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Analysis of the Influence Chat-bot with Speech Recognition Features on Travel Website in Batam City

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Abstract

Today's advanced technology allows everyone to travel all over the world. Traveling nowadays really helps everyone who wants to travel long distances because everything is practical online. Artificial intelligence is starting to become known to many people, artificial intelligence in terminology refers to technology developments that are able to imitate human thinking and acting skills, and one of the products is chat-bot. Chat-bot can be applied in the travel sector, but often chat-bot in the travel sector do not have enough chat-bot, with a speech recognition system which will greatly facilitate travel websites. users to get information more quickly and easily. Researchers aim to test the effect of chat-bot with speech recognition features on travel websites in Batam City using the Agile method as a development method and using the Hidden Markov Model and Recurrent Neural Network algorithms. With a quantitative approach to collecting data through distributing questionnaires to obtain user responses to chat-bot on travel websites. The results obtained were good responses, the test results stated that travel website users were advised to use chat-bot as a source of information. From this research, it is concluded that websites that implement chat-bot with a speech recognition system are preferred by users because of their ease in obtaining certain information.

Keywords: travel, speech recognition, chat-bot, hidden markov model, recurrent neural network.

Introduction

Today's advanced technology allow everyone to travel all over the world. Travel nowadays is very helpful for everyone who wants to travel long distances because everything is practical online, the use of digital marketing the image of the tourism sector has been dramatically transformed because of the development of digital services through out time(Kerdpitak, 2022). It's not the same as in the past where people who wanted to travel had to go to a service

provider to buy travel tickets. Soon after the COVID-19 outbreak, numerous publications explored this novel phenomenon and its impact on the lives of citizens and specifically on the travel and tourism industry(Ivanova et al., 2021). In 2019 there was a Covid-19 pandemic and in 2022 there will be a recovery for the travel industry and many countries have relaxed Covid-19 restrictions. This of course immediately activates the search for various tourist attractions again. According to Google data, searches related to Southeast Asian tourism are very promising and according to Google data, the Philippines and Indonesia are the highest attracting visitors in Southeast Asia. With post-Covid-19, several new trends have emerged, one of which is work with play, which has been a trend for quite some time before Covid-19.. Several strategies were carried out, starting from offering weekend price promotions via online booking platforms, free spa services, and give a different touch to the interior and exterior, so that ideas emerge for offers stay cation packages at each hotel(Islahuddin & Arfin Muh Salim, 2022). And of course employees also need comfort in their work environment, and hotels also offer packages like this for customer convenience. In the last two years, internet users have also increased, especially in the ASEAN region.

Artificial Intelligence (AI), which known as deep artificial intelligence more precise terminology, refers on technological development able to imitate thinking skills and act human. The word "Artificial" in AI refers to something created by humans, while "Intelligence" describe the attributes of intelligence(Farwati et al., 2023). Existence of Artificial Intelligence, have been created new business models. One example of Artificial Intelligence that we can experience is intelligent assistants, including Google Assistant on Google. Intelligence assistant is one of the NLP (Natural Language Process) technologies. NLP uses statistical and probabilistic techniques to determine the probability of a string of words, or simply relate it to a machine's understanding of natural spoken language and being able to communicate with humans.

Among the NLP products that are quite well known are chat-bot. The benefit of using a chat-bot itself is that it can help users answer some of the questions they ask, of course this immediately solves small problems that users face when using certain applications. Intention recognition relating to chat-bot capabilities to understand the purpose or intent the user wants to convey via text or voice. For example, users can express the intention to search information about tourist attractions, search food recommendations, or ask directions(Wulandari & Sasongko Wibowo, 2023). And some travel websites have a chat-bot feature, which is sometimes rarely found on travel websites, but makes it difficult for users to get detailed information directly.

Based on one data survey result of 44%, it can be concluded that users hope to use AI-based chat bot rather than direct customer service. Of course, this really proves that chat-bot are needed in the travel sector.In the hospitality and tourism industry, chat-bots can provide travel planning, booking, service support, recommendations and advice to customers regarding travel issues. Chat-bot help tourism companies for 24/7 customer support, more revenue opportunities, increased engagement, automated lead capture, reduced overhead costs, competitive advantage and time saving(Alsoud et al., 2023). In this chat-bot, researchers will analyze how users respond to a web travel system that implements a speech recognition system using the Agile method as a development application and using the Hidden Markov Model Algorithm and Recurrent Neural Network (RNN) as a speech recognition application.

