Mobile Application Development for Management of Information System of Agro-Tourism Activities and Attractions with YII Framework

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Abstract—Noppitam district, Nakhon Si Thammarat is known as one of Thailand's rich natural sources which features a range of agro-tourist attractions. However, there is no dependable information system for management of tourism and routing guidance available in such district. The locals mostly resort to their own social media platforms in attempt to publicize local attractions, which unfortunately causes disorderliness to the information. Upon arrival at the Noppitam district, Nakhon Si Thammarat, tourists therefore have to search for information of each tourist attraction separately. Regarding this, it is essential to develop the management information system for agro-tourism activities and attractions with the YII framework, and implement the MySQL to devise the database. This can help with management of information for tourism, restaurants, and residences available around the district. Moreover, it can serve as the central system which provides tourists with information regarding tourist attractions open in the Noppitam district as well as guides them to the destinations, restaurants, and residences nearby, with accurate multilayered data on Google Maps API. The system also enables tourists to give feedback, either via their iOS or Android devices. Thanks to the participative data management, owners of attractions, restaurants, and residences can manually update information to keep it all up to date.

Keywords—management of information system, agro-tourism, Noppitam district, YII framework

1 Introduction

Located in Nakhon Si Thammarat, Thailand, the Noppitam district is of four sub-districts as follows. 1) Krungching sub-district is in a valleyed area surrounded with mountains. Its geographic characteristic is a mix of plateaus with high mountains. There are plenty of forests, natural resources, and key river sources inside the Khao Luang National Park and the Khao Nan National Park [1]. 2) Noppitam sub-district is a plentiful land with an abundant source of natural resources as well as a gorgeous landmark. The land is rife with waters and thus suitable for agriculture; and the Noppitam sub-district has various tourist attractions worth a visit [2]. 3) Na Reng sub-district is a land

of natural resources and rich environments, where a variety of wildlife and plants are well conserved, as part of the land belongs to the Yot Lueang Waterfall in the Khao Luang National Park. 4) Karhaw sub-district is a land through which canals flow into almost every village. Such geographic characteristic enables the residents to pursue their agricultural jobs [3]. In overall, the Noppitam district is characterized as a land of plateaus with high mountains, has plenty of natural resources, belongs partially to the Khao Luang National Park, and features both traditional and new natural tourist attractions such as the Khao Janglone Sea of Fog Viewpoint, Krungching Rafting, Krungching Waterfall, Hong Cave, and Krungching Onsen Therapy. Additionally, the Noppitam district is good for agriculture, which helps uplift potential of agriculturists, thanks to a large canal (Klong Klay). At agro-tourist attractions, tourists can participatively enjoy ways of local life in which the residents can demonstrate their daily agricultural activities. The tourists can also learn how to travel eco-friendly, so awareness of environment conservation can be raised [4]. Besides, they are provided with onsite agricultural experiences, starting from soil preparation until harvesting. Examples of attractions are Loong Khiew Lady Finger Banana Garden, Ban Wang Nak Organic Durian Garden, Ban Wang Nak Bantam, Pee Sit Hybrid Farm, Loong Nuad Durian Garden, Ar Ead Grape Farm, and Loong Khiew Salak Garden. In the past, however, the Noppitam district received little recognition and was rather known as Krungching or Krungching Waterfall, which was seen print on 1,000 THB banknotes released in 2535 B.E. [5]. Although tourist attractions in the Noppitam district were unpopular in the past, they now become more recognized because the locals have put effort on publicizing the places as well as different activities on social media platforms. Yet their effort seems to be too individual, causing disorderliness to the information. Upon arrival at the Noppitam district, Nakhon Si Thammarat, tourists have to search for information of tourist attractions, residences, restaurants, and routes on their own, and cannot access all the information in one click as it should be. This leads to such problems as waste of time, inaccuracy of information, and outdatedness of information. These problems worsen travel experiences, especially for agro-tourists, who are of specific interest in agriculture, prefer information technology, and love browsing information on smartphones [6].

