Tour Guide Application for Tourist via Line Chatbot – In the case of Multicultural Tourism, Narathiwat Province –

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Abstract

The objectives of this research composed of 1) to develop a tour guide application and provide information via Line Chatbot of multicultural tourism for southern border cities. 2) To evaluate the efficiency of the application in practical use via Line Chatbot in the specific location at Narathiwat Province 3) To evaluate the satisfaction and effectiveness of the application by providing updated and corrected various information and all times auto responses between the application and user for better convenience and practical use. An automatic response in the form of an official account (LINE Official Account) can provide multicultural tourism updated information has been developed the application using the System Development Life Cycle (SDLC) which uses Artificial Intelligence (AI), Natural Language Processing (NLP) technology and the dialogflow program. The application is divided into 3 parts: 1) the user interface, 2) the message processing part from the user, and 3) the fulfillment engine. The user can select the information from the rich menu and a shortcut menu that displays additional requirement for the user needs. The tourism information included tourist attractions, restaurants, accommodations, and tourist routes, etc. From the satisfaction assessment of the application, a sample data group of 100 tourists has been used statistical analysis included mean and standard deviation. The results of the research found that 1) the efficiency of the application via Line Chatbot from the expert is at a very good level ($\bar{X}$= 4.37, S.D. = 0.38) and 2) the satisfaction of users is at a very good level ($\bar{X}$= 4.37, S.D. = 0.38) under this specific development.

Keywords: Line Application, Chatbot, Multicultural Tourism, Artificial Intelligence

Introduction

Narathiwat Province is located in the southern part of Thailand, the province is the gateway to ASEAN, passing through the eastern region of Malaysia and bordering the Gulf of the country. This province having a human capital and multicultural in Malay identity also linked to neighboring countries like Malaysia and Singapore including the natural resource capital for ecotourism attractions in accordance with the third development issue, namely developing the tourism sector, services based on wisdom and culture and quality natural resources. According to the Narathiwat Province Development Plan (2023 -2027), this province has a great geographic advantage in tourism and many available readiness accommodations for tourist place attractions also this province is the gateway to the neighboring country, especially Malaysia. The 3 border checkpoints channel can support for a large number of Malaysian tourists to travel to the Narathiwat areas. But some places are still not very popular due to lack of the information on tourist attractions. Managing such these problems has been conducted using the information systems by creating a database of tourist attraction of the Phitsanulok tourism information system through the LINE Chatbot application, which is more convenient and efficient communication channel that makes users satisfied with receiving quickly and continuously services (Wasu et al., 2020).

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Currently, there is a computer program called Chatbot that can reply the questions immediately and can work 24 hours a day and also learning to interact by applying the principles of machine learning for increasing the efficiency of the communication covering the desired goals (Jirandorn, 2017). Chatbot can connected via social networks such as LINE, which is an application that is very popular in Thailand (Kwanrudee, 2017; Kornkan et al., 2020). This can be used to communicate in text, sound or voice, images, video, and also stickers by applications on smartphones in the tourism industry. Tourism 4.0 has been focused on technological innovation and value creation in tourism. A study on a holistic approach to create an application for tourism industry 4.0 has been used of innovation and technology for value added to support the solution problems that may occurred in tourist destinations and cultural heritage. The data connection to the internet has a large number of databases that can be used to support in planning, (Miri et al., 2018), developing and promoting Tourism Marketing 4.0. By relying on a large amount of information from online data (Big Data) and all devices had been connected to the IoTs, including social media, etc.

Therefore, under this particular environment in the area, this research objectives composed of 1) to develop a tour guide application and provide the multicultural information via Line Chatbot for tourist in the southern border cities, 2) to evaluate the efficiency of the application via Line Chatbot and 3) to evaluate the satisfaction of users in the practical use of the system.

Materials and Methods

1. Scope of the research activity

Using dialogflow and LINE application to analyze the questions and solution from the users has been collected all resulted information and pictures then displayed in Chatbot conversation. Social media has been found to be an effected on Thai tourists' travel decisions by recommending tourist attractions through the LINE application. Text, images, and videos will be used to provide for tourists' perception and deciding choices. A conceptual development framework of the application as shown in Figure. 1.