HMM contains two random processes, including a sequence of state transitions, which is a simple Markov process and a sequence of observations that correspond to the state. In practical problems, we can only see the observation value, but not the state directly, and can

only infer the existence and transfer characteristics of the state through the observation sequence, that is, the state of the model is covered in the observation sequence, so it is called the "Hidden" Markov model (Li & Zhang, 2020). And RNN are the most commonly used NN architecture for sequence prediction problems. They have gained particular popularity in the domain of natural language processing (Hewamalage et al., 2021).

Based on the background above, the author is motivated to create a system, how web travel can interact with users who visit the website, with the implementation of speech recognition it is hoped that it can make it easier for everyone to get information.

The researcher aims to create a travel website based on speech recognition using the Hidden Markov Model Algorithm and Recurrent Neural Network, and using the Agile model as an application, followed by a quantitative method with a questionnaire survey to obtain analytical data.

Literature Review

Research by (Pillai & Sivathanu, 2020) this research focuses on the adoption of AI chat-bots for hospitality and tourism used by users. The aim of this research is to find user interest in chat-bots by using qualitative and quantitative methods to collect data. The results of this research obtained positive results, the variables assessed validated each other's information based on the experience of chat-bot users.

Research by (Arslan & Barışçi, 2020) this research focuses on sound recognition in Turkish. The aim of this research is to develop an automatic speech recognition (ASR) system scheme for the Turkish language. The results of this research found the opposite results in previous research because the lack of data material was the biggest obstacle in system development. So concrete studies are needed to achieve an automatic speech recognition (ASR) system with human-level working abilities to understand Turkish.

Research conducted by (Melián-González et al., 2021) this research focuses on predicting interest in using chatbots for travel and tourism. The aim of this research is to look for factors in the use of chatbots, differences in opinion from users using quantitative methods. The results of this research are that the main reason people use chatbots is because chatbots are expected to work properly and help users plan their trips.

Research by (Deshmukh, 2020) focus of this research is to discuss various ways of working and differences in types of HMM. The aim of the research is to discuss various types of HMM. The results of this research are two main approaches, namely the old model and the new model. The old model based on this research still requires a lot of resources and training stages, while the new model with a combination of HMM neural networks is better with a faster and more practical decoding process. HMM contains two stochastic processes, including a hidden state process that is not visible but a symbol process that can be observed, then hidden states form Markov chain, and the observed probability distribution of symbols depends on the underlying state.

Research conducted by (Tsap et al., 2021) focus of this research is to implement an audio to text translation system, the aim of this research is to explore RNN and the results of this research according to research, the development of RNN will lead to the emergence of smart assistants that are able to recognize the owner's voice and understand tasks correctly.

Research Methods

The research flow is created with the aim of organizing how the stages will go through. The stages involved are: Literature Review, Problem Formulation, Application Development, Testing, Data Collection, Data Analysis, and Writing. The research flow is described in the form of a flow chart below as follows.

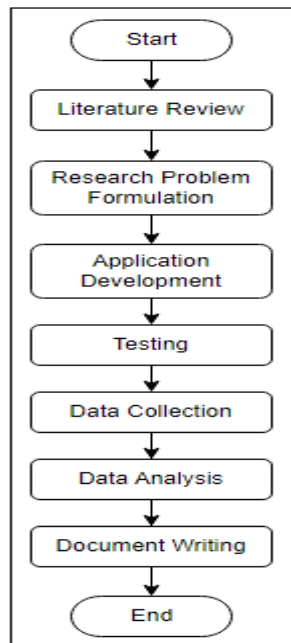


Figure 1. Research Flow.

Research Problem Formulation

Travel business management requires fast customer service, so this business needs the right information technology to help improve the quality of its service. Travel Web has become one of the most popular service providers nowadays where transactions can be done online, of course this is an easy solution for people who want to go on holiday and so on. From hotel reservations, vehicles, travel packages, and others.

However, the chat-bot implemented on Web Travel takes some time for the user to get the appropriate answer, but one of the things that some users don't like is the need to repeat typing into the chat-bot, this sometimes makes users uncomfortable using chat-bot because it must type. However, if the chat-bot can respond to a question briefly without having to wait for a reply from online customer service, one way is to apply artificial intelligence to the chat-bot and can also use speech recognition to make it easier for users to use the chat-bot without having to type the text being asked. As a question, this chat-bot is expected to be able to answer general questions. The challenge that researchers need to face is how to develop and develop this Travel Web based on a speech recognition system in a chat-bot.