In response to such problems, the researcher would like to uplift travel experiences of potential tourists and publicize agro-tourism in the Noppitam district, Nakhon Si Thammarat. The researcher developed the information system for management of agro-tourist attractions, which was done in collaboration with a partnership network of the four sub-districts. The system offers information regarding agro-tourism with highlight on healthy agriculture, and provides guidance on agro-tourism and eco-tourism activities, which could make each trip livelier and more fulfilled. Tourists can have an access to information of attractions, residences, and restaurants, which are displayed in the form of multilayered data on all kinds of smart devices. Developed upon the Yii framework and Google Maps, the system gives permission to two groups of users. The first group includes owners of attractions, who are allowed to manually update their agro-tourism business information; and the other group includes tourists, who are allowed to access the information on their smartphones, ask for directions to the destination, contact the attraction's owner, and give feedback on the system. For administration and

management of the system, only the super admin holds permission [7]. This kind of system should be convenient to agro-tourists, for they often depend on tourism websites to help with their trip planning, and drive on their own on each journey. Most of the agro-tourists embark on each trip of this kind for sake of relaxation, stress relief, agricultural learning, and observation of local, economy lives, where they can be embraced by authentic nature and agriculture-centered environments.

2 Literature review

Based on a thorough review of literature on agro-tourism activities and attractions, agro-tourism can be defined as a category of tourism in which tourists can take part in agricultural activities in order to grasp a better understanding of agricultural tasks [8]. Agro-tourism is advantageous to development of agriculture zones. A propellent collaboration of agricultural sectors and local communities to improve tourism contributes to addition of agriculture value and competitiveness within the field, which brings sustainability to communities [9]. On the other hand, agro-tourism can be referred to as a kind of tourism for a specific group of tourists, who mostly head to farms and ranchlands for purpose of nature discovery and travel [10, 11]. Agro-tourism features studies of agricultural processes passed on from locals in a particular setting. Tourists should be participative in activities to gain a real-world experience, learn different cultures [12], and understand local traditions. Such tourism takes advantage of existing local resources as a key to bodies of knowledge within a community, so it benefits both non-agriculturists and local agriculturists simultaneously. From the review of literature, agro-tourism can be defined as a journey to agro-tourist attractions, vegetable gardens, orchards, herb gardens, or ranchlands, where tourists can gain experiences in agricultural activities and ways of local life. Safely said, agro-tourism adds value to agriculturists and nearby communities, and it contributes to conservation of cultures, traditions as well as environment [13].

Thanks to a review of literature, development of information technology system for management of agro-tourism activities and attractions helps with administration of directions to attractions, residences, as well as restaurants. Compatible with all kinds of smart devices, the system runs on the Yii framework [14, 15, 16], written in the PHP scripting language, and it is designed using the Model, View, Controller (MVC) format, written in the form of Object-Oriented Programming (OOP), which is a PHP component and is effective for further development. The term Yii stands for “Yes It Is”. The framework itself is available as an open source, which is geared to process data more efficiently and requires shorter programming scripts. It is considered user-friendly, high-tech, adjustable, and supportive of web-based tasks and security updates. The Yii also requires shorter time for development and improvements; its web platform can retrieve data from Google Maps to display locations of agro-tourist attractions and their routes [17, 18, 19]. Users can search for agro-tourist attractions, residences, and restaurants around the Noppitam district, Nakhon Si Thammarat at their fingertip. Furthermore, they can filter the search results to show agro-tourist attractions, residences, or

