learners. Typically, a chatbot is a program supporting user interaction via conversation in natural language, and it is accessible through the web or social networks (Pérez-Soler et al., 2021).

This paper aims to develop an intelligent chatbot, AIVAS-iBOT (Appropriate Image-based Vocabulary Acquisition System- Image BOT), for mobile language learners using natural language processing and Telegram. This chatbot is also deployed on Skype and can be downloaded from Skype. This research aims to assist foreign language learners in getting familiar with an educational chatbot environment and minimize image search time.

2. Literature Review

2.1 Chatbots in Education

In education, chatbots are becoming an increasingly popular option to interact with learners, and their popularity and adoption are rapidly spreading (Smutny & Schreiberova, 2020). For example, a review article by (Smutny & Schreiberova, 2020) listed 47 educational chatbots using the Facebook Messenger platform. Consequently, a systematic review by (Kuhail et al., 2023) reported 36 papers to understand, compare, and reflect on recent attempts to utilize chatbots in education. The main emphasis of using chatbots in education is to improve learners' learning experiences and learning outcomes. Some examples of educational chatbots are ELIZA, ALICE, and SmartChild. At the Botlist directory, over 2000 chatbots built and deployed on various platforms (e.g. Amazon Echo, Skype, and Slack) could be found.

2.2 Image Recommendation Research in Language Learning

Image recommendation systems have became popular in various domains, such as e-commerce and product recommendation. However, few research studies have examined the scope of image recommendation for language learning. One research by (Hasnine et al., 2018) built an image recommendation environment for language learners. This study proposed a model for Feature-based Context-specific Appropriate Image (FCAI) recommendation to mobile language learners. However, this model has yet to be implemented in a chatbot environment. Also, a few chatbots are built to support image recommendation for word memorization.

Therefore, we introduce AIBAS-iBOT, a chatbot for image search and recommendation to mobile language learners in this study. This educational tool can be downloaded from Telegram and Skype messages.

3. AIRS-iBOT

3.1 Design Process and Methods

Figure 1 shows the flowchart of the AIVAS-iBOT.

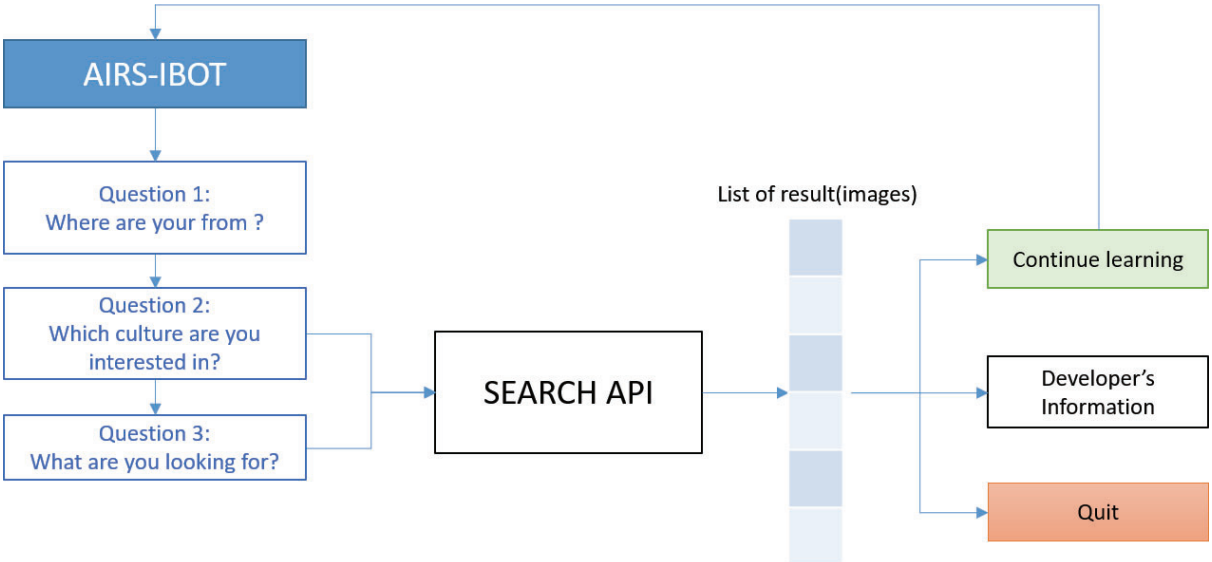

Figure 1. Flowchart of the AIVAS-iBOT.

