AIRA Chatbot for Travel: Case Study of AirAsia

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Abstract. Tourism is one of the main economic contribution to many countries worldwide. This paper presents an Artificial Intelligence tool to help improve the performance, quality and credibility of customer service for AirAsia Berhad, a renowned local business in travel/airline industry in Malaysia. The tool, AIRA, is developed using C# in Verbot 5.0 and plays an important role as an information gatherer, gathers all the latest and correct information in order to provide the best service to customers. The evaluation has proved that AIRA provided a simple, easy to navigate GUI with high efficiency, hence a user-friendly system that requires little or no technical knowledge to operate. AIRA is hoped to improve the quality of customer service in AirAsia by giving an alternative to entertain travellers.

1. Introduction
Tourism is one of the main important sectors of the economy. There is a general mutual agreement that tourism expands when there are better transportation systems. This is because in tourism the customers come to a particular destination where tourism services are provided [1]. Therefore, transportation is an integral part of the tourism industry. The statistics from the World Tourism Organization (http://media.unwto.org/content/why-tourism-matters-2016) shows that with the advancement and application of technologies within the transportation sector, tourists are able to reach many destinations of the world [2].

Air transportation is one of the most important transportation modes in the tourism industry as compared to sea and automobile transportation. This is because air travel has made significant changes in terms of the customer’s travel distance and time usage. In order to meet requirements and create improvements, it has been stated that the airline companies spent billions of dollars and apply new technological innovations to match the constant developments in this industry. The literature has stated that there are 1,629 airlines, 27,271 aircrafts, 3,733 airports, 29.6 million scheduled departures a year that carry 2.7 billion of passengers per year [3, 4].

Malaysia has an ancient history of tourism dated back in 1970s, where the Malaysia’s tourism industry was considered underdeveloped until its turning point in 1970s. With the establishment of the Tourism Development Corporation of Malaysia (TDC) in 1972, the country took a major
step in the right direction to make TDC the official development authority to promote tourism and travel. The country has since taken up interest in the development of this industry shown by the creations of five year plans such as the National Tourism Policy (NTP) enacted in 1992, the National Ecotourism Plan (NEP) in 1996 and the most recent Malaysia Tourism Transformation Programme (MTTP) in 2010. All these policies tap into the unexploited and unexplored potentials of the home-grown tourism, hoping for a greater and sustained economic growth in Malaysia. Figure 1 shows the growth of tourism in Asia Pacific in 2016 [5].

![Chart: Growth of Tourism in Asia Pacific](image)

**Figure 1.** Growth of Tourism in Asia Pacific [5].

The tourism in Malaysia has contributed to the overall output and socio-economic development of the country. Within the Asia and Pacific region, the data gathered for 2014 indicates that Malaysia was ranked very highly at position 26 out of the 184 countries in the world in terms of the relative contribution of the industry to its national output [6]. According to [7], the factors driving international tourist arrivals into Malaysia suggested that the Malaysian airport facilities significantly drives the growth of international tourist arrivals.

The air transportation industry in Malaysia is supported by many world-class air transportation services available within the country such as the Malaysia Airline, AirAsia, Berjaya Air, Firefly, Malindo Air and MAS Wings. This research has selected the AirAsia Berhad as the case study, being the largest airline in Malaysia by fleet size and destinations, and Asia’s largest low-cost airline by passengers carried and jet fleet. AirAsia Group operates scheduled domestic and international flights to more than 165 destinations spanning over 25 countries.

Previous case study on AirAsia by [8] reported that the relationship between service quality and price towards customer loyalty in the Air Asia services is very much significant. In searching the overall gap between expectation and perception in terms of service quality, the highest gap reported was about the responsiveness of AirAsia’s staffs in handling delays. When problem aroused, the staffs are not able to give adequate amount of information in a timely manner.

Next, in terms of assurance, the highest gap is regarding the flight schedule. Customers are expecting their flight schedules to be assured at all times but it shows that flights are always delayed and not precise, leading customers to wander or linger around the airport with excessive time which leads to lower down the productive level of the customers. Furthermore, in terms of empathy, the highest gap is about the service personnel. Their expectations are low as the company’s staffs did not resolve the customers’ problems, due to shortage of staffs with the level of expertise and knowledge.
To assist AirAsia in providing quality service by capitalizing the technological advancement, this research proposes the use of conversational agents or chatbots as AirAsia virtual assistant frontliners to help consumers book flights, locations and accommodations. The remainder of this paper proceeds as follows. Section presents existing chatbot technologies related to customer services. Section 3 presents the proposed AIRA Chatbot for AirAsia. Section 4 presents the evaluation of the proposed chatbot and finally Section 5 concludes the paper.