restaurants separately, thanks to the implementation of Geographic Information System, which displays spatial data in the multilayered form. The Geographic Information System (GIS) [20, 21, 22, 23] assists in management of spatial data of each area. It systematically stores a huge amount of data, and enables developers to edit, browse, and display the data easily and conveniently. The GIS has been implemented in tourism data collection of Phuket. The System is a web-based one, displays information regarding and locations of attractions, and serves as a medium of attraction advertisement directing to tourists. In addition, governmental sectors and private sectors can make use of spatial data retrieved from the GIS to enhance the tourism industry at a provincial level. An example is the implementation of the GIS in enhancement of the Tha Chin River tourism [24]. Initially, the developer keyed locations of different places in the program called QGIS, based on the Geographic Information System, and the program uses such data to identify locations, which yields accurate information. Moreover, the QGIS shows stakeholders the expansion of the tourism industry, which can be further analyzed for future investment of businesses in the field. Likewise, in the central region of Thailand, the Geographic Coordinate System was implemented to promote the tourism campaign 12 Cities You Can't Say No [25]. Implementation of such system helps introduce tourist attractions and activities, information of which is available online on services of Google Maps and the GIS. Tourists are provided with a friendly access to those services using smartphones, PDAs, and laptops. For Muang Kaen municipality, located in Mae Taeng district, Chiang Mai, [26] the GIS has been implemented and developed based on the PHP scripting language [27, 28]. It is aimed to aggregate data regarding tourist attractions, residences, restaurants, coffee shops, and activities. Taking advantage of MySQL, the GIS displays such data online via Google Maps API [29, 30]. The system gives access permission to tourists and admins separately. To summarize, the review of literature indicates that the Geographic Information System has been integrated with compatible programs to manage cultural tourism data, which have been retrieved from several tourist attractions located in Thailand. Effective management of such data can fascinate tourists with Thailand's places, which may contribute to greater recognition of the attractions. Nonetheless, the researcher noticed that only a few have implemented the GIS in agro-tourism settings. This is probably because agro-tourism is quite new, therefore less popular, and agro-tourism has very specific targets. As such, the researcher found it advantageous to implement the Geographic Information System in management of agro-tourism information, which can cover restaurants, residences, and activities. The information should be displayed on online maps with accurate locations provided, so tourists can access it easily and conveniently via their smartphones and electronic devices.

3 Research methods

3.1 Research settings

This study sought data of agro-tourism activities and attractions in four sub-districts of the Noppitam district, Nakhon Si Thammarat. 12 agro-tourist attractions were selected as research models for development of information system for management of agro-tourism activities and activities.

3.2 Research framework

According to the framework employed, there are three components necessary for development of information system for management of agro-tourism attractions and activities, as follows.

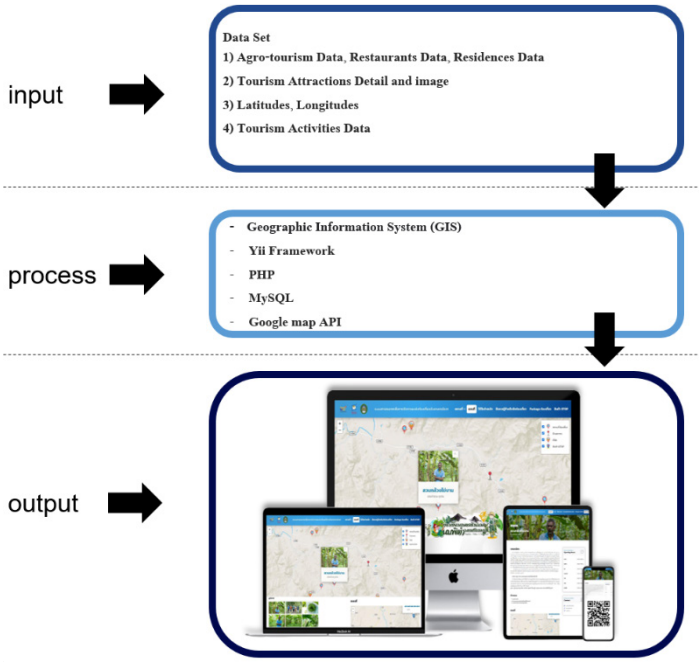

Fig. 1. Research framework

1. Input: The system requires data sets as input. The researcher, in collaboration with local business owners in the field, retrieved the data from interviews, syntheses, and observations of agro-tourist attractions and activities, restaurants, and residences. The aggregated data include information of the places aforementioned, photos, locations, latitudes, longitudes, and relevant activities.

