AERISTELLE: INTELLIGENT TRAVEL VIRTUAL PRESENTATION OF SELECTED TOURIST DESTINATIONS IN THE PROVINCE OF RIZAL

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Abstract

The primary aim of the study is to develop an application *Aeristelle:* Intelligent Travel Virtual Presentation of Selected Tourist Destinations in the Province of Rizal where the primary aim is to help improve the tourism promotion of the selected areas in Rizal province. *Aeristelle* only covers selected tourist destination from eight selected municipalities of the Rizal province that has lowest tourist arrivals based on the information given by the Tourism Office of Rizal. The researcher implements Artificial Intelligence specifically Natural Language Processing or NLP through the development tools namely Dialogflow and Firebase by Google for the storage of external data. NLP algorithm of Dialogflow were utilized in the analysis of the response module of *Aeristelle* where the information regarding tourism promotion of the selected areas of Rizal Province were provided by the Rizal tourism office.

The external data such as images of the tourist destination and location map, and Audio-Visual Presentation are stored in Google Firebase. The researcher also used waterfall model for the actual software development and mixed method approach of research through interview and use of survey questionnaire. The entire process of the study includes data gathering where the researcher conducts series of interview to the staff of Rizal Tourism office, software development utilizing waterfall model, system evaluation where selected IT professionals evaluates the system. Acceptability test where also conducted to the staff of Rizal Tourism office where they test and assessed the application if it meets the requirements given.

The result of evaluation of the IT professionals was based on selected criteria of ISO/IEC 25010 or the Systems and software Quality Requirements and Evaluation (SQuare). The result of the evaluation of the developed application in terms of Functionality, Reliability, Usability, Efficiency, Maintainability, Security and Portability, *Aeristelle* got the overall rate of the evaluation of 3.84 meaning, it exceeds the expectations according to the IT experts who assessed the application.

The researcher also conducts a software acceptability test to the staff of Tourism Office of Rizal wherein, they test and evaluated the application if it meets the requirements.

Based on the result of the software acceptability test, developed application is acceptable based on the assessment of the staffs who is also one of the beneficiaries in the study. From the results of the study, the enhancement of tourism promotion in the province of Rizal is possible through the integration of Artificial intelligence and the researcher found out that the tourist companion application software *Aeristelle* is beneficial to the tourist and helps in tourism promotion of the said province.

Introduction

Philippines is a country of beautiful islands with enchanting culture and biodiversity. A place that is well-known to its beautiful Filipino smiles, warm and unique hospitality and wonderful culture. This is why despite of being part of the third world country, many foreign people still find this country as one of the most enchanting places on the earth. No doubt that this place called "The Pearl of the Orient" attracts many visitors across the globe and because of that the tourism sector in the country is continuously growing, making it one of the major contributors in the economy of the state. According to Remo a journalist from daily inquirer, the secretary of the Department of Tourism states that tourism in the Philippines has maintained a high profile in the radar of world tourism. The continuous growth of arrivals from foreign tourists as an evident that the country is still one of the most popular destination by many foreign tourists. The journalist also highlights a good example discussed by the Tourism Secretary based on the figures given by the United Nations World Tourism Organization where it says that, the number of arrivals in terms of foreign visitors has reached its best record of 7.2 million, this is equivalent to 8.27 percent increase from its statistics report last 2017. Evidently, the country is slowly recognizing as one of the destinations that must be visit in Asia.

In addition, the country has many to offer like mouth-watering delicacies, colorful and fun filled big parties called fiesta and most of all its beautiful and picturesque sceneries that will surely captivates every visitor whether young or old. Talking about sceneries, there are thousands of tourist destinations from 10 regions across the country that can be choose from, one of the said provinces is the province of Rizal wherein it is also known as the "green province". The said province is one of the first class provinces among the Calabarzon (Cavite, Laguna, Batangas, Rizal and Quezon) area. Surrounded with the mountainous ranges of Sierra Madre and Laguna de Bay with the land area of 1,191.94 square kilometers which composed of thirteen municipalities and one component city namely Antipolo City, it serves as a home for more than

two million Rizaleños across the province and best place for those who wants to escape from the busy city of metropolis for a while since its only accessible by one hour ride from Metro Manila.

The province is also rich in culture, heritage, arts and nature parks. From Higantes festival of Angono, Rizal where the colorful giant paper mache effigies is one of the main highlights of the celebration, the colorful religious procession and street dancing of Tromba festival in Baras, Rizal which celebrates in honor of Nuestra Señora de Turumba. The giant 54 megawatts Rizal windfarm of Pililia where it provides alternative energy to the province. The rich agricultural farm of Jala Jala where the best carabao milk and dragon fruit can be found to the mind blowing contemporary artworks of Pinto art museum in the city of Antipolo and the beautiful pilgrimage site of Antipolo Cathedral where the miraculous image of Our lady of Good Voyage is found and thousands of devotees pays visit asking for a safe voyage. Not only that, the province is also well known to its delicious rice cakes like Suman sa Ibos and Kalamay, huge peanut brittle, sugar coated coconut candies and the famous all-time favorite Kasoy where you can buy by takal (per cup) or by kilo at the Pasalubong Centers around the province.

