

Initiative Concerning Global Service Development by NTT Communications

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Abstract

NTT Communications has established bases in over 120 cities in more than 40 countries and regions, where it provides information and communication technology services on a global scale. The network services it provides cover an area exceeding 190 countries and regions. At the company's Technology Development department, we have set *service development of new technologies* as one of our missions and are developing state-of-the-art technologies while verifying developed technologies and evaluating their performance. In this article, we introduce an example of global service development by NTT Communications.

Keywords: AI, global, service development

1. Introduction

To develop new services and deploy them globally, it is important to consider and reflect not only the advanced nature and future prospects of the technology to be adopted but also various factors such as the market, infrastructure, and the regional characteristics of the area in which services are provided. Therefore, NTT Communications (hereafter, NTT Com) dispatched two of our engineers from the Technology Development department to its subsidiary, NTT Com Thailand, where they worked on service development tailored to match the circumstances in Thailand for about a year starting in September 2016. The main reason we chose Thailand as the dispatch destination is that the economic growth in Southeast Asia has been remarkable in recent years, and Thailand is a major economic country in that promising market. Moreover, its citizens in general are positive about accepting new things. Thus, it is easy to obtain the cooperation of users in demonstration experiments using state-of-the-art technology such as artificial intelligence (AI). This article introduces our initiative concerning the AI Concierge service.

2. AI Concierge

In this section, we present an overview of AI Concierge and explain the background that led to its development, as well as its architecture and functions.

2.1 Overview

AI Concierge was developed with the aim of converting operations for concierge and reception services into AI and thereby improving operational efficiency. It uses the COTOHATM*1 communication engine provided by NTT Com. By using voice or text input to AI Concierge, the user can search for phone numbers, communicate by phone with persons in charge of visits, be guided to meeting rooms, toilets, or other areas, and receive information about recommended lunch spots. In addition to Japanese and English, AI Concierge supports 17 other languages, including French, Spanish, Thai, and Indonesian.

*1 COTOHATM: A communication engine that handles business processes such as answering inquiries, problem solving, order entry, and invoicing while analyzing and understanding people's spoken and written language with high accuracy and communicating with customers (end users).

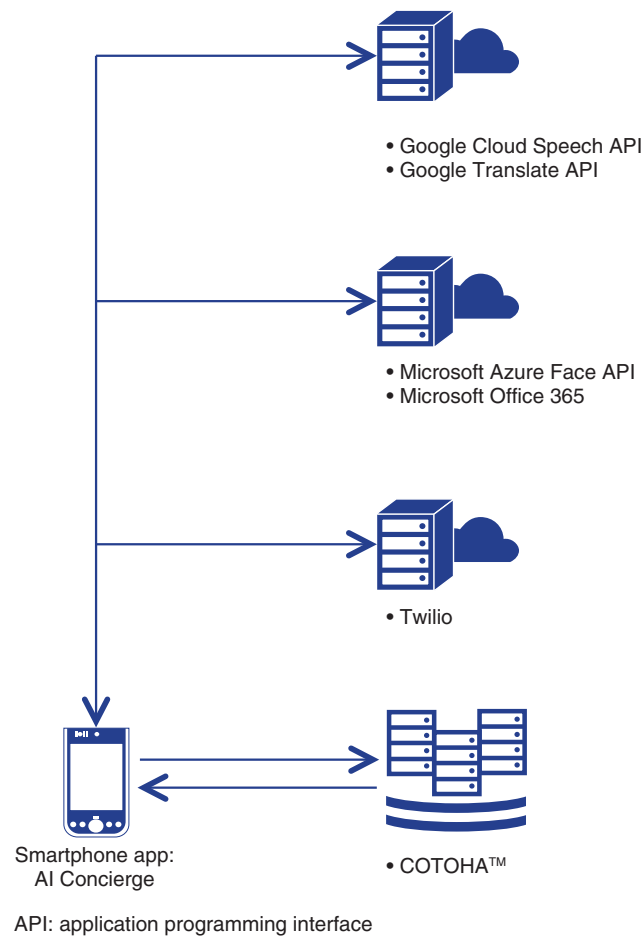


Fig. 1. Architecture of AI Concierge.