2. Process: The researcher made use of the retrieved data for data analysis, interface design, and system development. The use case diagram was employed in data analysis and interface design, as such diagram can render overall functions of the system as shown in Figure 2 and Figure 3. For database management, MySQL [31] was selected. In terms of scripting, the MVC (Model View Controller) [32] format was selected and responsible for rendering the data on Google Maps, based on the PHP-language YII framework. Eventually, the system comes in the form of web application, accessible on its web portal and compatible with both Android and iOS devices.

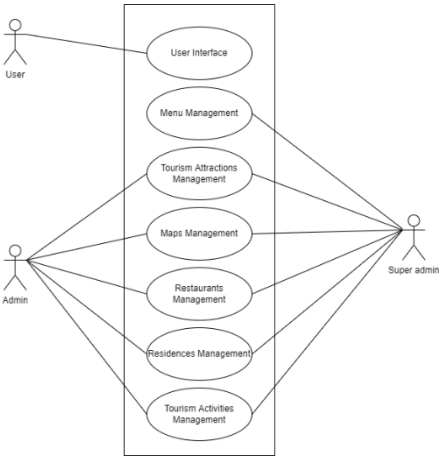

Fig. 2. Use case for GIS

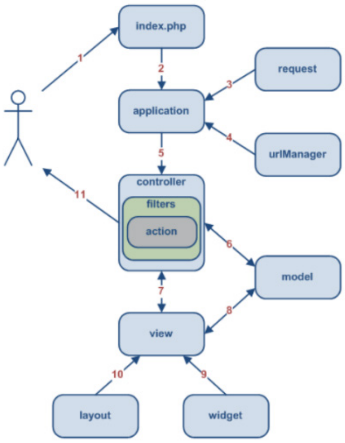

Fig. 3. YII framework

3. Output: The final task was to render the data and make the information system compatible with different devices as shown in Figure 4. It turns out as available on both Android and iOS devices, and users can filter the data of interest; for example, one may filter the in-app search results and opt in only agro-tourist attractions or restaurants.

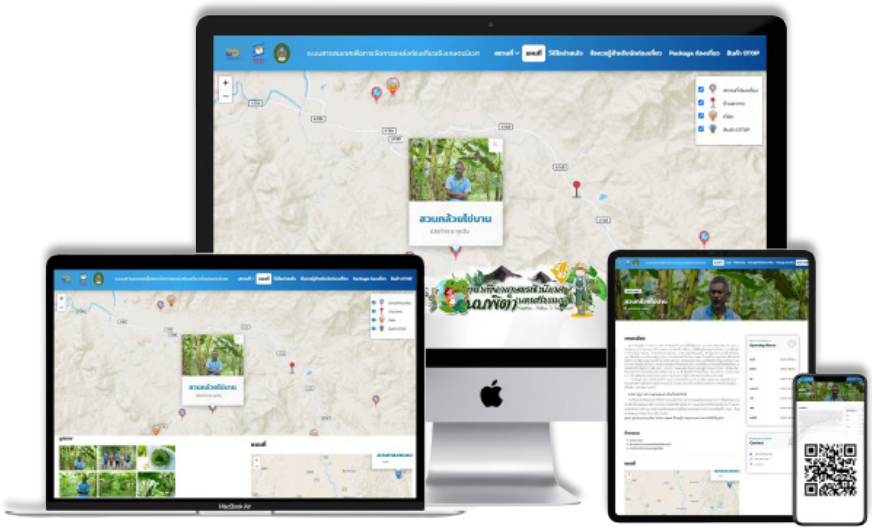

Fig. 4. Compatibility on all devices

4 Web development

The followings are findings of the research study on development of information system for management of agro-tourist attractions and activities. The method proposed in this study is an application created using the PHP programming language with the Yii Framework and MySQL as databases. This research to use agro-tourism system as an intermediary to provide information on agro-tourism in Noppitam district, Nakhon Si Thammarat province, Thailand, where there is no agro-tourism online information centers in Noppitam district. The system design architecture as shown in Figure 5.