To develop this Travel Web, of course we need an algorithm that can be applied to chat-bot, researchers use the Hidden Markov Model algorithm and the Recurrent Neural Network algorithm which is known from the Hidden Markov Model which has the ability to predict the next word from the previous word. This will make it a suitable algorithm for build a reply sentence based on the training data that will be collected. Followed by a Recurrent Neural

Network which could recognize the user's speech and is able to translate the speech into text according to what is said to the application.

The influence of web travel which implements a speech recognition system will be measured using a quantitative approach, namely using a questionnaire as a technique for collecting data which is done by asking several questions via Google form with closed questions, namely the user chooses one alternative answer for each question that is available.

Application Development

Agile Development is a software development methodology that is based on an iterative process where the agile model is very suitable for short-term development. The agile model consists of requirements, design, development, testing, implementation, review which are explained below.



Figure 2. Agile Methods.

At requirements stage researchers need to define the things needed to develop a Travel Website based on a speech recognition system. Visual Studio Code as an IDE (Integrated Development Environment) for developing website coding, apart from that, back development also requires the Python framework. Django will be an option for a combination of web travel based on a speech recognition system. Then design begins by designing the index page and chat-bot appearance in the Django framework. After completing the design of the index page and the appearance of the chat-bot, we begin with the algorithm model development stage. In the development stage, researchers used two algorithmic models, namely Hidden Markov Model and Recurrent Neural Network to help researchers build Artificial Intelligence based on a speech recognition system.

Hidden Markov Models (HMM) are statistical models for modeling generative circuits characterized by underlying processes that produce observable sequences. The Markov model is based on Markov assumptions in predicting the probability of a sequence. If the state variables are defined as $q_1, q_2 \dots q_i$, the Markov assumption is defined as:

Model Markov Assumptions:

$$P(q_i = a | q_i \dots q_{i-1}) = P(q_i = a | q_{i-1})$$

Hidden Markov First order models are based on two assumptions. One of them is the Markov assumption, namely that the probability of a state only depends on the previous state as explained previously, the other is that the probability of an output observation o_i only depends on the state that see q_i and not on the state or other observations.

RNN can recognize speech and process natural language. RNN also recognizes the sequential characteristics of data and uses patterns to predict possible next scenarios. RNN has a neuron layer consisting of network nodes that can process input and then output to other nodes in the network. The nodes will be connected by weights which can affect the signal strength and final network output. RNN uses feedback or what is called looping during the computing process to repeat information to the network. This allows RNN to process data sequentially and temporally. The way RNN works can be described as in the image below as follows.

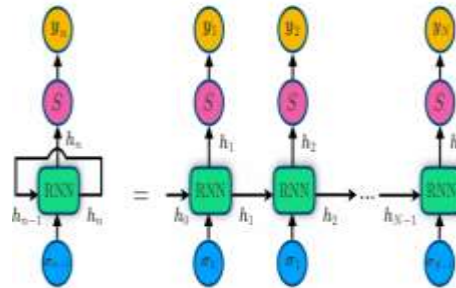


Figure 3. Recurrent Neural Network Flow.

At the testing stage will be carried out after the front end and back end of the travel web are complete. The testing stage will be tested first by researchers to test how far artificial intelligence is capable of learning and answering questions via chat-bot. Then the front end will be tested directly with several users to ensure that the front end runs well. At deployment, researchers need to purchase a hosting service to post projects that have been developed. Then at this stage the researcher will deploy online or hosting so that it is easy to help potential users to test Web Travel chat. A review will be obtained after the user has tested the travel website chat-bot that has been deployed by the researcher. Then the user answers all the questionnaires provided by the researcher while also getting response data from users who use Web Travel based on a speech recognition system.

Testing

The testing stages were carried out using the Black Box Testing method. With this method the author will check the functional features of the speech recognition system developed by the author.

After carrying out development, the author will create a test case which will then be tested using the website that has been developed by the author. If there are test cases that have not been successful, then the author needs to make revisions so that the website developed with a speech recognition system can run well and correctly as a whole.