The users are able to start the inquiry for information through the LINE application on their computers or smartphone in the forms of auto responses conversation from the Chatbot. This system developed using dialogflow that embedded with Artificial Intelligence (AI) technology. Then, comparative set of the question and answer from the database will process using the Natural Language Processing (NPL) technology and Intent Matching algorithms compliance to clarify the correct intent of the questioner (Dahiya, 2017).

Sathamunee et al., (2021) studied the development of the information systems to promote tourism using LINE Chatbot application system in Phitsanulok Province, all data has been collected and analyze the performance of the system from 385 tourist members of online social group found that the overall efficiency and acceptance of the system from the experts and the users is at a high level. Also, in accordance with the studied form Thonglim, (2023) found that by using

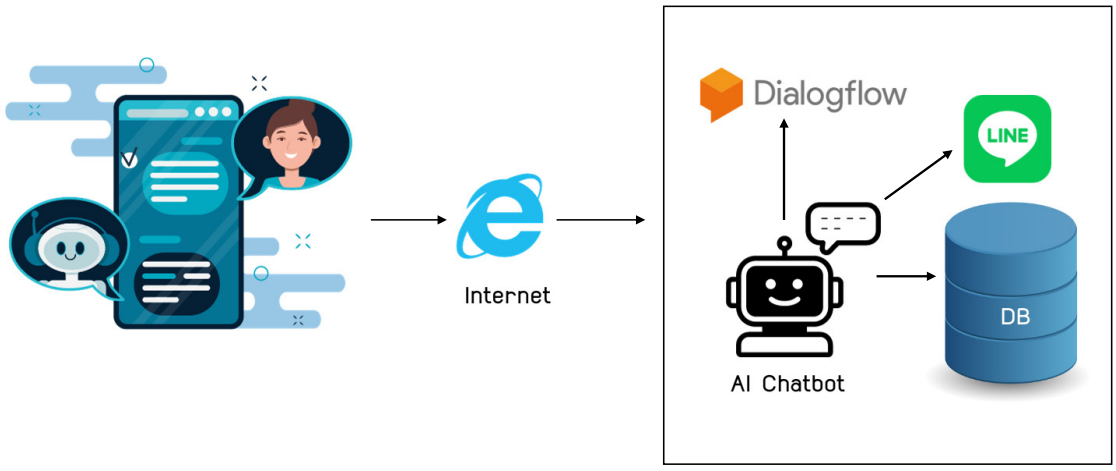

Figure 1. Conceptual framework of the research

the development of a response and educational information notification system for Faculty of Medical Sciences, Naresuan University with LINE chatbot had been represented in high level of satisfaction of the application performance that can supported the information directly to service users. Also, can reduce the burden on officials in answering questions in providing educational information.

Sumana et al., 2020 has been studied the development of Chatbot applications for student services in the case study of the student development division, Rajamangala University of Technology Suvarnabhumi, found that the highest level of the efficiency with a total mean of 4.50, standard deviation of 0.20 and satisfaction of users of the Chatbot application is at a high level at the mean of 4.46 and the standard deviation is 0.03. These results indicated that the Chatbot application development can effectively reduce the time required to answer the questions of the official staff and students at the university.

2. Evaluation of the system performance

Two steps of the system evaluation under these specific criteria have been presented as follow:

2.1 System Development Life Cycle (SDLC) has been conducted in this research and described as follows:

1) Study on work problems

Narathiwat Provincial Tourism and Sports Office, is the only organization website that used as a tool for publicizing various information including travel and sports information. Due to the workload and duties of the officer, that sometimes hinder the searching for travel information on websites and the tourist route not yet been updated also the replying delay in various questions through the Facebook page of the organization. Then, the head of the Tourism Promotion and Development Group needed additional public relations channels to reduce the burden on officials to a certain extent.