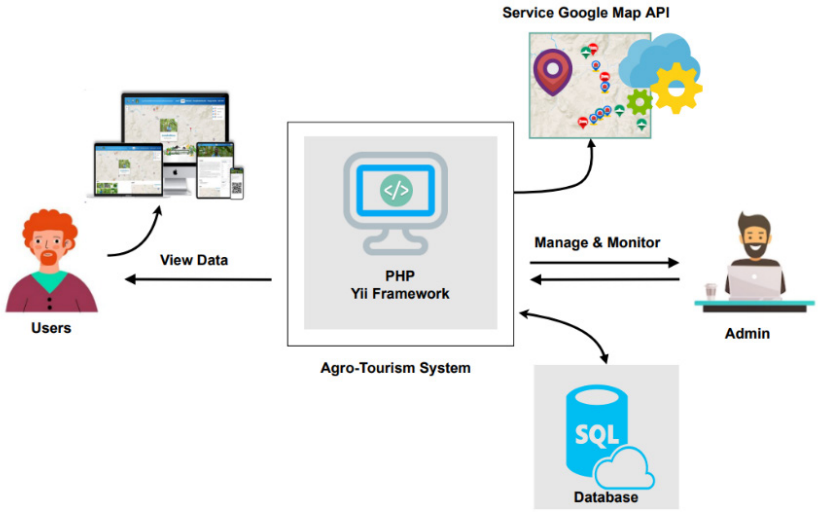

Fig. 5. System architecture diagram

4.1 Back-end

The website grants permission to two groups. The former is the super admin, who is entitled to manage user profiles, main menu, as well as information of tourist attractions, maps, restaurants, residences, and activities. The latter is owners of tourist attractions, restaurants, and residences. These owners can have an admin to manage information as well as locations of their places, which means the admin is entitled to edit or update the information manually. However, it is important that an admin provide his/her business information to the system prior to further actions. He/she will be instructed to set username and password for logins so he/she can update, remove, and edit their business information at his/her pace. To illustrate, if an admin wishes to add information of their own tourist attraction to the system, he/she is required to provide details of his/her agro-tourist attraction name, location, province, district, sub-district, contact information (phone number, Facebook, and Line), latitude, longitude, service dates and hours, pricing, and service conditions as shown in Figure 6.

