

Tourism Infomercial Analyzer for Metro Vigan, Philippines

Ana Leah Arquelada Alconis, Amando Pimentel Singun Jr.

ABSTRACT--- Tourists are attracted to traveling to the historic places of the Philippines such as Vigan, which is the home of one of the New Seven Wonder Cities of the world. Tourism in Vigan has experienced continued growth and development. Today it has become a great challenge to meet and satisfy the needs and demands of tourists in getting vital information on the various tourism industries. When a large number of tourists is arriving at the same time, the Ilocos Sur Provincial Tourism Office, the forefront of the province, has been experiencing difficulty in catering all the information needs of such tourists. All of these may cause an adverse impact on tourism. To remedy such a problem, the Tourism Infomercial Analyzer system is designed and developed with features of an infomercial, travel router, and analyzer. The system aims to advertise, educate, and promote the province to the world. Likewise, it showcases the hidden beauty of the place and provides a detailed explanation about the province, its attractions, accommodations, and native commodities. Moreover, the system is designed to assist tourists with the possible land routes to reach crisscrossing destinations. Finally, the system is the most prominent product of Expert System suited to advertise and promote all tourist destinations in Metro Vigan.

Keywords— Tourism, Infomercial, Recommender, Analyzer, Itinerary Planner, Advertisement, Promotion, Marketing, Content-Based Filtering, Random Forest Algorithm

I. INTRODUCTION

People in all walks of life, nowadays, are very much enticed to travel places around the world that are historical, panoramic, industrialized, commercialized and the like. Such enthusiasm of the people to travel gives the tourism industry an incredible boom in the tourism business globally. Tourism has become an important sector that has a great impact on the development of countries specifically on the economy, socio-culture, and environment. On economic benefits, it can provide direct jobs to the people such as tour guides or hotel housekeepers. Indirect employment is generated through industries such as agriculture, food production, retail, and transportation. The country's development on socio-culture is achieved in the continuous preservation of natural and cultural heritage assets of communities; thus, generating more trade opportunities and foster peace and intercultural understanding with other people around the world. Likewise, environmental development is planned and implemented by a shared responsibility among all tourism stakeholders in support for sustainable goals, strategies, and processes that undermine external threats on tourism such as natural disasters, climate change, international and national security and infrastructure.

In the Philippines, the Department of Tourism (DoT), a government agency, is responsible for the promotion and

development of tourism. It has field offices deployed strategically around the country to ensure and maintain the delivery of efficient and effective frontline services for the tourism industry. In the province, the Ilocos Sur Provincial Tourism Office, tactically situated in one of the ancestral houses along the Calle Crisologo of Vigan City which serves as the forefront of the province that caters to all the information needs of the tourists that come for a visit by providing flyers, maps, and brochures of the province. However, when a large number of visitors arrive at the same time, a negative impact has surfaced on the possibility for the office to answer all the specific questions and destinations in a certain area. To remedy such a problem, an expert system called Tourism Infomercial Analyzer is designed and developed which includes the features of both the infomercial analyzer and a travel router. The infomercial analyzer features aim to advertise, educate, and promote the province to the world by showcasing the hidden beauty of the place and providing a detailed explanation of its attractions, hospitality industries, and native commodities. The travel planner is designed for assisting the tourist to find the shortest possible land route to reach one destination to another and also gives a more effective approach for the management of various tourists' information. Finally, it is useful for tourists and tourism agencies to select the best package based on the proper time, budget, and preferences of required tourists' places. With the use of an expert system, eventually, all tourist destinations information in Vigan City and the province as a whole will be at hand and rapidly advertised and promoted worldwide.

II. CONCEPTUAL FRAMEWORK

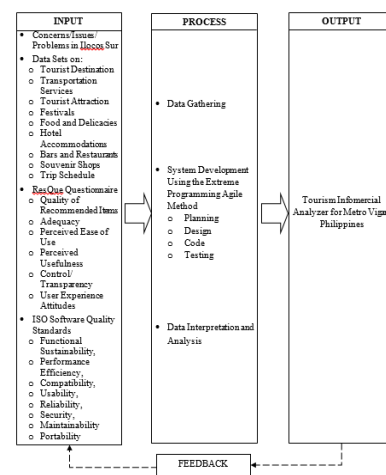


Fig. 1. Conceptual Paradigm

Revised Manuscript Received on June 10, 2019.

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Figure 1 depicts the conceptual framework of the Tourism Infomercial Analyzer System for Metro Vigan Philippines. This shows the full view on how the study and the system/application was designed and its possible course of action or a preferred approach to an idea of development is reflected in the framework.