2) System analysis and design

From the consulting with the head of the organization in mentioned above, this research has been analyzed and designed the system by using LINE application as another public relations channel platform and recently this application is very popular to use. The LINE chatbot system has been developed and designed through the Use Case Diagram. Then, the admin was responsible for supervising adding, deleting, editing, searching for information, and updating various information. Also, the user can search and share various information that the admin has been notified. The description of the process as shown in Figure 2.

3) Chatbot system development

This study has been developed by using the LINE Official Account tool for the user interface. There are two methods for exchanging contact between administrators (Admin) and us-

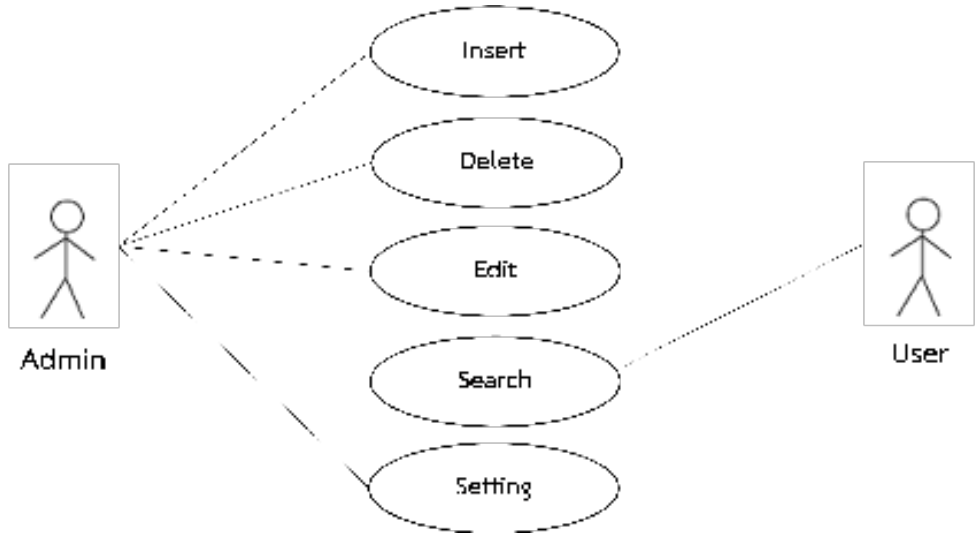

Figure 2. Use Case Diagram of the chatbot

ers: 1) conversation methods (Chat Mode) and 2) automatic methods (Bot Mode). By the conversation method, interaction with the system manager or auto-response, message that match the keyword will be immediately responded. This method is managed through the LINE Official Account Manager, while the automatic method is through the dialogflow console and allows the system to be flexible in understanding the text or sentences of the user questionnaire (Chun et al., 2018). In addition, LINE Official Account can design a rich visual menu or a shortcut menu that can display in additional user desired through images on the smartphone or computer screen. Developing an automatic method by using dialogflow as a tool, the Google service that uses machine learning in the field of Natural Language Processing (NLP) (Google, 2021) which can learn and understand the needs (Intent) and increase the flexibility interactions by understanding the user's desired (Entity) message or sentence (Nongnuch et al., 2019; Kornkan et al., 2020). The dialogflow has been created an agent for information receiving from users (Input/Request) and then process or check the user's intent or needs compliance matching with the questions or answers that have been set. Therefore, the user responses through the Messaging API and webhook as demonstrated in Figure 3.

And also using Google Site to support the connection of two system integrations to make a Chatbot, the LINE application can respond to users using LINE message and then generate a format variation content, such as display information content with message cards. The message cards can be designed for desired content also a large area for tapping or clicking links. Therefore, expected that the users will tap or click on links more than other types of text as shown in Figure 4.