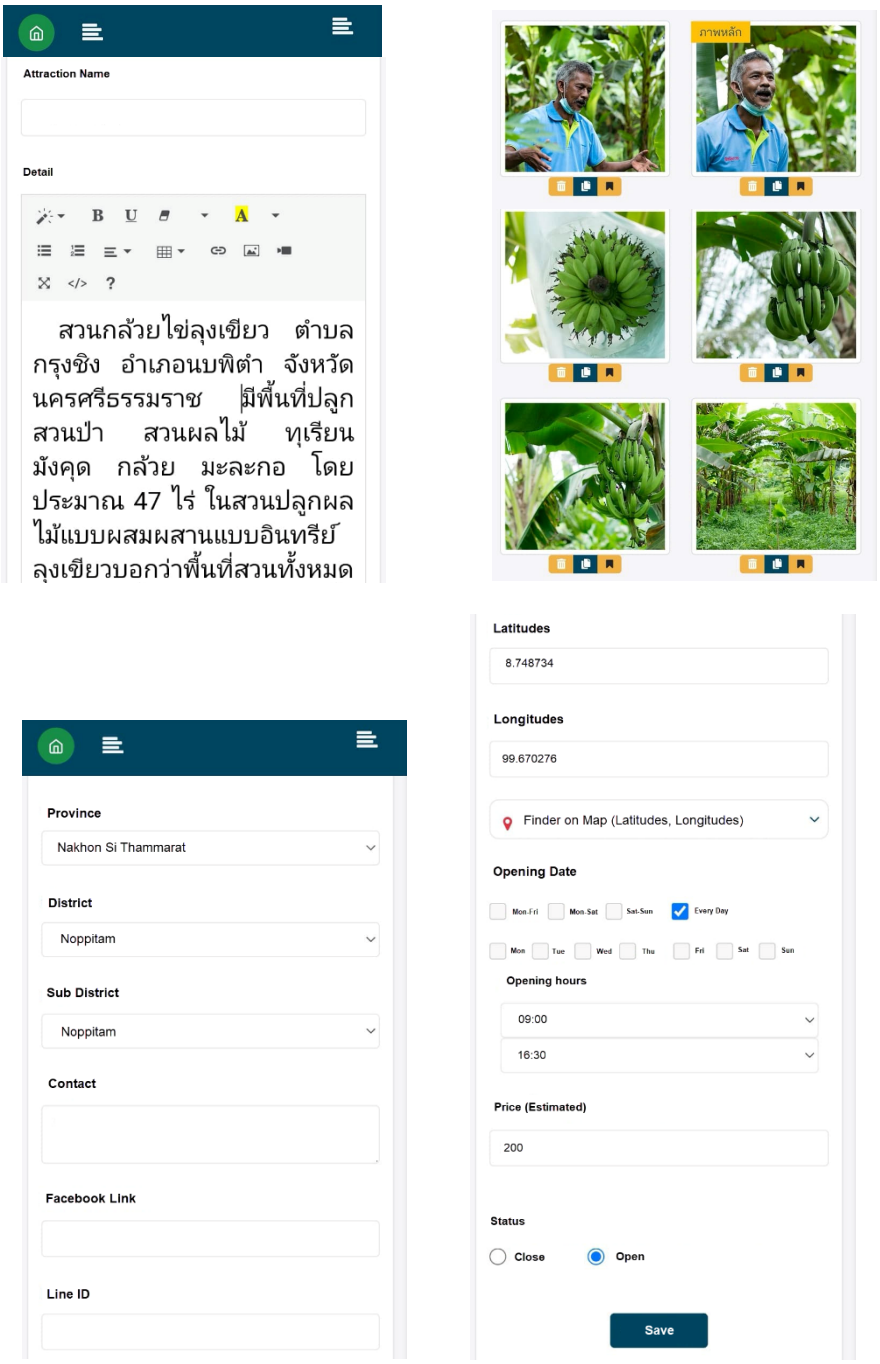

Fig. 6. Addition of agro-tourist attraction information

4.2 User interface

Users, in other words tourists, can use the information system on all devices such as smartphones, computer laptops, and iPads, on which they can easily browse information of their desired tourist attractions, restaurants, or residences, with no need for logins. The information is available on Google Maps API, where locations of places are made accurate thanks to latitudes and longitudes, so users can head to each of their destinations worry-free. Once directed to the maps provided, the system can show them icons that represent different places located in the Noppitam district, Nakhon Si Thammarat, which include agro-tourist attractions, restaurants, and residences (Figure 7). Users may opt in only where they would like to visit on the map, which can respond to their requests precisely. For example, if a user filters in only tourist attractions, the map opts out information of other places as shown in Figure 8.