Based on the Input-Process-Output (IPO) model, the framework has three (3) stages. The Input stage is where all the necessary information and data for the study are gathered. This includes the tourism problems/issues and challenges, data sets (tourism destination, transportation services, festivals, food and delicacies, hotel accommodations, bars and restaurants, souvenir shops, and trip schedule), ISO Software Quality Standards Questionnaire, and ResQue (Recommender Systems' Quality of user experience) Questionnaire.

The Process Stage is the next stage where the inputs are analyzed, processed, and evaluated. This involves data gathering, systems development, software architecture, and data interpretation and analysis. In the data gathering, all collected information is being consolidated, evaluated and summarized in order to identify the technical and operational requirements of the system.

The system development is used for the software development approach that designed and defined the development process of the software. According to Sergeev (2016), Extreme Programming (XP) is a popular Agile methodology of software development. It was designed to deliver the largest amounts of code within the shortest amounts of time. That is why this methodology has the highest degree of customer involvement among other Agile methods. XP also has the shortest iterative cycles compared to other Agile methodologies.

Due to restricted time allocated, this study employed the Extreme Programming (XP) Agile Software Development Model as shown in Fig. 2. This model has four (4) distinct phases namely: 1) planning; 2) design; 3) coding; and 4) testing that were being followed and used as a guide in the development of the proposed system to ensure the success of the system even with limited time allotted. The system architecture is then designed and constructed in order to meet the identified requirements of the system.

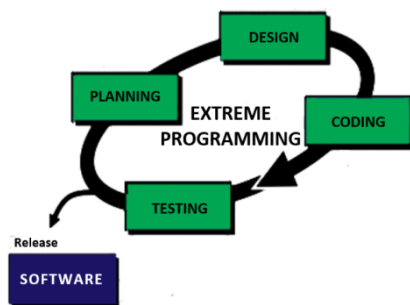


Fig. 2. Extreme Programming Agile Method Development Phase

In the Data Interpretation and Analysis process, the gathered data are evaluated, processed, and analyzed to extract the data needed by the researchers as a basis in conceptualizing and developing the structure, features, and functions of the Tourism Infomercial Analyzer for Metro Vigan, Philippines. The process will result in the final

system – the Tourism Infomercial Analyzer for Metro Vigan, Philippines.

III. STATEMENT OF THE PROBLEM

This study aims to design and develop “Tourism Infomercial Analyzer for Metro Vigan, Philippines”. Specifically, it sought to answer the following questions:

1. What are the problems/issues and challenges encountered in the existing system that are related to tourism in the province of Ilocos Sur?
2. What algorithm can be proposed to address the identified problems of the existing system?
3. What proposed system can be developed to address the identified problems and issues of the existing system?
4. What is the level of efficiency of the proposed algorithm?
5. What is the extent of compliance of the developed application to ISO 25010 Software Quality Standards?
6. Is there a significant difference in the extent of compliance of the developed application to ISO 25010 Software Quality standards as assessed by the IT Expert and Users?
7. What enhancement can be done to improve the proposed system?

IV. PARTICIPANTS OF THE STUDY

For the needs assessment, the researchers included participants involved in the tourism industry to get the necessary information needed for the research.

The tourists are those individuals (n = 154) who explored and used the system. While the Tourism Industry Workers (n = 178) are those HRM instructors, employees of the tourism offices, business entrepreneurs, and managers and staff of the different tourism industry who evaluated the system within the locality. Lastly, the Information Technology Experts (n =18) are those technology specialists who have technical expertise in IT Systems (Singun, 2018).

V. RESULTS

Problems/Issues and Challenges Encountered Related to Tourism in the Province of Ilocos Sur

A thematic analysis was used to identify the problems/issues and challenges encountered related to Tourism in the Province of Ilocos Sur as follows:

On Advertisement - minimal tourism promotions for tourist destinations, lack of promotional marketing of native commodities, and events and festivities are not widely disseminated. This result is consistent with the findings of Hasan (2015) that promotional activities play an important role in the development of the tourism Industry in Finland.

On Business - overcharging of tricycle and *kalesa* fare from tourists and lack of accommodation during peak seasons. The overcharging of tricycle and *kalesa* fare is supported by the article of Vidad (2016), that transport in

Vigan City is accompanied by stress caused by the overpricing of the fare. Despite reporting this issue to the officials, some tricycle drivers are just too sneaky enough to charge one an elevated fare.