2.2 Background to development

In Thailand, there is much interest in the latest ICT (information and communication technology) such as the IoT (Internet of Things) and AI. Accordingly, in collaboration with NTT Com Thailand, we focused our efforts on developing services using AI. One problem at NTT Com Thailand was that they did not have staff dedicated to the company's reception desk, and at times no staff members were present at reception. Additionally, the English proficiency of the staff dealing with customers was not very high, so they could not respond appropriately to some customers. Consequently, by developing a reception service utilizing multilingual AI, we aimed to solve the problem at NTT Com Thailand and also promote the development of new services utilizing AI.

2.3 Architecture and functions

AI Concierge is being developed under the assump-

tion that its functions will be used at company reception desks. The architecture of AI Concierge (as of May 2018) is shown in **Fig. 1**.

AI Concierge incorporates several AI engines on the cloud—namely, COTOHA, the Google Translate API (application programming interface), Google Cloud Speech API, Microsoft Azure Face API, Microsoft Office 365, and Twilio—as components. The six components incorporated in AI Concierge are summarized below.

- Communication engine COTOHA (conversation scenario processing function)
- Google Translate API (translation function)
- Google Cloud Speech API (voice-to-text/text-to-voice conversion function)
- Microsoft Azure Face API (face-analysis function)
- Microsoft Office 365 (groupware function)
- Twilio (outbound calling function)

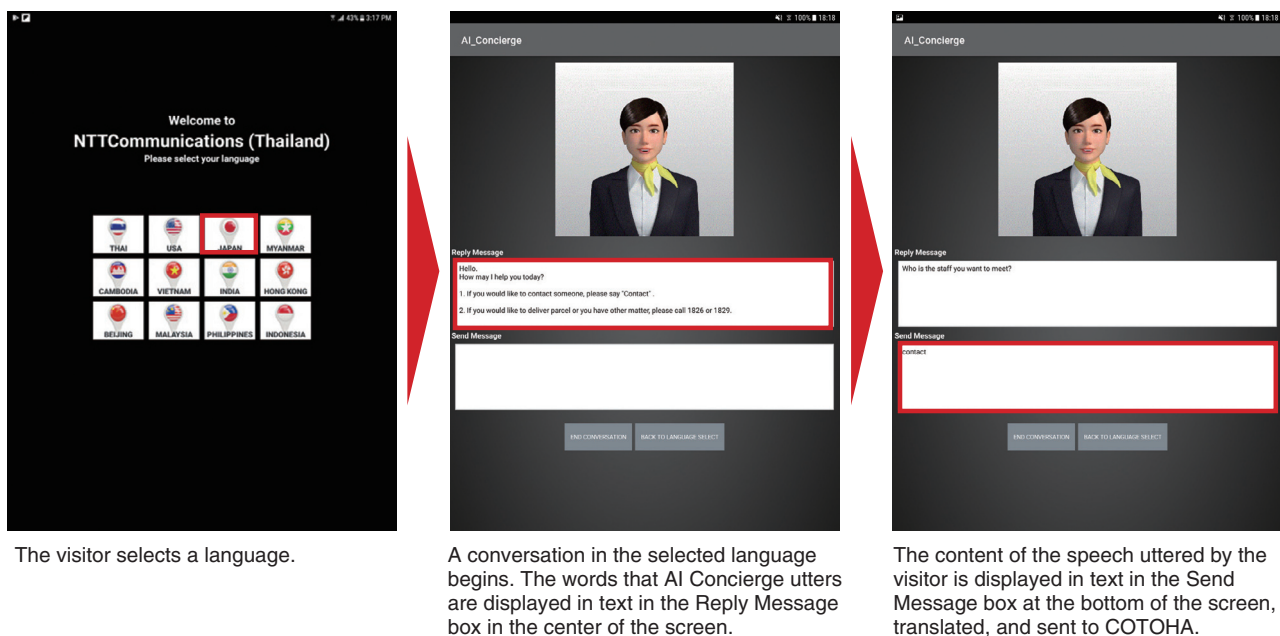


Fig. 2. Transition of AI Concierge's screen.