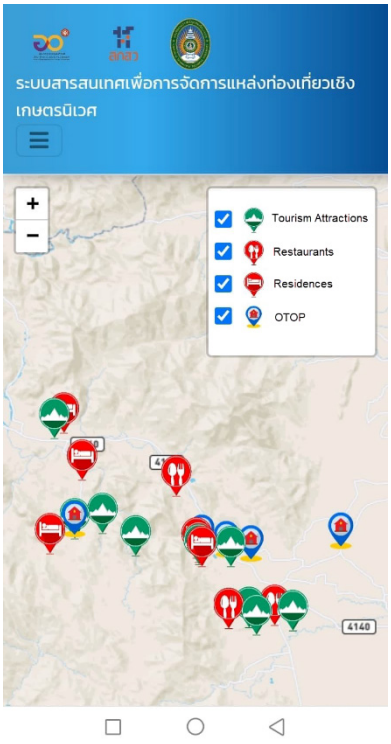

Fig. 7. All places displayed

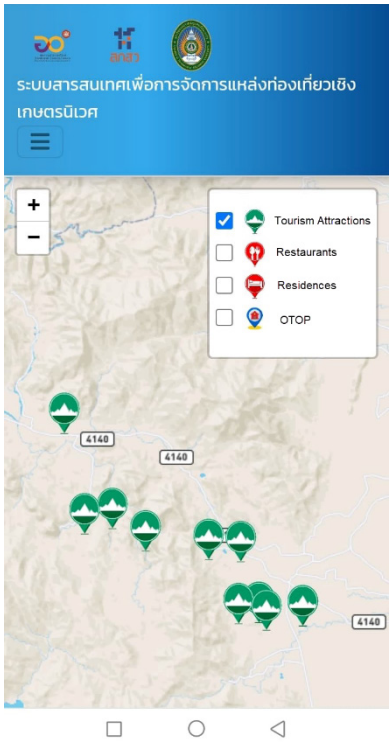

Fig. 8. Only tourist-attractions displayed

Here, once users place a pin on a place, general information of such place will be presented, for instance, name of the place and photos, which may be their first impression before making a visit in Figure 9.

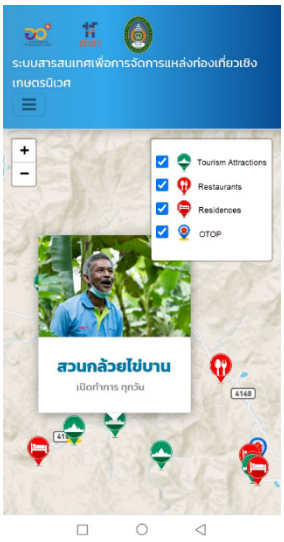

Fig. 9. General information of place

Additionally, users may click on the name for further information so they can be informed in detail. The system can show them photos, opening hours and dates, and contact information of the place's owner as shown in Figure 10. Once a decision is made, users shall be directed to Google Maps and have directions and navigation to their desired place as shown in Figure 11.