2. Related Work
The literature defines chatbots are software programs that engages in artificial conversations through a text-based input medium that can be used in various fields such as education, healthcare, and route assistance [1]. It is proved to be a helpful contribution to any industry where one can seek assistance without need of human. [9] developed an artificial intelligent chatterbot with whom human can interact by speaking to the chatterbot and it responses using its speech synthesizer. The chatbot was implemented by using the Artificial Intelligence Markup Language (AIML), another type of Extended Markup Language (XML). Another chatbot is called TeenChat [10], an adolescent-oriented intelligent chatting system which acts as a virtual friend to listen, understand, comfort, encourage, and guide stressful adolescents to pour out their bad feelings, and thus releasing the stress. TeenChat was developed specifically to help manage adolescent stress and the effect of it. Too much stress brings a variety of physical and psychological problems including anxiety and depression to the growing youths.

Aside from serving as social applications, the use of chatbots is also advancing and revolutionizing the current Travel and Tourism (T&T) industry by simplifying the process for travellers and jet packers. As the tourism and aviation industry continues to advance and provide easier means of transportation for its travellers, the Information Technology (IT) industry catches up the bandwagon by producing a large amount of applications, websites and services to assist these travellers. In the T&T industry, where planning can be hectic for both consumers and staffs’, conversational commerce offers great opportunity.

Chatbots are famously used as virtual assistants to help consumers book flights, locations and accommodations. There are a few notable ones such as Cheapflights, which is Facebook messenger bot that adapts to the conversation style of each individual user and respond in similar language. Travel application called the HelloGbye assists travellers in a way by accepting input of vacations the travellers desire and generates a list of potential flights tailored to their requirements. A more robust chatbot has been patented as a unique invention designed to interact with web retailer’s customers with real agent reaction times as they give astute answers directly concerning web retailer’s products and goals [11]. Work by [12] demonstrated how an artificial intelligence engine uses the combination of Bayesian probability keyword selection, natural language parsing and regular expression processing.

Other than that, online platform such as HiJiffy and Exa helps the travellers to find a range of hotels, tourist locations and airport transfer and even translates and tailored its responses to the guest’s language [13] but the chatbots do not provide an incorporated line of services that cater from the beginning to the end of the travel planning process. This would create difficulties for the travellers as they have to download or use different platforms for different usages. The applications do not provide other additional services to allow the users to plan their time within the airport while waiting for boarding or check-in.

3. Proposed AIRA Chatbot
This research proposes a verbot (Verbal-Robot) to help improve the performance, quality and credibility of customer service for AirAsia (Malaysia) Berhad called AIRA. AIRA is designed as a stand-alone application, with possible extended features provided by web connectivity.
3.1. Knowledge Representation
AIRA interacts with customer and generates automated responses to a user’s input. She is able to answer basic questions and provide customers with the latest flight information. Each time a user enters an input, AIRA will select the closest matching response by searching for the closest matching known statement that matches the users input and then chooses a response from the selection of known responses to that statement. Figure 2 and Figure 3 show the knowledge representation for places and the activities in AIRA, respectively.

Figure 2. Recommendation of Places in AIRA

Figure 3. Activities in AIRA
3.2. Implementation
AIRA is developed using C# in Verbot 5.0 tool. Figure 4 show examples of AIRA interactions with the user/travellers. On the start-up page, AIRA greets the user by introducing herself and displaying the current time, date and place in real-time using special internal variables of Verbot. The users will then be asked for their name and AIRA will remember that from start to the end. When the user does not type or key in any input within few minutes, AIRA will ask the user to type or ask anything in order to continue run the chatbot program. AIRA also update new rules into her knowledge base as shown in Figure 5.

![Figure 4. AIRA responding to user’s input](image1.png)

![Figure 5. AIRA respond upon no feedback and adding rules to self](image2.png)

The main objective of AIRA is two-fold. The first objective is to reduce customers’ waiting time at the airport, from check-in to boarding. With the ability to perform basic services to customer, AIRA will be able to solve the lack of human resources problem within AirAsia. For example, with consideration to the fact that boarding or waiting time can be a dreadful for most travellers, AIRA is able to recommend good places based on the leisure category that the user prefers within the vicinity of the airport itself. AIRA works by prompting a website displaying information and floor plans for further exploration by the users.
The second objective is to recommend the customers with places, hotels and foods based on customer preferences and requirements. For example, if the user loves a good city life, AIRA will be more likely to recommend city centers such as Johor Bahru or Kuala Lumpur. Once the user chooses a location, AIRA will then bring the user to a webpage whereby the user can book their respective flights immediately. Figure 6 shows AIRA’s suggestion to users if the user does not have any ideas where to visit or go. In order to recommend places to the user, several questions will be asked by AIRA like the amount of person traveling and preferred tourist activities. After getting all the information, a place like Perak (shown in Figure 6) will be provided by AIRA and she will describe the attractions about that state.