Due to the lack of accommodation during peak seasons, homeowners in the city already start accepting transients in their vacant rooms and houses. Some hotels and food establishments are already located outside the city. The challenge is, how to introduce those new businesses to the market especially those located outside the city proper. This finding supported by Tejero (2015) in his article at the Philippine Daily Inquirer that the boom of tourists in Vigan resulted in the launching of new hotels and the adding of rooms of old ones.

On Human Resources - lack of tourists' guides and just a few tourist assistance centers. This is exactly what appears in the study of Gamage (2016) that tourism as a fast-growing industry in Sri Lanka faces several challenges and Human Resource Crises have been the top among others. The shortage of well-trained tourism personnel coupled with a high rate of turnover continued to be a major issue for the industry with the situation worsening with many new hotels coming up in the country and absorbing the existing experienced personnel.

On Environment - heavy traffic is evident, inadequate signage of tourist spots, and maintenance and further improvements of tourist scenic spots. This is exactly what appears in the article of Tejero (2015) in the LifeStyle Inquirer that the main problem in Vigan is, it has no room for expansion. The area cannot have road-widening, so this sudden boom of tourists results in impossible traffic, and parking is a challenge.

Furthermore, knowing the opinion and feedback of tourists is a great help for tourism administrators and tourism industry managers to continuously improve their services and facilities. This is supported by Horner and Swarbrooke (2016) that an understanding of consumer behaviors is also important for the product development of new tourism products and facilities. It will allow the marketing manager to have a clearer view of the types of benefits that consumers are looking for and enable these to be reflected in the marketing strategy.

These identified problems, issues, and challenges have cast a negative impact on the tourism industry that may have an effect on the future growth and development of the tourism industry of the province. These problems are closely related to the statement of Libosada (2018) that tourism is a fragmented industry, and yet it requires the cooperation or input of every social and institutional organization. If sites start developing the tourism industry, they must be ready to provide the needed facilities and services to the transients.

The Proposed Algorithm to Address the Identified Problems Related in the Existing System

To solve the complications of itinerary planning, a Tourism Infomercial Analyzer System is proposed as a means of offering travel recommendations to tourists easily and effectively as shown in Fig. 3. This proposed recommender system uses a content-based filtering and random forest algorithm in order to predict an itinerary tour schedule for the visitors given their travel preferences.

Content-based filtering is used to determine the destination candidates based on user preferences. After the pre-filtering, the Random Forest Algorithm is used to select from the destination candidates taking into consideration the itinerary template schedule set by the system administrators.

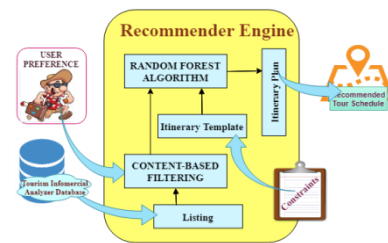


Fig. 3. The System Architecture of the Recommender Feature

The used of Content-Based Filtering (CBF) is supported by Son and Kim (2017) since it is one of the most successful recommendation techniques based on the correlation between contents. Moreover, to solve the cold start problem, a Random Forest algorithm is used as supported by the study of Zhang, Min, and He (2014) that states that a random forest algorithm is more general and more appropriate for cold-start recommendation.

Proposed Developed System to Address the Identified Problems and Issues Encountered in the Existing System

The researchers proposed a developed Tourism Infomercial Analyzer System, an information-itinerary planner system that provides a solution or at least minimizes the identified problems, issues, and challenges encountered related to tourism in the province of Ilocos Sur. The functionality of the system is divided into four (4) main features: the content management, the infomercial, the recommender, and the analyzer.

The content management is used by the administrators to manage the Tourism Infomercial Analyzer System website. The infomercial features of the system tend to solve the problems on advertisement and on business as identified by the participants. While the problems on human resources and on environment specifically on heavy traffic and inadequate signage of tourist spot could be minimized by the recommender features of the system. Moreover, on environment along maintenance and further improvements of tourist scenic spots, the analyzer features of the system provide the basis for the tourism administrators in making decision for the sustainability of tourism industry.

The conceptual framework of the Tourism Infomercial Analyzer System is shown in Figure 4. It portrays the overall view and relationship among the interrelated components of the running system. The users of the developed system are categorized into different user classifications with their specific rights and privileges. Each user has a unique role in assessing each of the online features and functionality of the Tourism Infomercial Analyzer System.

