LAB University of Applied Sciences

USING A CHATBOT TO INCREASE TOURISTS' ENGAGEMENT

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Abstract

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Abstract

Technological innovations like Artificial intelligence (AI) are increasing efficiency every day across many industrial sectors. Few industries can compare to how much Artificial Intelligence (AI) has improved the tourism industry. Machine learning (ML) and modern chatbots have become functional and appear to be examples of how this technology can positively affect our daily lives.

The objective of this thesis is to introduce the impact of chatbot technology in the tourism industry and researching its current state. Furthermore, this research provides enough information to evaluate the digital trends and growing demands in the tourism sector. This research also aims to design a Telegram chatbot that can assist travelers in planning their travel activities and also increase the tourist's engagements with their environment.

This research discusses if tourists like this idea, their journeys will be much simpler as they do not have to use other services to get necessary information about the cities they are visiting. For businesses, this means higher engagement of tourists with local businesses, which in turn means more profit.

Keywords

Artificial intelligence, chatbot, tourism, machine learning, conversational interface

CONTENT

1 INTRODUCTION

After the explosion of modern tourism, countries around the world have prioritized the tourism industry to supplement their economy, and with sustainable tourism increasingly becoming a profitable business, tourist destinations across the globe are taking advantage of this new development. (Tsaih & Hsu 2018, 124.)

Using digital technology is one of the key points to developing the tourism industry and promoting the connection of people. Recently, we have seen several new technologies playing a central role in the travel sector. Artificial Intelligence, machine learning and chatbot lead the way as the most exciting and promising technologies due to their rapid progress.

One of the common examples of an AI system is a chatbot; the word chatbot consists of the terms "chat" and "robot.". “A chatbot is a computer program that simulates a human discussion using natural language.” There is a wide variety of synonyms such as chatterbot, virtual assistant, virtual agent, intelligent agent, or web-bot. (Wang & Petrina 2013, 124.) From introducing businesses to searching for tips and information or displaying restaurant opening hours, modern chatbots are dominating the digital age and finding more ways to facilitate users’ lives.

The recognition for the capability and value of chatbots is only on the rise. According to the SM Marketing Platform (2017), Facebook messenger saw an increase from 33,000 bots in September 2016 to 100,000 bots in April 2017. Along with this, the SM Marketing Platform (2017) reported an 80% success rate with customers for an online-based mobile repair company after launching its chatbot services. According to the results, 1,500 customers requested help from the bots, and 1,000 customers left "thank you" messages for the bots. (Ukpabi et al. 2019.)

Some chatbots can interact with humans through voice technology with the growing innovation of voice interfaces. Amazon’s Alexa, Microsoft’s Cortana, Google Assistant, and Apple’s Siri are examples of systems based on voice recognition. Many companies like Expedia, KLM, Booking.com, and Finnair are utilizing this new functionality. According to Arnold (2018), millennials prefer to use chatbots instead of interacting with a real person because modern chatbots offer a millennial-friendly user experience while they are planning for a trip.

1.1 Research Objectives

This thesis discusses Artificial Intelligence (AI) but is mostly focused on chatbots. The thesis introduces the fundamentals of chatbots and their functionality and conversational interfaces. Finally, the thesis focuses on providing information to evaluate digital trends and growing demand in the tourism industry.

The primary aim of this research is to design and create a Telegram chatbot for holidaymakers to plan their trip and help them to make the right choices. More specifically, the implemented chatbot aims to help travelers to organize their itinerary and give them personalized suggestions based on their preference. To solve the research goals, the study has the following questions:

1. How does a travel chatbot provide good customer satisfaction?
2. How do users feel about chatbot technology, and how can chatbots improve tourists' engagement?

Solving these questions helps in designing and creating an advanced chatbot that offers a wide range of options to travelers, which leads to more customer satisfaction. Many travel companies, airlines, and hotels may use this research in order to attract more clients and improve their customer experiences.

1.2 Benchmark Basis

The basis for measurement of success of this thesis is in the user interviews I will be conducting after the implementation part. The idea is to ask real users whether chatbot technology is a tool they are willing to take into use for getting travel-related information when they are traveling in Finland. The feedback given in user interviews and whether or not they would be willing to use the chatbot will act as the measurement of success.

1.3 Scope of the Thesis

This thesis focuses on the relationship between artificial intelligence, chatbots, and the tourism industry. The reason I chose this topic was due to the recent advancement in chatbot technology and machine learning and its impact on the tourism industry. To gain a practical understanding of chatbots, I develop a chatbot that operates on the Telegram messaging platform. The scope of this thesis focuses on chatbot's ability to provide options and plans for travelers and obtaining more tourists for businesses. Finally, rather than diving into the technical specifics of machine learning like technologies or statistical

models, the thesis discusses the origin and history of machine learning, artificial intelligence, and chatbots. Also, it gives limited details regarding the implementation of a chatbot by programming.