Data Collection

The data source was obtained from the author distributing questionnaires, the data taken was based on the research title referring to travel with an artificial intelligence system. Of course, the sample that the author needs is prospective users who have a percentage of traveling. The number of samples for the author to get good research results, the author must be able to get approximately 200 samples and above, at this stage the author concludes that

there are two types of variables that determine whether the research carried out can get benefits. The following are several variables that will be tested.

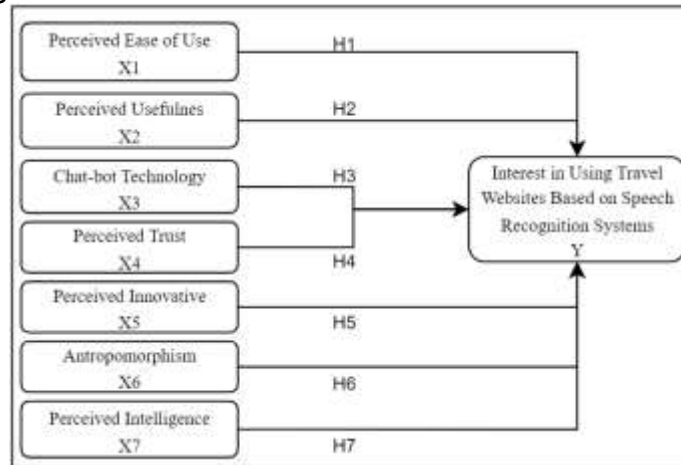


Figure 4. Research Variable.

Data collection was carried out using a quantitative method where the author distributed a questionnaire via Google Form containing material from the effects of travel websites that implement speech recognition.

Table 1. Questionnaire questions

No	Variable	Indicator	Source
1	Perceived Ease of Use	Chat-bot for tourism require little mental effort of planning a trip It is very easy to use chat-bot for my travel planning and booking Interaction with chat-bot is clear and understandable for planning my tour Chat-bot for tourism are easy to use for travel planning and booking	(Pillai & Sivathanu, 2020)
2	Perceived Usefulness	Chat-bot are useful for my trip planning Chat-bot for tourism increase my efficiency in travel planning Chat-bot for tourism improve my trip planning performance (save time) Overall I feel that chat-bot are very useful for travel planning	(Pillai & Sivathanu, 2020)
3	Chat-bot Technology	I may face problems when i use technology like chat-bot for tourism I can't keep up with new technology Using technology like chat-bot for travel makes me anxious Technology related word are difficult to understand I find it difficult to understand technology related matters I escape from utilization of chat-bot technology as it is not much familiar to me I am apprehensive to use technology as i feel that i make mistakes while using technology which i cannot fix	(Pillai & Sivathanu, 2020)

4	Perceived Trust	I feel that the information about travel provided by chat-bot is honest and authentic. I feel chat-bot for tourism have clarity of services provided and honest opinions that are reliable. I feel chat-bot in tourism for travel planning are trustworthy I feel that chat-bot need the ability to provide travel planning services	(Pillai & Sivathanu, 2020)
5	Perceived Innovative	I discovered a new tool that is easy to use I am a technologically skilled person, I like to know all the latest things	(Meliá n-González et al., 2021)
6	Anthropomorphism	I'm always looking for new things and new tools Chat-bot for tourism have a mind of their own Chat-bot for tourism can experience emotions Chat-bot for tourism can experience emotions I feel that chat-bot for tourism are –inanimate objects: alive I feel like chat-bot for tourism are computer animation: real	(Pillai & Sivathanu, 2020)
7	Perceived Intelligence	I feel chat-bot for tourism are competent I feel that chat-bot for tourism are knowledgeable I feel chat-bot for tourism are responsible I feel chat-bot for tourism are smart I feel that chat-bot for tourism make sense	(Pillai & Sivathanu, 2020)
8	Interest in using travel websites based on speech recognition systems	I plan to use chat-bot for future travel scheduling I intend usage of chat-bot for future travel plan and book my travel plan There a possibility that I will suggest my friends to use chat-bot for travel planning	(Pillai & Sivathanu, 2020)

Results and Discussion

Before implementing the developer needs to purchase hosting to implement the project online so that it can be tested by users. It is recommended that before purchasing hosting, the developer needs to consult with the hosting provider to find out how likely it is that the system being developed will be able to run well on the hosting purchased. Then carry out the purchasing process, next we need to adapt the coding that we have created to the website that we are hosting.