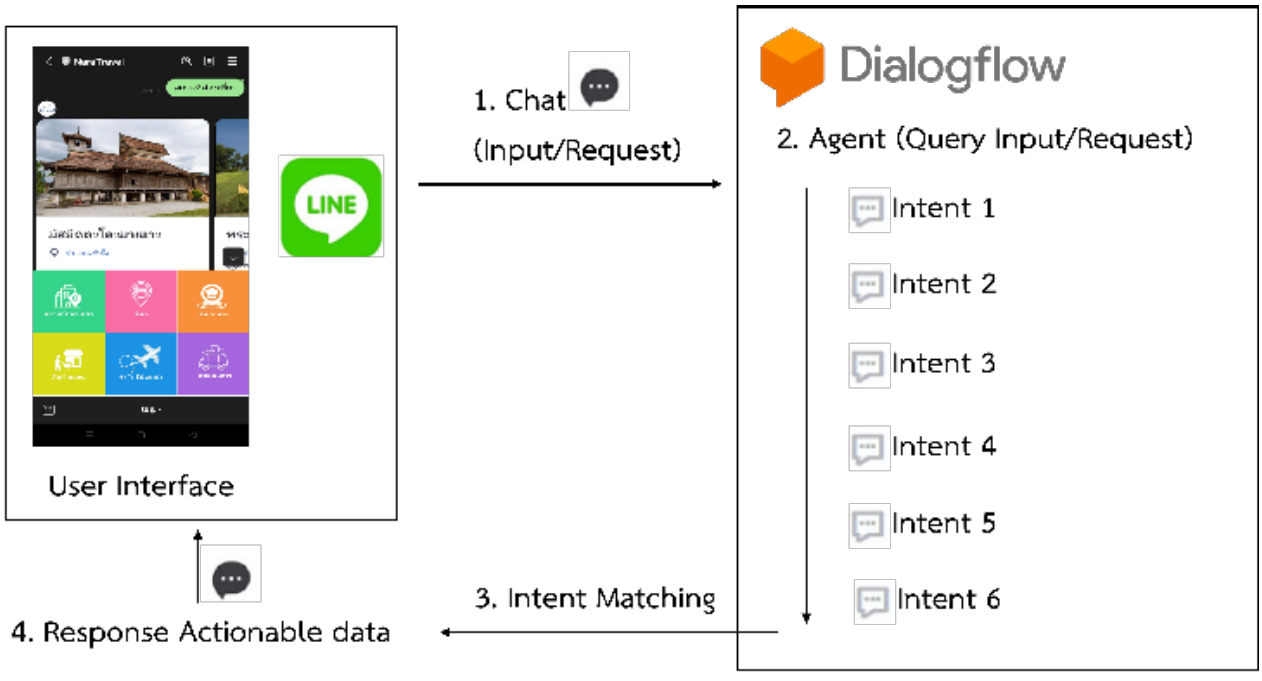

Figure 3. Chatbot workflow diagram

Figure 4. Development of a system for displaying information with message cards.

4) Testing and evaluation

After the development of the system, 5 experts have been tested and evaluated the efficiency and the integrity of the application using the White Box method. Then, overall performance of the application also has been checked. Revision version in accordance with the recommendations of the experts has been validated to meet the designed requirements of the user.

5) Practical use examination

A sample of 100 people has been tested and evaluated in practical use of satisfaction and effectiveness of the tour guide application.

6) Statistical analysis

The descriptive statistical processing method has been used to analyze the obtained data. The collected data was analyzed for statistical values, which consisted of mean and standard deviation. Content Validity testing was used to calculate the results of IOC (Item Objective Congruency Index) consideration from 3 experts. The confidence test (Reliability) is the calculation of Cronbach's Alpha coefficient to determine the stability of the system.

2.2 Experimental design

One hundred travelling tourists in Narathiwat Province have been selected for the sample group using Simple Random Sampling in this research activities. The questionnaire has been used to collect the data and the system performance using the White Box method had been conducted for testing and evaluation of the efficiency of the application (Srisa-at, 2006) as follows: 1) testing of individual parts 2) testing of functionality by integrating each part of the application system 3) testing of all functions and 5 levels of specifying criteria rating scale. Then, the satisfaction assessment in all various aspects using Google form has been evaluated using the Black Box method (Thianthong, 2005). The system evaluation has been divided into 3 areas: 1) quality of information content, 2) performance of the functions, 3) images and display. The application form has been used to evaluate the effectiveness of the system, and then the content validity has been checked by 3 experts in all coverage of questionnaire. According to the specified elements for consideration and evaluation, the consistency between each question and the definition of research terminology as well as the appropriateness of the language used for correction and improvement, the Index of Item – Objective Congruence (IOC) value has been verified. The consistency index value of the all questionnaire was found in the range of 0.67 - 1.00, which is greater than 0.50. Therefore, it can be used as a tool appropriately. Then applying to the similarly characteristic sample of people with an experimental group of 30 people. The whole version reliability of questionnaire has been evaluated the effectiveness of the application via Line Chatbot using the coefficient method Cronbach's alpha and found to be at 0.80.