1.4 Research Methodology

This thesis presents an idea of increasing tourists' engagement using modern chatbots after the explosion of contemporary tourism. The research method used in this study is a constructive approach to improve the link between academic research and the tourism industry. The purpose of constructive research is to develop solutions to solve practical problems with the help of scientific contributions. It is believed that scientific research needs to be more attached to industrial challenges. The constructive approach has significant potential to close the gap between science and practice. (Pasian 2015, 95.)

According to Pasian (2015) the constructive research process involves the following:

1. Find a practically relevant problem.
2. Obtain an understanding of the topic and the problem.
3. Innovate or construct a solution idea.
4. Demonstrate that the solution works.
5. Show theoretical connections and research contributions.
6. Examine the scope of applicability.

The constructive approach used in this study produces a better theoretical and practical contribution. If tourists like the created chatbot assistant, their journeys will be much simpler as they do not have to use other services to get the necessary information about the cities they are visiting. For businesses, this means higher engagement of tourists with local businesses, which in turn means more profit. By applying constructive research, this study helps researchers to design and create more advanced chatbots that offer a wide range of options to travelers, which leads to more customer satisfaction.

2 ARTIFICIAL INTELLIGENCE

The definition of Artificial intelligence (AI) is an artificial entity that can solve complicated problems and simulates human intelligence through a computer or machine. Artificial Intelligence (AI) combines computer science and physiology intelligence with making computers behave like humans. Intelligence is the ability to think rationalized, problem solves, and make decisions and learn from experience. Artificial Intelligence is divided into Strong/General AI and Weak/Narrow AI. (Borana 2016.)

2.1 Strong Artificial Intelligence

The idea of Strong Artificial Intelligence (AI) is that machines can carry out complex tasks like learning, developing, and functioning like human minds in the future. Therefore, strong Artificial Intelligence is the vision claimed by many proponents that soon, such kinds of machines and robots with human-level intelligence will change the world by replacing human beings in certain jobs. In these jobs, the machines will have the ability to simulates human processing like reasoning, planning, and doing all duties that a human can do. (Borana 2016.)

2.2 Weak Artificial Intelligence

Weak Artificial Intelligence (AI), unlike Strong Artificial Intelligence (AI), is limited to simple tasks, and machines can act as if they are intelligent. Features like thinking can be added to the computers to make them more useful tools. (Borana 2016.) Narrow Artificial Intelligence (AI) can be seen in technologies such as image and speech recognition, AI-powered chatbots, or even self-driving cars.

2.3 Artificial Intelligence Main Areas

Major areas of Artificial Intelligence (AI) can be divided into eight categories based on syncrat.com (2005):

- Natural Language Processing: Computers can communicate with people in natural language.
- Robotics: Create devices that can manipulate and interact with their environment.
- Machine Learning: Analyzing data and treads to help with a task latter.
- Knowledge-based systems: Systems that contain a database of knowledge and can help in finding information, making decisions, and planning.

- Cognitive modeling: Techniques and the copying of the way people think and manipulate knowledge.
- Neural Networks: An artificial neural network is an interconnected group of nodes, inspired by a simplification of neurons in a brain.
- Planning: Is about the decision-making tasks performed by robots or computer programs to achieve a specific goal.
- Perception: Is the process of collecting, explaining, selecting, and organizing sensory information.