When the application is launched, AI Concierge first displays a language-selection screen, and the visitor begins a conversation in the designated language by selecting the language of choice. When the visitor responds to the question from the application, the words uttered by the speaker are converted into text by the voice-to-text conversion function of the Google Cloud Speech API, the text is translated by the Google Translate API, and the translated text (English text) is sent to COTOHA. COTOHA stores a group of scenarios written in English and returns the appropriate answer taken from those scenarios based on the received text. The text returned from COTOHA is conveyed to the visitor as a response in voice and text in the designated language acquired using the Google Translate API and the Google Cloud Speech API again. The transition of AI Concierge's screen is shown in **Fig. 2**.

AI Concierge also has other functions. For example, one function can change the app's response according to the information about the visitors themselves. The system acquires information about the visitor by capturing an image of the face of the visitor by the internal camera when they are selecting their preferred language and analyzing that image information using the face-analysis function of Microsoft Azure. With that information, AI Concierge can change the image displayed on the reception screen

and modify the voice used to communicate with the visitor. It is also possible to change the scenario by, for example, including the name of the visitor in the response, based on the visiting history of the visitor acquired by facial analysis. The groupware feature of Microsoft Office 365 and Twilio^{*2} are used to check the schedule of the person in charge of the visit so that AI Concierge can call that person by telephone.

AI Concierge is currently installed in the reception area at NTT Com Thailand, and the reception service is up and running. Commercial services of AI Concierge are expected to begin throughout Thailand in the near future. In addition, since AI Concierge is multilingual, its expansion to other countries is being actively pursued.

2.4 Introduction at events

AI Concierge was exhibited at Digital Thailand Big-Bang 2017^{*3} held in Thailand from 21 to 24 September 2017 (**Fig. 3**). At that event, a wide range of customers, including researchers, businesspersons, and students participated and exchanged opinions.

*2 Twilio: A service that makes it easy to incorporate various means of communication such as voice calls, messaging (short messaging service/chat), and video phone calls in applications and businesses.

*3 Digital Thailand Big-Bang 2017: An event held in Thailand based on the concept "Digital Transformation Thailand."

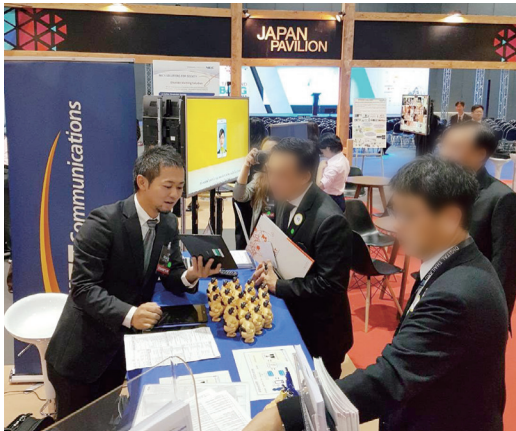


Fig. 3. Exhibition at an event in Thailand.

Many visitors were interested in the possibility of talking in the Thai language, and that fact reconfirmed the need for including local languages in information and communication technology services, which give precedence to handling the major languages such as

English and Chinese. Additionally, in the second half of 2017, AI Concierge was exhibited at NTT Com Forum (Japan), a private event of NTT Com, and at an event in India.

3. Future development

This article introduced the AI Concierge service in Thailand as an example of service development outside Japan. AI Concierge has been implemented as a reception service at NTT Com Thailand, and in the near future, a full-scale commercial service across Thailand will start. Furthermore, since AI Concierge is compatible with multiple languages, its use is expected to expand to other countries. NTT Com will continue to actively develop advanced services such as AI Concierge that utilize various state-of-the-art technologies for deployment around the world.

Trademark notes

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