With this, based on the recent tourist arrival report of the Provincial Tourism Office of Rizal in 2018, the statistics climbed up to 16,625,320 tourist arrivals where it composed of 10.44 % of overnight stay and 89.56% of same day visitors across the province. It also revealed the Top tourist destinations which are the National Shrine of Our Lady of Peace and Good Voyage in Antipolo City, Regina Rica from Tanay, Tiangge or apparel market in Taytay followed by Pililia Wind farm and the Recreation and Convention Center of Binangonan, Rizal where majority of the visitors in the said figure are Korean nationals. Despite of the its growing figures and continuous promotion projects of the said office through social media, traditional method like pamphlets and brochures, media promotion and campaigns, it cannot deny the fact that there are some areas in the Rizal province that in needs of further promotion. In order to retain or improve the statistics in the near future, the Tourism office should keep in improving or innovating their strategies by seeking new approaches in terms of tourism promotion in the said province.

With the increasing demand of tourist in acquiring information and with the help of technology, the researcher came up with a research study entitled: "*Aeristelle*: Intelligent Travel Virtual Presentation of Selected Tourist Destinations in The Province of Rizal". Where the researcher utilized Artificial Intelligence (AI) through Natural Language Processing and information given by the said office to develop an application that will help in tourism promotion of selected municipalities around the Rizal province through providing essential information to the potential and current visitors of the province. This will also help the tourist in planning their trip

around the province since it acts as a virtual travel agent through providing reliable information in real time.

Statement of the Problem

The general problem of this study "How may a chat bot application be developed using AI natural language processing for the tourism promotion of Rizal province?"

Specifically, this study sought answering the following question:

1. What is the current procedure of the Rizal Tourism office in promoting tourism in Rizal province?

2. How may an application software using AI natural language processing be developed to provide essential travel information such as fun trivia, recommendations and other related materials to the tourists?

3. How may the incorporated features in the developed application *AERISTELLE* can help the province of Rizal promotes its tourism?

4. How may the developed application be assessed using the ISO/IEC 25010, or the Software Quality Requirements and Evaluation (SQUARE)?

Integrated Review of Related Literature and Studies

The researcher selects theories that could support the main idea of the study. the first one is the Economic Theory in Tourism where one of the examples is from Ukaibulu and Igbojekwe (2015) where the authors elaborated in their paper the concept of the Development Theory. The said theory refers to the nation's social conditions where in its needs are fulfilled by coherent and viable use of natural resources and systems, the said theory includes subparts namely the Theory of modernization which developed by Rostow (1990) and was proposed by Winton (1954). The main idea of the said theory is that there is a natural inactivity that needs to deal with before self-sustained development occur

Another theory is from Said and Maryono (2018), where they elaborate the popular theory Push-pull framework by Dan (1977) and Klenosky (2002) in the motivation and perception of tourists in visiting a specific tourist spot. It is said that the theory expounds the reason why the tourist visits a tourist spot rather than other destinations, the type of experience they want and the what type of activity they want to do. Another related theory where Lohmann and Netto (2017) discusses is the application of leisure theory in tourism where the authors explains that

"All human beings have the right for free time, and it's is precisely during this time that leisure should can be practiced." Though people has the right for free time, there times that in less developed countries has access to leisure.

The last two theory which is directly connected to the development of the application are the Diffusion of Innovation theory and Conversation theory. In Diffusion of Innovation theory aside from the three models of Human Computer Interaction, Norman (2008), also explains the theory which was introduced by Rogers (1962). In this theory, the author discusses that computer technology like iPods, Personal Digital assistant and other innovations of technology follows the waves of adoption and diffusion.

the conversation theory on the other hand, explains that Pask (1975) developed a theory based on the theoretical study called Cybernetics. Conversation theory tries to explain the learning in both living organism (like human) and machines (in this case a chat bot). The main idea of the said theory is that the learning takes place in a form of conversation about a specific topic which makes a knowledge unambiguous or clear. Lastly is the theory of Internet of Things where Internet of Things or IoT is defined as the" global network of physical devices that connected to the internet" meaning a set of IoT devices are connected into a large network. In the theory of IoT it says that inanimate devices will be able to speak.

In terms of the historical background of the province of Rizal, according to the official website of the Rizal province, Rizal was established in the 11th day of June 1901. Because of its rich biodiversity, the province was once a home of different ancient immigrants from different parts of Asia like Indonesia, Malaysia and China. Later on, it was colonized by Spaniards then American and later on, the Japanese. Before it was named Rizal, the province was known to its former names like *Tondo*, *Monte de San Mateo* and *Distrito de Morong*. After the conflicts between Filipino American in year 1900, Dr. Trinidad Pardo De Tavera suggests that the province should be named after the National hero, Dr. Jose Rizal the suggestion was raised during the historical meeting at Pasig Catholic Church.

The province was later on named Rizal Province under the Act no. 137 of US Law. On the 7th day of November in the year 1975, the 12 progressive municipalities like Las Piñas, Makati, Marikina, Muntinlupa, Mandaluyong, Navotas, Parañaque, Pasig, Pateros, San Juan and Taguig were incorporated in the area of Metro Manila under the Presidential Decree No. 824. Later on, with its rich culture and biodiversity, the province was called the "Green City" since it is near by the Laguna De Bay, it is surrounded by mountainous areas like Sierra Madre and greenery low land areas. At present, that the province is working out with its ongoing project called "Yes to Green Program". It is composed of several units that aims to further develop the said province.