In the design process, Question 1 defines the language for the chatbot's user interface. Question 2 indicates the country where the results come from, and Question 3 indicates what you want to search for. Each question has some button to guide user action; it enhances the user experience by selecting the available button or directly entering the question/answer.

After getting a list of results, AIRS-IBOT will give the information on the next step. Here a learner will have some choices for continuing using the chatbot. They are:

- Continue Learning: It will go back to the first question, and you will continue to use the chatbot
- Developer's Information: It gives the information of the developer of this chatbot.
- Quit: Quit the operation of the chatbot

3.2 Integration with Telegram and Skype

Telegram (https://telegram.org) and Skype (https://www.skype.com/en/) are popular instant messaging platforms. According to the Telegram website (https://telegram.org/apps), Telegram apps are open source and support reproducible builds. Anyone can independently verify that the Telegram apps you download from the App Store or Google Play were built using the same code that we publish. Skype website (https://www.skype.com/en/features/) suggests that hosting a video or an audio conference with up to 100 people, recording your calls, enabling live captions and subtitles or just simply talking over their smart chat platform is possible at Skype.

Due to these benefits, many apps and chatbots are built and integrated into Telegram and Skype. Telegram and Skype have 550 million and 2.1 billion users, respectively. Many of them use these platforms for educational purposes. Therefore, we aimed to integrate AIVAS-iBOT with Telegram and Skype. Figure 1 shows the integration.

3.3 Deploy in Telegram

At first, we created a Telegram account to create our chatbot onTelegram Bot. To start a new chatbot in Telegram, search for "BotFather" – a bot for managing all Telegram Bots and start registering the new bot.

- Send /start to start a new conversation
- Send /newbot to create a new Telegram bot.
- Configure Telegram in the Azure portal with an access token field

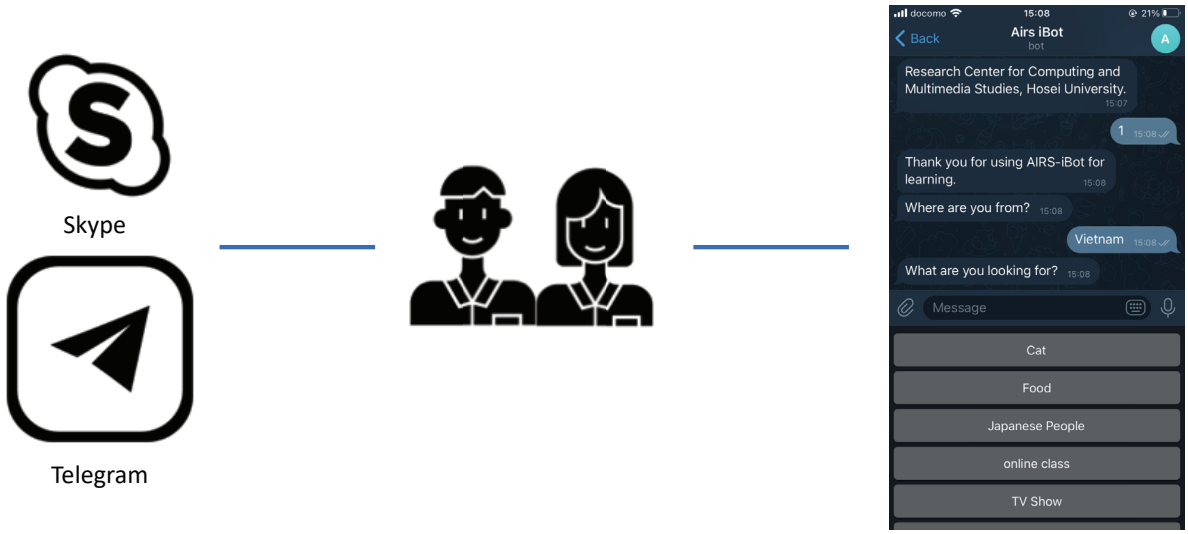

Figure 1. AIVAS-iBOT Integration with Telegram and Skype.