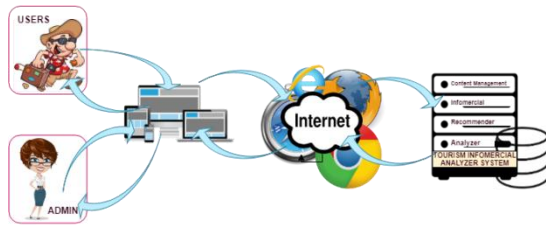


Fig. 4. The Conceptual Framework of the Tourism Infomercial Analyzer System for Metro Vigan, Philippines

The specific functional requirements are as follows:

1. **Content Management.** This is the backend of the system. It is only accessed by the system administrator, who is responsible for the maintenance and management of the Tourism Infomercial Analyzer System Information. The system administrator must have a login account in order to be able to manage (add, delete, or edit) listing, festivals, transportations, delicacies, itinerary template, cities/municipalities, categories, page contents, and visitors' records;
2. **Infomercial.** This feature is designed to provide non-registered and registered visitors information of the different tourist destinations (such as scenic spots, souvenir/shopping centers, accommodations, restaurants, or bars), events and festivals, food and delicacies, transportation, emergency hotlines, and general information of the province. The visitors just surf or search to the website in order to view that information;
3. **Recommender.** To avoid the hassle of making a tour schedule, the visitor must first register to the site for the system to generate an itinerary schedule on the specified date/s and travel preferences. The registered visitors have the option to edit, save, print, or delete the recommended travel plan. The itinerary plan includes schedule timetable, site information, and travel route map to reach the intended destinations; and
4. **Analyzer.** An electronic form is available at the website to get ratings and feedback from the visitors on the different tourist destinations, the site, and the generated itinerary plan. At the backend of the system, the administrator can keep track of registered visitors, monitor the feedback, and generate ranking reports.

Level of Efficiency of the Proposed Algorithms.

The Tourism Infomercial Analyzer systems' algorithm was assessed by the IT Expert participants using the adopted ResQue (Recommender Systems' Quality of User Experience) questionnaire. The study divulged that all the prescribed systems' algorithm performance categories (e.g. quality of recommended items, adequacy, perceived ease-of-use, perceived usefulness, control/transparency, and attitudes) had been complied with a grand mean rating of 4.15 with a "Highly Efficient" level of efficiency.

It implies that the IT Expert participants of the study believe that the algorithms used effectively generate itinerary plan recommendations based on the users' preference. Furthermore, those algorithms also help users to discover places they might not have found otherwise. Thus,

the algorithms used in the system give highly users' overall perception results while promoting tourism of the province to different users worldwide.

Extent of Compliance of the Developed Application to ISO 25010 Software Quality Standards

As regards to the extent of compliance of the developed Tourism Infomercial Analyzer System with the standard set by the International Organization for Standardization (ISO 25010) as assessed by the participants, the study revealed that all the prescribed system categories (i.e. functional sustainability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability) had been complied with to a grand mean rating of 4.21 with a descriptive rating of "Very Great Extent" of compliance.

This implies that the Tourism Infomercial Analyzer System is accepted by the participants of the study and can be a great advantage to further promote the tourism industry of the province.

Test for Significant Difference in the Extent of Compliance of the Developed Application to ISO 25010 Software Quality Standards as Assessed by the IT Expert and Users

There is no significant difference on the assessment of the IT experts, tourism industry workers, and tourism participants with respect to the compliance of the tourism infomercial analyzer system for Metro Vigan, Philippines with the International Standardization Organization (ISO 25010).

This implies that developed Tourism Infomercial Analyzer for Metro Vigan, Philippines complied with the ISO 25010 software standard and met the expectations and demands of different types of users.

Enhancement to be Done to Improve the Proposed System

A Thematic Analysis was used to identify the proposed future improvements to further refine or improve the tourism infomercial analyzer system. Such improvements include the following:

On Further Improvement - make the system offline and downloadable, consider cellphone verification for confirming visitors account, and add tourism promotions and propaganda videos; and

On Additional Features - include weather forecast, allow booking and reservations options, and provide a language translator.

The continuous software development and additional functional features will offer a lot of value to fit the needs of tourists. This is supported by the study of Mathew and Rao (2016) that Tourism Management System would play a vital role in planning the perfect trip. It allows the user of the system to access all the details such as weather, location, or events.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, the following conclusion and recommendations have been generated:



1. At present, there are still problems/issues and challenges encountered on the Tourism Industry of the Province of Ilocos Sur that needs to be addressed appropriately.
2. The content-based filtering and random forest algorithm can be used to generate itinerary schedule for tourists.
3. The Tourism Infomercial Analyzer System can be used by all types of users which focuses on content management, infomercial, recommender, and analyzer features. It has generated itinerary plan that guides visitors before and during the trip. It has the capability to address the tourism concerns/issues of the province. However, the said system needs to be enhanced to make it more accessible to attract more users of the site.

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