In the area of technology more specifically the area of Artificial intelligence, Gill (2017), discussed that AI or Artificial intelligence refers to the capability of the machine in executing "intelligent" task like what a human being do. It has two key components which is automation and Intelligence. The primary aim of artificial intelligence according to the author are reasoning, automated learning and scheduling, machine learning, natural language processing, computer vision, robotics and general intelligence. AI in general has three stages which are the machine learning, where the computer uses specific algorithms in order to acquire from experience. Second is the machine intelligence wherein, it uses advanced algorithm in order to acquire knowledge from experience for example, deep neural networks. Lastly is the machine consciousness where it executes self-learning based on experience without the need of any external data.

Normal(2008) also explains that intelligent interfaces like Natural language should be able to tell what the user wants in their own words. This interface should have the capability to understand what the end user means and to deduce the given task. Gadiar (2017), also explains that Chat bots, for the next coming years will evolve into something utilitarian and more personalized based on the needs of the millennials.

In developing a chatbot, Mishra(2018) said that the developers should consider four things in developing this kind of AI technology the first one is to set a limitation or boundaries of what a bot can do. Second is it can be able to personalized recommendation based on the previous activity and context of the user. The third one is making human intervention a back-up option for Chat bot in case that it cannot comprehend or answer complex queries. the last one is to measure the performance level of the Chat bot.

In line with this, A travel and business website named Revfined (2019) elaborates the influence of Artificial intelligence or AI and how Travel and tourism improves the services to the clients. In their article entitled "How Artificial Intelligence Changing the Travel Industry" it was discussed that AI has already existed over the decades but only today that the computers have developed enough specifications to carry more complex tasks without assistance. With this, the author said that AI plays a big role in the field of Travel and Tourism industry. One of the abilities of AI is to provide additional assistance to the clients in order to improve customer services. Example is the online Online customer service and the existence of Chat bot or Chat robots where AI can respond to any queries and provide relevant answers and also suggestions to the customers.

With this, there are a lot of studies nowadays that involves virtual assistants and one of these is the study of Claessen, Schmidt and Heck (2017), the authors emphasized that Virtual assistants (VA) in general can able to support the users in seeking necessary information they need. Another study which conducted by Romero-Charneco, Casado-Molina and Alarcón-Urbistondo (2018), where they investigate the effectiveness of using instant messaging in

seeking information about culinary tourism specifically in gastronomy. The author emphasizes the use of instant messaging provides a medium for communication but also provides relevant information about cultural tourism especially in choosing the best restaurant.

In relation to this, Zsarnocsky (2017) explains how Artificial Intelligence or AI affects the industry of travel and tourism. According to the author, AI is one of the most important innovative solutions. It's already achieved many visible results and it's already used in the selected fields in different industry. One of this is can be seen in the industry of tourism. Some of these evidences are the smart systems and chat bot where it is used in airlines and travel agencies and personalized solutions which is one of the innovative solutions that will further develop in the near future.

Methods

The study employed a mixed method research where it combines quantitative and qualitative method. the main objective of the said method is to provide much wider perspective about the study by highlighting the research problem and use all the approaches available to further understand it better. This type of research methods was used to define specific problems stated in the study. In order to fulfil the specific objectives of this research, the researcher conduct a series of interview, observation and surveys to the specific respondents.

Aside from that, the researcher also used the development research method approach for the system design and development. According to Richey and Klein (2005) the said method has a function of either emerging generalizable conclusions or creating a context specific knowledge which can serve as a solution for a specific problem. In this case, the researcher used a software development model called water fall model, a type of system development that is easy to understand and use.

The model is composed of 5 stages namely: Requirements analysis, system design, coding and testing, system deployment and operation and maintenance. The model design is based on linear sequential wherein each phase must be completed first before it can proceed to the next phase or stage.

In terms of population and sample of the study, the researcher chose 5 selected experts from the field of IT and 6 employees from the Tourism office in Rizal province who is also the main beneficiary of the study. Overall, the total respondents for the study is 11.

The researcher used several research instruments to support data gathering of the study. These includes an interview guide where it involves questions related to the statement of the problem, a survey form as additional tool for gathering data such as the software quality test

based on ISO/IEC 25010 or the SQuare - System and Software Quality Models and acceptability test to evaluate the application. A four-point likert scale was also used to gather the mean value of the scores and to determine the satisfaction rate of the respondents in the software application.

The researcher conducts a series of interview to the employees of Rizal Tourism Office. the data gathered in the said activity focuses on the current procedures of tourism promotion in Rizal province and the number of tourists that inquires in the said office.

After the interview, the researcher conducts an evaluation survey from Rizal Tourism Office and IT Professionals for further validation of the study. After the series of survey has been done, the researcher tallied, computed and summarized the scores in order to interpret the data gathered for study.