After going through testing on the website where coding adjustments have been made, the user then carries out a review process to see whether the chat-bot can run well. And finally, the user answers all the questionnaires given by the researcher while also getting response data from users who use Web Travel based on a speech recognition system.



Figure 5. Chat-bot Design.

Discussion of questionnaire demographic characteristics of respondents

Table 2. Data on Demographic Characteristics of Respondents

Categorize	Characteristic	Total Respondent	Percentage
Residential position	Batam	241	99,6%
	Outside Batam	1	0,4%
Sex	Male	138	57%
	Female	104	43%

Based on the questionnaire that was obtained, the demographic characteristic data obtained was 242 respondents, of which 241 respondents (99.6%) lived in Batam and 1 respondent (0.4%) outside Batam, of which 138 respondents (57%) were predominantly male and 104 respondents (43%) were women.

Reliability Test and Validity Test Results

The validity test in this analyzes researcher use Pearson Correlation. If the significance value is <0.05 count as valid, and the Pearson Correlation Coefficient value is >0.05 .

Table 3. Validity test

Variabel		Pearson Correlation	Sig.
Perceived Ease of Use	X101	.850	.000
	X102	.878	.000
	X103	.884	.000
	X104	.835	.000
Perceived Usefulness	X201	.707	.000
	X202	.850	.000
	X203	.865	.000
	X204	.909	.000
Chat-bot Technology	X301	.762	.000
	X302	.891	.000
	X303	.875	.000
	X304	.872	.000
	X305	.844	.000
	X306	.868	.000
	X307	.852	.000
Perceived Trust	X401	.861	.000
	X402	.827	.000
	X403	.821	.000
	X404	.849	.000
Perceived Innovative	X501	.891	.000
	X502	.905	.000
	X503	.868	.000
Anthropomorphism	X601	.826	.000
	X602	.831	.000
	X603	.895	.000
	X604	.735	.000
Perceived Intelligence	X701	.745	.000
	X702	.705	.000
	X703	.825	.000
	X704	.794	.000
	X705	.858	.000
Interest in using travel websites based on	Y101	.801	.000
	Y102	.857	.000

speech systems	recognition	Y103	.871	.000
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In testing reliability if the value is > 0.6 then the indicator is given a reliable value on the Cronbach's Alpha coefficient. And all questionnaire indicators tested in this study had a Cronbach's Alpha value greater than 0.65.

Table 4. Reliability test

Variable	Cronbach's Alpha
X1	.883
X2	.855
X3	.937
X4	.859
X5	.865
X6	.840
X7	.843
Y1	.797

Hypothesis Test Results

Table 5. Hypothetical results

Hypothesis	Connection	F	Sig.	Adjusted R Square	t	Sig.	Results
H1	X1 > Y				-4.492	.000	Accepted
H2	X2 > Y				1.273	.204	Rejected
H3	X3 > Y				2.433	.016	Accepted
H4	X4 > Y	42.145	000 ^b	.558	2.288	.023	Accepted
H5	X5 > Y				-.189	.850	Rejected
H6	X6 > Y				-.047	.963	Rejected
H7	X7 > Y				13.948	.000	Accepted

From the results of the hypothesis test presented in tables 5 for the f test, and shows a significant value of 0.000b and an F count value of 42.145 where the F count value is only 30 greater than F table.

Then R square test show a value of 0.558 which means perceived ease (X1), perceived usefulness (X2), chat-bot technology (X3), perceived trust (X4), perceived innovation (X5), anthropomorphism (X6), Perceived intelligence (X7) has influence of 55.8% on interest in using a travel website based on a speech recognition system and there is a 44.2% influence from variables that cannot be studied in this research. And t test can be seen from the significance value with the Sig value. < 0.05 means the variable is significant and on the other hand, greater than > 0.05 means it is not significant. The significant variables are variables X1, X3, X4, and X7 while the variables that are not significant are X2,X5 and X6.

Classic Test Results

On checking normality with a probability graph show the data is normal because it approaches the diagonal and vice versa, if it moves away from the diagonal it is considered abnormal.

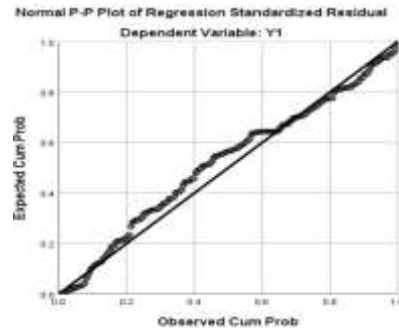


Figure 6. Normality Test Results.