Results and discussion

Under this particular studied to promote tourism in Narathiwat Province by using the chatbots on the Line application and develop public relations of the Narathiwat Provincial Tourism and Sports Office can be described as follows:

The development of a travel recommendation application via Line Chatbot about multicultural tourism of southern border cities represented in Figure. 5

The evaluation of the performance of the application via Line Chatbot using the White Box method in various aspects as follows: 1) testing of individual parts 2) testing of functionality by integrating each part of the application system 3) testing of all functions. The results were then analyzed with basic statistics compared to the criteria and then the results were summarized as shown in Table 1.

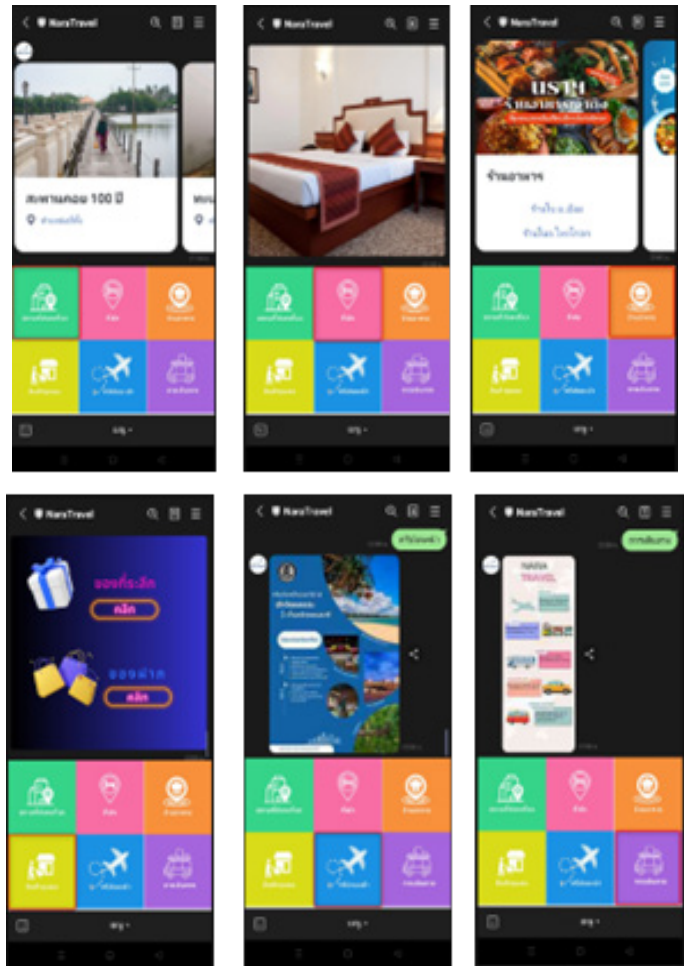

Figure 5. Tour guide application via Line Chatbot

Table 1. Results of the efficiency evaluation

Assessment Item	$\bar{x}$	S.D.	Level of Satisfaction
1. Quality of the information content			
1.1 Sub-section testing	4.35	0.40	Best
1.2 Functional testing by integrating each part of the application system	4.59	0.29	Excellence
1.3 All functional testing aspect	4.18	0.45	Best
Mean avg	4.37	0.38	Best

The results from Table 1, represent the evaluation of the efficiency of the tour guide application via Line and found that the overall efficiency was at a very good level ($\bar{x}$= 4.37, S.D. = 0.38). While, considering the evaluation in each area, the testing aspect of working by integrating the system of each part of the application was at the highest level ($\bar{x}$= 4.37, S.D. = 0.38). The sub-section test ($\bar{x}$= 4.35, S.D. = 0.40) and the whole function test ($\bar{x}$= 4.18, S.D. = 0.45) were effective in the work at a high level.