The study utilized frequency, percentage and mean computation for data analysis to determine the acceptability of the application, the researcher conducted an evaluation survey among the 6 employees and personnel of Rizal Province Tourism Office and five (5) experts in the field of IT. The data gathered were analyzed to further understand the evaluation of the respondents.

Using the mean formula, the satisfactory rating of the software was computed in order to identify the status of the software evaluation. The score of evaluation were based on four-point Likert Scale where, the highest scale is 4 which equivalent to Exceeds standards, 3 as Meets standards, 2 which equivalents to needs improvement and 1 which is equivalent to Poor rate. The said rating scale was used in order to interpret easily the evaluation. Below is the table of 4-point Likert Scale that was used by the researcher for the evaluation. This scale was analyzed using this scale and were summarized and tabulated to interpret the responses quantitatively average,

Scale	Range	Description
4	3.26 - 4.00	Exceeds Standard
3	2.51 – 3.25	Meet Standards
2	1.76 – 2.50	Needs Improvement
1	1.00 – 1.75	Poor

The said responses indicate the acceptability level of the software application based on the System and Software Quality Models or ISO/IEC 25010 which highlights the standard quality factors such as the functionality, efficiency, usability, reliability and maintainability of the software.

Significant Findings

The findings are divided into several parts, the first part discusses the current procedure in tourism promotion of the Rizal Tourism Office. Next, is the development of an application

software using AI natural language processing then the evaluation of the developed application *Aeristelle* using the Software Quality Model ISO / IEC 25010.

Part I. The Current Procedure in Tourism Promotion of Rizal Tourism Office

The researcher conducts a series of interview to the admin and personnel of the Rizal Tourism Office. Interview guide questions has been asked and the transcribed statements of the Officer in Charge (OIC) of the Rizal Tourism office and, one of the tourism staff of the said office. in order to maintain the confidentiality, the researcher decided not to disclose the name of the participants instead, a codename was used to represent the persons who answered in the interview. The code name "OIC" was used to represent the Officer in Charge in the Tourism office of Rizal Province and "Admin Aide 1" to represent the tourism staff who answered the remaining questions based on the interview guide.

The Background History of Rizal Province

This theme discussed the background history of the Rizal province. How it was discovered and why this province was named after our National Hero, Dr. Jose Rizal. In this part, the first question "What is the background history of Rizal" were asked to the participants. The first participant was the Officer in charge of the said province.

OIC: "*Ang bayan ng rizal ay itinatag noong June 11, 1901. Tatlong taon pagkatapos mamamtay si Dr.Jose Rizal. Bakit Rizal? bago dumating ang mga kastila, ito ay pinanirahan ng iba't ibang lahi mula sa iba't ibang parte ng asya gaya ng mga Malaysian, Indonesian at Chinese. Nakita nila ang napakayamang lugar which is Rizal. Ang Rizal ay sinakop during Spanish then American at Japanese.*

Noong panahon ng amerikano pinangalanan ang probinsya ng "Rizal".pero bago ito ay unang nakilala sa pangalang "Tondo". Mula Tondo nagging Monte de San Mateo at pagkatapos ay nagging Distrito de Morong. Si Dr. Trinidad Pardo de Tavera noong panahon ng amerikano, sinuggest nya ang pangalang "Rizal" ito ay nakasaad din sa 137 US Law. Noong mga panahong iyon ilang bayan mula sa Manila at Laguna ay naging parte ng Rizal gaya ng Las Piñas, Makati, Marikina, Muntinlupa, Mandaluyong, Navotas, Parañaque, Pasig, Pateros, San Juan at Taguig. Marahil maraming nagtatanong bakit Rizal?

Maraming espekulasyon tungkol dito pero isa siguro sa magandang halimbawa ay ang pagbanggit na din ng lalawigan sa Nobela ni Dr. Jose Rizal na Noli Me Tangere at isa pa noong bata pa si Rizal ay ipinangako ng kanyang Ina na siya ay dadalhin sa simbahan ng mahal na birhen ng kapayapaan at mabuting paglalakbay sapagakat si Rizal noon ay sakitin. At iyan ang history ng Rizal, ang lahat naman ng ito ay makikita mo din sa website at pwede mong gamitin.

Sa kasalukuyan, ang bayan ng Rizal ay ang most competitive province in the country (2 times) ang Rizal din ay tinaguriang the "Green city" bakit Green city? Dahil malapit ito sa lawa gaya ng Laguna de Bay, malapit sa bundok at malapit sa kapatagan.".

English translation:

Rizal was established in June 11, 1901, three years after the death of

Dr. Jose Rizal. But why Rizal? during the pre-Spanish times, the province was occupied by different early ethnic people from different parts of Asia like Malaysian, Indonesian and Chinese. They found a place that is rich in natural resources which is Rizal. The Rizal Province was colonized by the Spanish, American then Japanese. During American Colonial period, the province is known by the name Tondo. From Tondo it became Monte de San Mateo then eventually, Distrito de Morong.