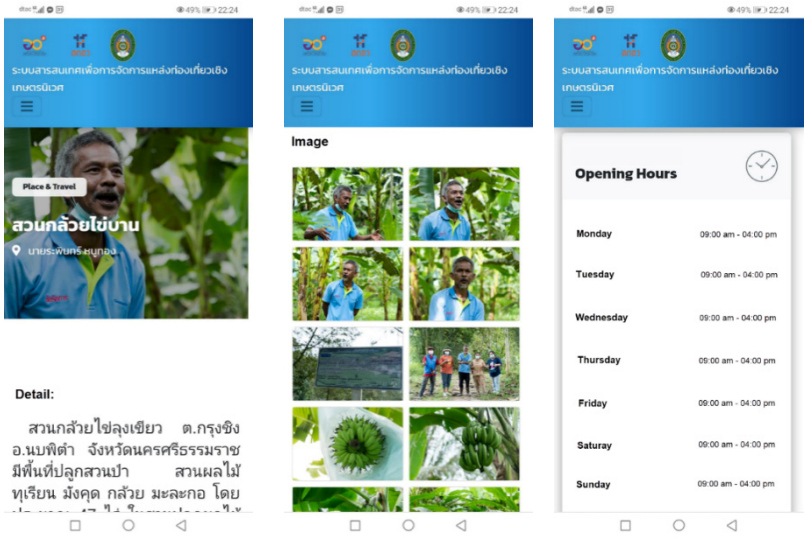

Fig. 10. Detail of place

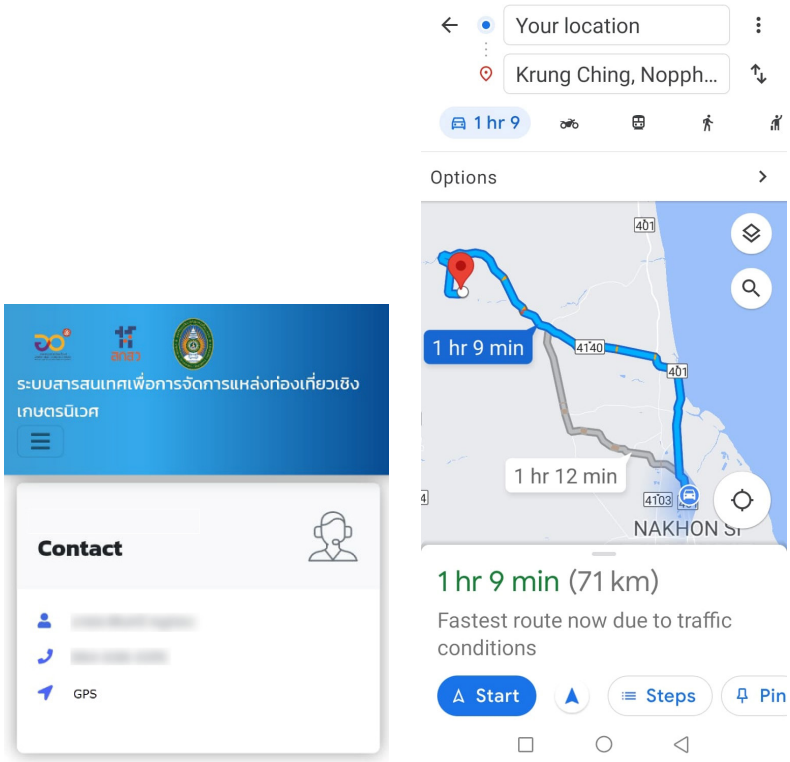

Fig. 11. Directions and navigation

Users may leave reviews or recommendations for places on the web. To avoid abuse of personal information, reviews and recommendations are published anonymously with random system-generated profile pictures. In case offensive reviews are detected, the super admin reserves the right to disapprove them.

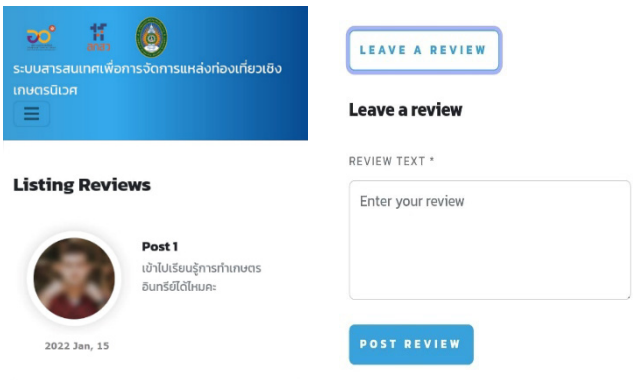

Fig. 12. Tourist reviews

5 Conclusion

The current study has sought to develop the information system for management of agro-tourist attractions and activities. The major research setting was the Noppitam district in Nakhon Si Thammarat. By collecting data from different agro-tourist attractions as well as reflections from nearby communities, the study managed to reform traditional means of attraction publicity. Considering tourist behavior at present, the publicity needs highlight nature- and environment-centered experiences and family activities. Besides, given an access to the YII framework-based management information system, tourists can have a closer contact with local communities. The YII framework allows the information system to be compatible with all smart devices. It supports rendering of layered maps on which information of tourist attractions, restaurants, and residences is made available. The information system can also show tourists directions to their desired places out of the maps, so they can plan their schedules in advance.

It is recommended that further studies pursue development of information system for management of agro-tourist attractions and activities in way that it assists tourists in decision making. By analyzing limitations tourists encounter during their trips, the system should tailor tour programs that suit each group of tourists, and further provide several options that best meet the needs of each tourist.

6 Acknowledgement

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