![Figure 6. AIRA recommending within airport and other places of attraction](image)

Once the user has selected their travel location and viewed the respective information regarding the travel location, AIRA will then display a travel documentation/note/receipt based on the user’s previous input. From there, the user can choose to either ignore or save the file for further references as shown in Figure 7. AIRA finally saves the input at the end of the conversation. It contains the place recommended by AIRA and its attractions, food and hotels will be displayed as well.

![Figure 7. AIRA’s conversation logs.](image)

4. Evaluation

Both travellers and AirAsia staffs are not necessarily possess computing knowledge, hence any system proposed for the travel and tourism industry has to be crafted in the most user-friendly manner and strives to allow users to monitor and control the system with ease. Because information is overly generated in a great number of way, people will easily get confused by various and different information. This will cause a lot of misunderstanding and misconceptions.

Upon completion, AIRA was evaluated via a questionnaire as shown in Figure 8. 20 respondents were involved in the evaluation stage. The demographic information has shown that majority of the respondents aged between 21-40 years old (45%), 30% aged between 41-60 years old, and 25% aged below 20 or above 60 years old. The questionnaire contains four questions to collect customer’s feedback and responses towards AIRA as follows:

- Q1. Would you adopt the places or suggestion provided by AIRA?
- Q2. Was AIRA able to answer all your questions regarding your flight?
- Q3. How would you rate AIRA for being user-friendly (between 1 to 5)?
- Q4. Would you like to see AIRA on mobie application in the future?

Figure 8. UAT questionnaire for AIRA.

Figure 9 shows the results for Q1. Based on the results, it can be assumed that most of the respondents are willing to try out the suggestions and places provided by AIRA as the results displayed “YES” took up 70% of the pie chart. However, 30% of the crowd felt that further improvements can be made to the system to extend its functionalities. Since the responses regarding this question produced a big contrast, it is concluded that the system was deemed useful and needed by only specific group of users. AIRA’s functionalities and knowledge bases must be improved to cover expectations of the remaining 30% of the crowd.

Figure 10 shows the results for Q2. This question is to designed to determine the completeness of the system knowledge base by levelling whether the system was able to answer all questions regarding the flights information given by the target users. The graph shown that AIRA is able to answer most of the questions asked by respondents. This is shown with option “YES” granting 65% from the entire pie chart. However, 35% of the crowd felt that AIRA has failed to
answer some of their questions. This is because AIRA was designed to answer frequently asked and general questions. In the future, AIRA has to cater more specific questions from the public.

Figure 11 shows that rating “three” and “four” dominated the graph with each containing 35% of the entire graph. Although it shows that the AIRA is not deemed perfect, it indicates that AIRA is suitable for anyone and it does not require an IT user to operate based on the user acceptance results. Finally, Figure 12 shows that 70% of the respondents agree that the system should be integrated and implemented on mobile application rather than stand-alone application. In addition, only a small amount of 30% disagree. This findings could be used for further improvement of AIRA.

5. Conclusions and Future Work

This paper presented AIRA, a travel chatbot that serves as an assistant for providing a best service to customer and creating interacting environment for AirAsia (Malaysia) Berhad. AIRA has been successfully developed and proved to provide a user-friendly interaction that requires small or no technical knowledge to operate from the users’ side. AIRA also provides few notable extra features the users may play with, such as follows:

- Changing agent: User may choose to change to another avatar if he/she does not like AIRA’s look and is able to have the changes reverted as well.
- Minimizing screen: User may choose to minimize the chatbot screen by typing in respective queries.
- Displaying website: User may choose to open the webpage to book flight tickets, view AirAsia Home Page or browse KLIA’s directory.
- Displaying file: User may choose to open or save a text file containing the information regarding the recommendations made by AIRA.
- Recording feedbacks: User may activate and input feedback which will be stored into the knowledge base and next time, when the user activates the same rule, the respective output will be displayed.
• Remembering names/travel destination: User may ask AIRA his/her destination if he/she forgets.
• Remembering last input: User may ask AIRA for the latest input created by the user.

In the future, AIRA is planned to be extended to cater speech recognition as well additional functionalities to allow AIRA to make decisions based on customers’ personality tests.

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