During the American era, Dr. Trinidad Pardo de Tavera suggested to name the province as "Rizal" this is also indicated in the 137 US Law. That time, some cities from manila and laguna has been part of the said province and these are: Las Piñas, Makati, Marikina, Munitinlupa, Mandaluyong, Navotas, Parañaque, Pasig, Pateros, San Juan and Taguig. Many people might ask why "Rizal"? One reason might be because when Dr. Jose Rizal was young and was sick, his mother promised him that she will bring the young Dr. Rizal in the church of Our Lady of Peace and Good Voyage which also known as the Antipolo Cathedral. Aside from that he also featured the province in his famous novel, Noli Me Tangere. And that is the brief history of Rizal.If you need further information about the history of Rizal, all of the information can be found on the official website of the Rizal province and you may use it as part of your resources.

At the present, the Province has been awarded twice as the most competitive province in the country and it is known as the "Green City". Why Green City? Because it is residing near the lake like Laguna de bay, mountains and plains.

Based on the interview, the province of Rizal has been discovered by many ethnic race and during the Spanish period, the province was known in as Tondo, Monte de San Mateo and Distrito de Morong. It was only proposed by Dr. De Tavera during the American era to name the province after our National hero.at present, the province has been known to its green and peaceful scenery and also earned many awards for its outstanding governance.

The Current Projects of the Rizal province

This part elaborates the present projects of the Rizal province. It also highlights the current projects of the Tourism Office for the said province. The participant elaborates the current

project Y.E.S. TO GREEN program into several part in order to understand the goals of the government for the community.

OIC: "*sa ngayon, ang project ng Rizal ay ang Y.E.S. TO GREEN program ito ay nahahati sa ibat ibang component. Una (Y) ibig sabihin ay Youth and women empowerment, ito ay pinakaimportanteng parte kung saan ay isinusulong ang education at protection ng mga kababaihan.ang letrang (E) naman ay Environment alam mo ba na ang laguna de bay ang tinaguriang 2nd largest lake in asia? At dahil dyan meron tayong tinatawag na "Project BuSILAK" ibig sabihin ng BuSILAK ay muling buhayin ang sapa, ilog, lawa at karagatan. Itinatampok din dito ang MRF or Material Recovery Facility at tree planting kung saan ay nagsasagawa ng bamboo planting sa gilid ng sapa o ilog.*

Ang sumunod naman ay (S) o Shelter and Livelihood Opportunities. Ditto nirestore natin anf hinulugang taktak at nirelocate ang mga squatters from Antipolo to Baras binigyan din sila ng pangkabuhayan. (T) naman ay Tourism. According sa Department of Tourism, 2018-2019 ang Rizal ay nasa #1 tourist arrivals (day tour). Bakit? Dahil malapit ito sa manila at major gateways. At pag sinabing Rizal... Faith, Nature and Adventure. Sunod naman ay (O) or Opportunities kung saan binibigyan ng opportunities for business ang Rizal gaya na lamang sa Pililia. (G) naman ay Good Governance ditto ginawaran ang Rizal ng Seal of Good Governance.

(R), Roads and Infastructure dito sa project ng Department of Tourism at DPWH(Department of Public Works and Highways), nagbibibigyan ng connectivity ang ilang bayan ng Rizal gaya na lamang ng Road Widening sa BosoBoso.next naman ay (E) or Enhance Agricultural Activity kung saan ngayong disyembre ay gaganapin ang Harvest Festival. Sa September hanggang December naman ay ang Christmas village. Dito din pala kasama ang Harvest Festival. Ito ay alay sa pagsilang ng Panginoon at thanks giving.

Ang isa pang (E) ay Education kung saan walang bata ang maleleft behind. Meron tayong ipinamimigay na free education kasama na din dyan ang libreng uniform at iba pa. last ay ang (N) – Nutrition, all year round ay merong nutrition program kung saan lahat ng departamento at kasali."

English translation:

At the present, project of Rizal is Y.E.S. to green program which is divided into several components. The first component is the (Y)-Youth and women empowerment, which is the most important part. The primary goal of this project is to provide education and protection to the youth and women. Second is (E)- Environment which features "Project BUSILAK" (Oplan BUSILAK) BUSILAK means *muling Buhayin ang Sapa, Ilog, Lawa at Karagatan* (revive the creek,

river, lake and sea). The project includes the MRF or Material Recovering Facility and Tree Planting where we plant Bamboos near the creek and river. Third is (S)- Shelter and Livelihood opportunities which includes the restoration of Hinulugang Taktak, Relocation of informal settlers of City of Antipolo to the town of Baras and livelihood programs.

Next is (T)-Tourism. According to the Department of Tourism, in year 2018-2019, Rizal became the top province when it comes to tourist arrivals this is based on Day tour. Why? Because it is near in manila and major gateways. Rizal province is also known as place for Faith, Farm, Nature and Adventure since the province has many pilgrimage sites and offers agricultural products like dragon fruit and dairy products and various of places that is best for nature tripping and adventure. Next is (O) or Opportunities from Business in Rizal. One example is in the Municipality of *Pililia*. After that is (G) or good governance, the province has been awarded a seal of good governance because of its best performance in terms of the provincial governance.

Next is *R* or Roads and Infrastructure where in it builds connectivity to several provinces nearby Rizal like Quezon and Laguna Province. One best example is the road widening project in Bosoboso which made it possible through the help of the Department of Tourism and Department of Public Works and Highways. Next is E for Enhance agricultural activity part of the project is the Christmas village in December featuring the harvest festival which showcases the different agricultural products of different municipalities in the province. Festival will also serve as a way of thanks giving offering for the birth of Christ.