To assess the satisfaction of users of the application by using the Google form as a tool for an evaluation. The evaluation of the system will be divided into 2 parts: 1) the quality of information content, 2) the performance of the functions, and 3) the images and display as shown in Table 2.

Table 2. Satisfaction results of users of the application via Line Chatbot.

Assessment Item	$\bar{x}$	S.D.	Level of Satisfaction
1. Quality of the information content			
1.1 Language using correctly of Chatbot	4.53	0.65	Excellence
1.2 Display all covering content detail	4.40	0.86	Best
1.3 The response information is correct and meets the needs	4.27	0.94	Best
1.4 Font, spacing, clarity of the display text	4.40	0.81	Best
1.5 Recognizing a variety of question and answer formats	4.40	0.81	Best
Mean	4.40	0.82	Best
2. Functional performance			
2.1 Chatbot's interaction speed with users	4.47	0.57	Best
2.2 Chatbot's ability to provide problem solution	4.73	0.58	Excellence
2.3 The Chatbot's ability to handle unexpected questions and can control such events	4.23	0.82	Best
2.4 Defining function for proper use	4.60	0.67	Excellence
2.5 Natural interaction between Chatbot and travelers	4.40	0.81	Best
Mean	4.49	0.69	Best
3. Image and display			
3.1 Operational method is simple and uncomplicated	4.47	0.57	Best
3.2 The user interface color scheme is beautiful and appropriate	4.53	0.78	Excellence
3.3 The display of information content is beautiful and appropriate	4.10	0.80	Best
3.4 The format of images and texts is clear and easy to understand	4.40	0.81	Best
3.5 The graphics are perfect for the content	4.10	0.84	Best
Mean	4.32	0.76	Best
Mean avg	**4.37**	**0.42**	**Best**

The results from Table 2 found that the overall picture in 3 aspects from the users of the application is at a very good level ($\bar{X}$= 4.37, S.D. = 0.42) for the quality of information content ($\bar{X}$= 4.40, S.D. = 0.82), function efficiency ($\bar{X}$= 4.49, S.D. = 0.69) and the images display ($\bar{X}$ = 4.32, S.D. = 0.76) is at a very good level.

Conclusions and recommendation

Chatbots are applied in communication between users and agencies, whether it be in public relations, and automate quickly response to the users or inquiries by providing useful news services. Chat programs that are installed on mobile devices such as LINE, Facebook Messenger, WeChat, and WhatsApp, etc. However, in designing and developing prototype chatbot applications, tourist attraction recommendation service has been used the chat line communication program (LINE) as a user interface by up to 45 million Thai people (Online Manager. online. 2020). Therefore, using LINE as the user interface allows the application to reach a large user base including the LINE program, there is a part called LINE Messaging API that makes it easy for system developers to define interaction formats and design a good user interface. Similar to the research of Buhuadcha, (2017), who used a program with LINE API combined with PHP language to develop a Chatbot prototype for giving advice on a research grant request system of the national budget, Nakhon Pathom Rajabhat University. The developed Chatbot displayed items in the form of buttons for users to tap instead of typing text and be more responsive to users. In addition, Chatbot development should focus on design in conversation format of short sentences and use polite words and also easy to learn including links to other useful information to meet the needs of the users (Hill et al., 2015). The highlight of an application prototype that recommended for tourist attractions are: functional performance in the Chatbot to handle unexpected questions and control such events and quality of the information content. For the corrected language use of Chatbots, which is in accordance with Santiratanapakdee, (2018) that the important capabilities of Chatbots for user acceptance is the user's learning and the effectiveness aspect. The development of Line Chatbot application with and automatic response to promote tourism may require analysis and the development of relevant linking work systems as well as increasing the accuracy of the application by increasing the amount of data from the real users and real environment hence increasing the efficiency of the accuracy on auto responses can be observed.

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