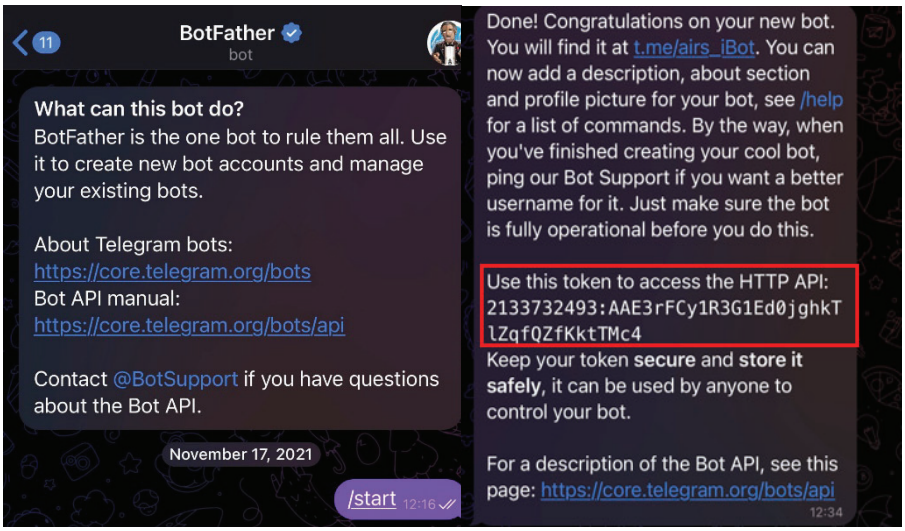

Figure 2. Access Token to Configure Telegram in Azure portal.

3.4 Image Recommendation

AIVAS-iBOT generates results upon answers to three questions by a learner, as follows:

First, *Where are you from?* Answers to this question give the chatbot an idea of a learner's cultural background.
Second, *Which culture are you interested in?* Answers to this question give the chatbot an idea about the language the learner is interested in.
Third, *What are you looking for?* Answers to this question give the chatbot an idea about the topic the learner is looking for.

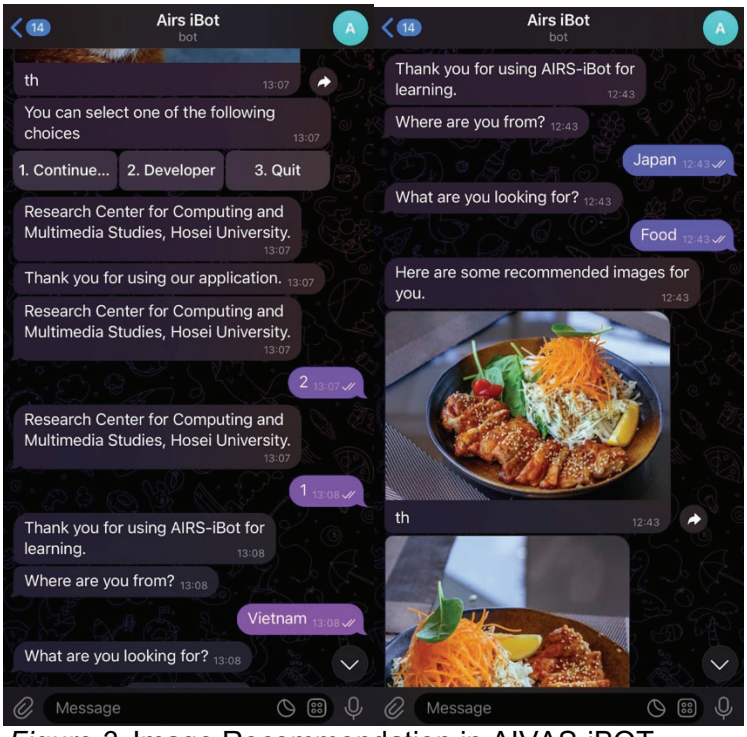

Figure 3. Image Recommendation in AIVAS-iBOT.

For each question, the AIVAS-iBOT suggests some options. So, a learner can choose from those options without typing his/her option if there answer matches with AIVAS-iBOT suggested options.

4. Summary

In this project, we developed a chatbot that returns appropriate images relevant to the language learners' search query. We use the Azure CLI to create AIRS-iBOT and use Bing Search API v7 as the function for searching images. For developing this Chatbot, we used Python as the programming language and Bot Framework Emulator to test and debug the bot. With Bing Search API, we can: AnswerCount. This means we can set the number of answers that we want the response to include. Also, we can Count Code. This means understanding the country where the results come from. In addition, Bing Search API can support many languages, the language to use for user interface strings.

Using AIVAS-iBOT, a mobile language learner gets appropriate images to represent a word he/she intends to memorize. The search and ranking result is swift in our chatbot. This chatbot is a new development to our image recommendation reseach for foreign vocabulary acquisition (Hasnine et al., 2017, 2019).

Future work will address the efficacy of this chatbot. We aim to investigate how learners interact with this chatbot environment, whether the recommended images help learners in short- and long-term memory retention, and what image properties are essential to recommend images for abstract nouns or adjectives. We also aim to investigate where generative AI could be used in improving the performance of AIVAS-iBOT.

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