Next is (*E)* or Education where the primary goal of the project is no children will be left behind. The government gives free education, uniform and other necessities to the poor families around Rizal province. And last is (*N*) for Nutrition program which is conducted all year round. All the departments under Rizal Government are involved in this project.

The Current Procedure of Tourism Promotion in Rizal Province

At this point, the researcher was endorsed to one of the Admin staff of the said office. the staff was one of the persons in charge of providing information to the researchers and tourists. In order to know the other information needed for the study such as common procedures of tourism promotion in the province of Rizal, the researcher asked some series questions related to the said procedures. The questions and responses were divided into three procedures or parts.

Procedure 1. The collection of data for promotion

To further know the current procedure of collecting and organizing the data that will be used for tourism promotion, the researcher asked the question "How do you collect and organize information for tourism promotion?". And the respond goes like this:

Admin Aide 1: "*bali mula sa stakeholders or yung information ng destination ng isang lugar, ifoforward yun sa municipal hall then sila yung magfoforward sa amin for promotion***"**

English translation:

From the stakeholders or destination, the information will be sent to the municipal then it will be forwarded to our office for promotion.

Procedure 2. Tools and methods used for tourism campaign

In this part, based on the interview once the data has been collected and organized, it will be distributed in different mediums or methods of promotion. In this case, the researcher asked the participant on what are the tools and the methods did they used in their tourism campaign for the province of Rizal.

Interviewer: *"ano po yung mga ginagamit nyong medium or mga tools para sa tourism*

promotion?" (What are the tools do you used in tourism promotion?)

Admin Aide 1: "*gumagamit kami ng social media gaya ng facebook page, naglilibot din kami sa mga schools at nagcoconduct kami ng orientation. Doon ineeducate namin yung lahat ng mga bata about sa culture, arts at tourist destination ng Rizal mula elementary hanggang college, tapos brochures may partnership din kami with major T.V. networks, NGO's (Non Government Agency), Travel agencies then magazine pero one time lang yun. Bale fineature lang dun yung Rizal. Tourism fair tsaka meron ding AVP* "

English translation:

We use social media like facebook page, we also go to different schools(around Rizal) where we conduct an orientation. this is where we educate the young ones about the culture, arts and tourist destinations of Rizal from elementary up to college. Then brochures, we also have partnership with major T.V. Networks, NGO's(Non Government Agency), Travel agencies then magazine , but its just one time only (Magazine) where in it features Rizal province. Tourism fair and we also have AVP.)

At this point, the office used several ways in promoting tourism in the province. Once is by using social media like facebook page, by conducting orientation and partnerships in different T.V. networks.

In addition, the researcher also ask how tourist can access essential information about the tourist destinations in the said province.

Interviewer: *"May mga ginagamit po ba kayo like website, Facebook or mobile*

apps para maka kuha po ng information si tourist?" ("Do you have any technological tools like websites, Facebook or mobile apps where the tourist can access information [about the province]?"

Admin Aide 1: "*meron kaming website tsaka facebook page*" .

English translation:

we have an official website and a Facebook page.

Aside from that, the respondents also elaborate what are the common inquiries they get from the tourist and how they cater them.

Interviewer: "*anu ano po yung mga tinatanong nila?"* (What are the common

questions asked by the tourist?)

Admin Aide 1: "*kadalasan, tungkol sa directions, magkano entrance fee or kung magkano yung papunta doon kung alam man namin. Kasi di kami talaga nagbibigay ng amount dahil di sya stable.mamaya kasi magbigay kami ng presyo tapos pagpunta nila doon, iba naman pala. Tsaka usually kasi mga Travel agency yung gumagwa nun. Ineendorse lang namin sila doon sa Municipal office ng gusto nila bisitahin o puntahan tapos sila na yung mag aasist.*"

English translation:

   Common questions are about directions, entrance fee and how much to spend to get there if we know. Because usually we don't say any amount because it is not stable like what if we give them the quotation but when the tourist came there, it's different. And usually, the travel agency is the one who do that. We will only endorse them to the Municipal office of the town they want to visit then those staff on that office will be the one who will assist them.

 Interviewer: "*gaano po kadaming inquiries and kinecater nyo sa nagyon?"*

("How many inquiries from the tourist do you cater at the present?)

Admin Aide 1: "*usually kasi nakakareceive kami ng inquiry sa e-mail or phone, madalang pag walk in. pag walk in, mga nasa 30 per month, kapaga email and phone, mga around 40 inquiries.*"

English translation:

Usually, we receive inquiries through e-mail or phone, it is uncommon to have a walk-in inquiry. In terms of walk in, it about 30 per month while email and phone are around 40 inquiries.

Procedure 3. Assessment of tourism performance

Once the promotion has been done, the said office will do some assessment if the campaign is effective and it reached the target numbers for that quarter or year. In order to know how they evaluate the effectiveness of their campaign the question "How do you asses the tourism performance of the province?" were asked to the participant in order to understand how they measure the performance or how effective their campaign is. And responds goes like this.