Multi correlation test results, where to test multi correlation it is taken if the VIF value is <10 and the tolerance is >0.01 then there is no multi correlation phenomenon, if the VIF value is >10 and the tolerance value is <0.01 then multi correlation occurs.

Table 6. Multi Correlation results

Variable	Tolerance	VIF
X1	.278	3.596
X2	.356	2.805
X3	.666	1.502
X4	.243	4.109
X5	.396	2.524
X6	.299	3.342
X7	.862	1.160

And the results of the heteroscedasticity test show that there is no heteroscedasticity in the data group, and if heteroscedasticity occurs then the points will form a certain pattern, when in the results of the researcher's test the scores are evenly distributed or gathered in one place as shown in Figure 7.

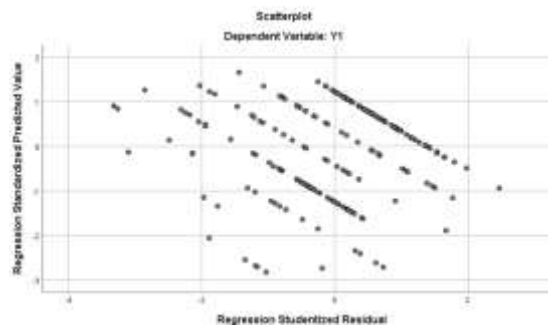


Figure 7. Heteroscedasticity Test Results.

And last one, the autocorrelation test results show a Durbin Watson value of 2.012 with $dL = 1.6966$ and $dU = 1.8413$, this Durbin Watson value is greater than the dU value, and means there is no autocorrelation between variables.

In the future, there will be more and more technologies that vary from manual to automation, and to having a level of artificial intelligence, one of which is known as chat-bot. Chatbot are known to be able to help users with various information in the digital world.

Speech recognition has become a part of chat-bot to make it easier for users to interact directly with chat-bot, one of which is in the tourism industry. With this, researchers aim to determine interest in using chatbot on travel websites based on speech recognition systems.

From the results obtained by researchers from this study, the variables above, namely perceived comfort, perceived usefulness, chat-bot technology, perceived trust, perceived innovation, anthropomorphism, perceived intelligence, influence interest in using chatbot on travel websites based on speech recognition systems. Chatbot users definitely have the desire to know a place, so it is a solution to get direct information in an instant and fast way without having to look for information everywhere to find out where they are going, a way for chat bot to provide the right reply to users based on existing information.

From this research, the results show that interest in using chatbot on travel websites based on speech recognition systems is based on perceived comfort, where a chat-bot must provide convenience for its users, the perceived usefulness of the chat-bot, the bot must have uses in the appropriate field, so chat-bot technology is of course also the latest technology and users can experience it directly, the information they get directly, and the trust felt by chat-bot users, as well as the innovation felt by chat-bot users compared to other chatbot. Apart from that, there is also anthropomorphism, namely the user assesses the characteristics of the chat-bot, and last the intelligence perceived by the user is the most important thing in determining interest in using a chatbot on a travel website based on a speech recognition system.

From discussion above we got a result of this research of this research Perceived Ease of Use, chat-bot technology, perceived Trust, anthropomorphism, perceived intelligence are the interest in using chatbot on travel websites based on speech recognition systems. This is different from previous research where perceived benefits and perceptions of innovation are the opposite. with previous research with previous research perceived usefulness and perceived innovation are small factors that influence interest in using chatboats on travel websites based on speech recognition systems. With a chatbot that has detailed information about travel in Batam City, this has implications. Having a chatbot that has travel information in Batam City will make it easier for visitors to get information and plan future travel trips better.

Conclusions

This research aims to determine interest in using chatbot on travel websites based on speech recognition systems. The results of this research concluded that perceived ease of use, chat-bot technology, perceived trust, anthropomorphism, perceived intelligence are factors in interest in using chatbot on travel websites based on speech recognition systems. The results of this analysis also show an R Square value of 55.8%, which shows that users are interested in using chat-bot. Based on the research results, users of chat-bot-based web travel with a speech recognition system use chat-bot as a source of additional information in searches.

This research also shows that users who use travel websites care about the services provided and chatbot on travel websites are considered important as a guide so that chat-bot become a quick solution in serving the things that these users need.