Admin Aide 1: "*usually kasi pag ganyan, kinocompare namin yung number of arrival tsaka number of visitors ngayon sa last year. Kelan mapantayan sya or higit pa dun. Kapag ganun, ibig sabihin okay yung performance.*"

English translation:

we usually compare the current number of arrivals to the official number of visitors last year. If the current number of arrivals is higher than last year then the performance is good.

In connection with the previous question, the researcher also asked "What is your target number of visitors at the present?" this is to know what is their target numbers in terms of local and foreign tourists or visitors at present and the respondent says that:

Admin Aide 1: "*sa ngayon kasi tinatarget namin na atleast same matrix nung last 2018 or higher. Tsaka nakafocus kami talaga ngayon sa day tour*"

English translation:

At present, we aim to reach at least the same number based on the matrix last 2018 or higher. Right now, we are focusing on the day tour.

All answers from the interview were noted and further assessed by the researcher in order to gather some insights and understand the different methods and current procedure of the said office aside from that, the researcher take this opportunity to know the background history of the province and its current projects. This information is helpful in the research especially in the development of the application.

Part II. Development of an Application Software using AI Natural Language Processing.

In this part, the researcher develops the system using the following software technologies: Google Dialogflow, Firebase and Facebook Messenger. Google Dialogflow serves as the Chatbot agent who will respond to the query of the user. Firebase which also a product of Google will serve as the storage of the application where it stores external data such as images of maps and tourist spots to be used by the chatbot agent for its responses.
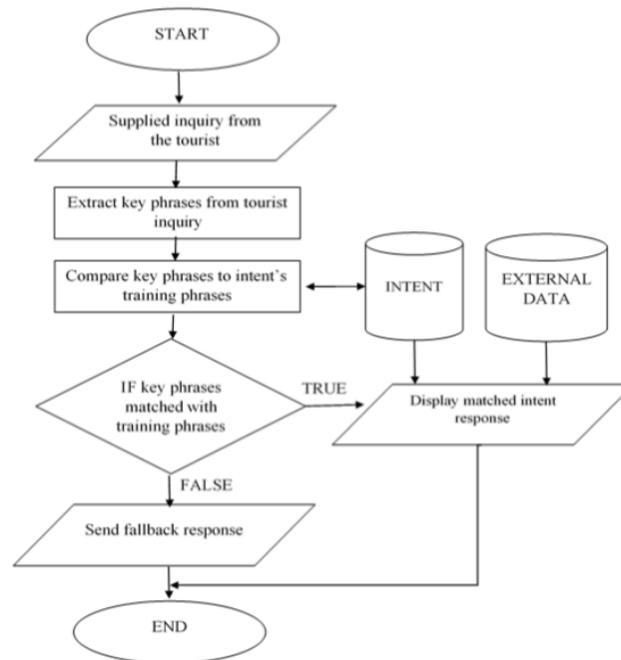
*1 - **The System's Algorithm in Flowchart***

The flowchart illustrates the algorithm of the system under Dialogflow more specifically on how the chat bot response to the queries of the user. First, the user's queries will be gathered through any platform which will serve as a medium between the end user and the dialog flow which in this case, is the Facebook Messenger. After that, the queries will be sent to Dialogflow which serves as another medium where, it connects the user through messenger and the agent. Then the agent or bot will then try to understand what the query is and what should be the response.

In this scenario, the chat bot will also match the sample queries to the training phrases or queries stored in intents. This is the crucial part of the dialog flow since it will test the agent how well it really understands what the user says. Intent is a service that pertaining to what the user wants and also decides on what action or response should use.

There are some cases that the set of response stored in the intent that needs external resources such as photos. In this case, intents are connected to the external data banks such as cloud

storage or database through link or web hook. Once the bot finds the best intent for the response, it will send a reply to the messenger then back to the end user.

The researcher chose Facebook Messenger because of its easy accessibility since its available in desktop and mobile aside from that it also works on free data although the viewing of images and external data is limited. Facebook Messenger will serve as a medium between the end user and the Dialogflow.

Part III. Evaluation of the Developed Application *Aeristelle* using the Software Quality Model ISO / IEC 25010

Table 1

Frequency Distribution and Descriptive Measures of the Software Quality Evaluation of the Developed Application in terms of Functionality

Items	4	3	2	1	Mean	Interpreta-tion
The application provides accurate information and meaningful recommendation to the user.	5	0	0	0	4.00	Exceeds standard
The information provided by the app satisfy	5	0	0	0	4.00	Exceeds stand-
Weighted Mean					**4.00**	**Exceeds standard**

The table presents the frequency distribution and descriptive measures of the evaluation in terms of the functionality of the app. Based on the table, the overall mean in this category is 4 meaning, the software is beyond the expectation of the evaluators. The result also depicts that the application can provide accurate and meaningful information that can satisfy the nee of the user.

Table 2

Frequency Distribution and Descriptive Measures of the Software Quality Evaluation of the Developed Application in terms of Reliability

Items	4	3	2	1	Mean	Interpreta-tion
1. The app performs the task required by the user.	5	0	0	0	4.00	Exceeds stand-ard
2. The application provides satisfactory information based on the user's needs.	5	0	0	0	4.00	Exceeds stand-ard
Weighted Mean					**4.00**	**Exceeds standard**

The table briefly discuss the frequency distribution and descriptive measure of the software evaluation in terms of reliability. The overall mean in this part is 4 meaning in this category, the app can provide information satisfactorily and can be able to perform the task required by the end user.

Table 3

Frequency Distribution and Descriptive Measure of the Software Quality Evaluation of the Developed Application in terms of Usability

Items	4	3	2	1	Mean	Interpreta-tion
The learnability to use application is ac-	5	0	0	0	4.0	Exceeds stand-
The application is easy to use.	5	0	0	0	4.0	Exceeds stand-ard
The application is appealing to the end user.	3	2	0	0	3.6	Exceeds stand-ard
Weighted Mean					**3.87**	**Exceeds**

The result of the software evaluation in terms of usability was discussed in Table 5. The overall mean of the said category is 3.87 meaning it exceeds the standard. The result also means that the app is appealing and easy to use.

Table 4

Frequency Distribution and Descriptive Measures of the Software Quality Evaluation of the Developed Application in terms of Efficiency

Items	4	3	2	1	Mean	Interpreta-tion
The application provides accurate information and meaningful recommendation to the user.	5	0	0	0	4.00	Exceeds standard
The information provided by the app satisfy	5	0	0	0	4.00	Exceeds stand-
Weighted Mean					4.00	Exceeds standard

The table presents the frequency distribution and descriptive measure of the software evaluation in terms of efficiency. Based on the result, the overall mean of the evaluation in this category is 3.7 which means that the software can provide essential information quickly.

Table 5

Frequency Distribution and Descriptive Measures of the Software Quality Evaluation of the Developed Application in terms of Maintainability

Items	4	3	2	1	Mean	Interpreta-tion
The application enables specified	3	2	0	0	3.60	Exceeds
The application is easy to adapt and	3	2	0	0	3.60	Exceeds
Weighted Mean					**3.60**	Exceeds standard

The table discusses the summary of evaluation in terms of maintainability. Based on the result, the overall mean of the evaluation is 3.6 or equivalent to exceeds standard. This means that the content of the application like data can easily be modified by the admin and easily adapt by the end users.

Table 6

Frequency Distribution and Descriptive Measures of the Software Quality Evaluation of the Developed Application in terms of Security

Item	4	3	2	1	Mean	Interpreta-tion
The data can only be accessed by an	5	0	0	0	4.00	Exceeds
Weighted Mean					4.00	Exceeds standard

In this table shows the summary of frequency distribution and descriptive measure of the software evaluation in terms of security. The overall mean in the said category is 4.00 with equivalent interpretation of exceeds standard meaning, the application's data is secured in terms of modification and it can only be doable by an authorized user which is the admin.

Table 7

Frequency Distribution and Descriptive Measures of the Software Quality Evaluation of the Developed Application in terms of Portability

Item	4	3	2	1	Mean	Interpreta-tion
The application can be easily adapted by the user.	5	0	0	0	4.00	Exceeds standard
Weighted Mean					**4.00**	**Exceeds standard**

The summary of frequency distribution and descriptive measures of the software evaluation in terms of portability also discusses in this table. In the said table, the total mean of the said category is 4 meaning, the software can be easily adapted by the end user.

Table 8

Summary Table of Software Quality Evaluation Parameters and the Overall Mean

Criteria	Mean	Interpretation
1. Functionality	4.00	Exceeds standard
2. Reliability	4.00	Exceeds standard
3. Usability	3.87	Exceeds standard
4. Efficiency	3.70	Exceeds standard
5. Maintainability	3.60	Exceeds standard
6. Security	4.00	Exceeds standard
7. Portability	4.00	Exceeds standard
Overall Mean	**3.88**	**Exceeds standard**

Overall, the total computed mean of the said software evaluation is 3.88 meaning the application exceeds the expectation or standards of the evaluators. Additionally, in terms of software acceptability test 4 out of 6 staffs from the Tourism Office of Rizal agreed that the software is acceptable based on the evaluation. It also shown that all the evaluators agreed that the quality of the application meets the standard set in the study.

Conclusion

The developed chatbot *Aeristelle,* an Intelligent Travel Virtual Presentation of Selected Tourist Destinations in the Province of Rizal is equally beneficial to the tourist and it can help in promoting tourism in the province of Rizal.

Recommendations

To further improve the study, the researcher recommends the following:

1.) The developed chat bot *Aeristelle* may be adopted by the tourism office of Rizal Province to promote its beautiful places and tourist destinations.

2.) further enhance the comprehension of the agent by adding more training phrases and improve its response by incorporating new information related to the tourism promotion of Rizal province.

2.) Future researcher and application developer may include other municipalities of Rizal province such as Antipolo, Binangonan, Rodriguez and Taytay in the scope of the application.

3.) Other Platforms like Web, Line Messenger and Google assistant may be considered to the development to broaden implementation and integration of the system.

4.) Include Global Positioning System or GPS as one of the main features of the said application so that, the app can provide essential information based on their location like best tourist spot near the area or nearest accommodation where the tourist can stay.

5.) In the future, further include other tourist destinations around the Philippines to the scope of the application.

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