References

- Alsoud, M., Sharari, H., Helalat, A., Abuhjeeleh, M., Trawnih, A., Mahrakani, N., & Alsoud, M. (2023). *USING ARTIFICIAL INTELLIGENCE MARKETING TO OPTIMIZE CUSTOMER SATISFACTION IN THE HOSPITALITY INDUSTRY*. 26, 39–68.
- Arslan, R. S., & Barişçi, N. (2020). A detailed survey of Turkish automatic speech recognition. *Turkish Journal of*

- Electrical Engineering and Computer Sciences*, 28(6), 3253–3269. <https://doi.org/10.3906/ELK-2001-38>
- Deshmukh, A. M. (2020). Comparison of Hidden Markov Model and Recurrent Neural Network in Automatic Speech Recognition. *European Journal of Engineering Research and Science*, 5(8), 958–965. <https://doi.org/10.24018/ejers.2020.5.8.2077>
- Farwati, M., Salsabila, I. T., Navira, K. R., & Sutabri, T. (2023). Analisa Pengaruh Teknologi Artificial Intelligence (Ai) Dalam Kehidupan Sehari-Hari. *Jursima: Jurnal Sistem Informasi & Manajemen*, 11(1), 39–45. <https://doi.org/https://doi.org/10.37411/jjem.v3i2.2253>
- Hewamalage, H., Bergmeir, C., & Bandara, K. (2021). Recurrent Neural Networks for Time Series Forecasting: Current status and future directions. *International Journal of Forecasting*, 37(1), 388–427. <https://doi.org/10.1016/j.ijforecast.2020.06.008>
- Islahuddin, & Arfin Muh Salim, M. (2022). Staycation: Inovasi Produk untuk Meningkatkan Daya Saing Industri Perhotelan di Era Adaptasi Kebiasaan Baru-Perspektif Manajemen Pendidikan. *Jambura Journal of Educational Management*, 3, 127–151. <https://doi.org/https://doi.org/10.37411/jjem.v3i2.2253>
- Ivanova, M., Ivanov, I. K., & Ivanov, S. (2021). Travel behaviour after the pandemic: the case of Bulgaria. *Anatolia*, 32(1), 1–11. <https://doi.org/10.1080/13032917.2020.1818267>
- Kerdipitak, C. (2022). The effects of innovative management, digital marketing, service quality and supply chain management on performance in cultural tourism business. *Uncertain Supply Chain Management*, 10(3), 771–778. <https://doi.org/10.5267/j.uscm.2022.4.005>
- Li, M., & Zhang, S. (2020). Inferring Travel Modes from Trajectory Data Based on Hidden Markov Model. *International Conference on Transportation and Development 2020: Planning and Development - Selected Papers from the International Conference on Transportation and Development 2020*, 95–103. <https://doi.org/10.1061/9780784483169.009>
- Melián-González, S., Gutiérrez-Taño, D., & Bulchand-Gidumal, J. (2021). Predicting the intentions to use chatbots for travel and tourism. *Current Issues in Tourism*, 24(2), 192–210. <https://doi.org/10.1080/13683500.2019.1706457>
- Mor, B., Garhwal, S., & Kumar, A. (2021). A Systematic Review of Hidden Markov Models and Their Applications. *Archives of Computational Methods in Engineering*, 28(3), 1429–1448. <https://doi.org/10.1007/s11831-020-09422-4>
- Pillai, R., & Sivathanu, B. (2020). Adoption of AI-based chatbots for hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 32(10), 3199–3226. <https://doi.org/10.1108/IJCHM-04-2020-0259>
- Pratama, Y. A., & Kristiana, T. (2023). Design of Cloud-Based Chatbot Application At Pt. Traveloka Singapore Using the Agile Method. *Jurnal Pilar Nusa Mandiri*, 19(1), 19–26. <https://doi.org/10.33480/pilar.v19i1.3055>
- Tsap, V., Shakhovska, N., & Sokolovskyi, I. (2021). The developing of the system for automatic audio to text conversion. *CEUR Workshop Proceedings*, 2917, 75–84.
- Wulandari, D., & Sasongko Wibowo, J. (2023). Implementasi Chatbot Menggunakan Framework Rasa Untuk Layanan Informasi Wisata Di Kota Pati. *Journal of Information Technology and Computer Science (INTECOMS)*, 6(2). <https://doi.org/https://doi.org/10.31539/intecom.v6i2.7107>