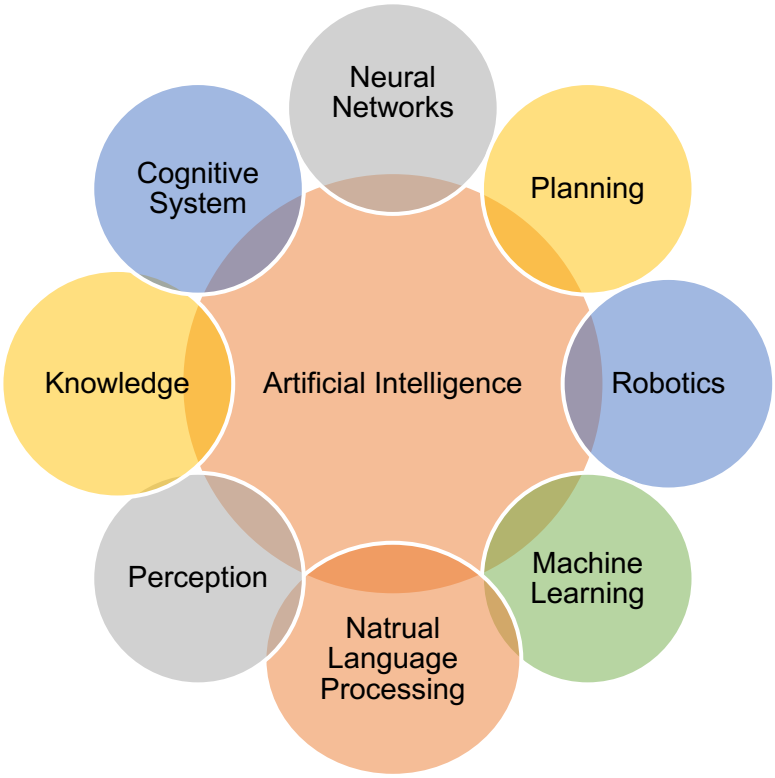

Figure 1. Artificial Intelligence main areas (Based on Ceepc.eu 2020)

2.4 Artificial Intelligence Current Progress

The objective of Artificial Intelligence is to compete or even outperform human minds and is used in all industries, especially in the fields of medicine, robotics, law, and tourism. It is used in homes and large establishments such as NASA space station. (Borana 2016.)

NASA has deployed artificially intelligent robots to planets, and they are essential in learning about their habitat and atmosphere, as well as investigating the chance of humans living on these planets. Moreover, auto manufacturers like Mercedes Benz have worked with Artificial Intelligence (AI) and the expert systems to design vehicle components and also subway systems in Washington, D.C. They implement advanced software controllers' systems to make subway trains stop within inches of the platform. (Borana 2016.)

While the latest voice assistant technologies like Amazon's Alexa or Apple's Siri display the capacity of algorithms based on Artificial Intelligence, it is far from being perfect. Although Artificial Intelligence has made much progress recently, it is not ready to replace the human mind completely. (Borana 2016.)

2.5 Advantages and Disadvantages

Experts designed Artificial Intelligence using the human mind as a model. Naturally, humans are born with inherent weaknesses that Artificial Intelligence is not affected by these human qualities. One notable advantage is that they are not affected by emotions, and they use logic instead of making decisions. Other factors, like emotions, influence even the most rational person's thoughts. Additionally, whereas humans require a certain amount of sleep to function, machines do not need any sleep, and because of this, they do not commit errors based on the lack of rest. The transfer of knowledge also becomes much faster while also reducing the time wasted in teaching humans through training. (Borana 2016.)

Humans can also present advantages over the unfeeling behavior of Artificial Intelligence. Although Artificial Intelligence does not have the problem of emotionally charged decisions, their inability to explain the logic and reasoning with the lack of creativity in responding leaves them at a disadvantage. Artificial Intelligence (AI) will do as much as it is told to do and, therefore, can produce wrong solutions, so because of this, they are far from perfect. Artificial Intelligence (AI) could be devastating for the world if put into the wrong hands. (Borana 2016.)

3 CHATBOTS: AN OVERVIEW

Artificial Intelligence is about creating intelligent agents (software and machines) that can perform multiple tasks from menial labor work to a wide variety of operations. (Khanna et al. 2015, 277.) One of the common examples of an AI system is a chatbot.In the following sections, there will be a subchapter about the fundamentals of chatbots and also a section that gives narrow information about chatbot history. Finally, there will be a section about the function and conversational interface of chatbots.

3.1 Fundamentals of Chatbots

A chatbot, also known as a virtual agent, is a computer program that responds to text or verbal commands and questions, providing advice in the place of a human. The conversation may be through text or voice, and the chatbot program understands one or more human languages. (Smith 2017.) A chatbot could be thought of as someone awake 24 hours 7 days a week, and it may also perform some productive functions like calculations, setting-up reminders or alarms.

There are simple chatbots that they are capable of doing a simple task like searching for a restaurant or setting the alarm. However, they are complicated chatbots that benefit from Artificial Intelligence (AI) and, therefore, can handle advanced tasks.

3.2 History of Chatbots

Alan Turing, who was known as the father of computer science, in 1950, came up with the question, "Can machines think?" Turing created an "imitation game" that is currently known as the Turing Test. The principle of the game was an "interrogator," which asked questions to humans and machines to differentiate the human and machine. If the "interrogator" were unable to separate the machine from the human, it could be imagined that the machine passed the test. (Turing 1950.)

In 1966, Joseph Weizenbaum, who considered as one of the fathers of modern Artificial Intelligence, came close to imitating a human. He created the first chatbot ELIZA, that could identify keywords and patterns and matched those keywords to produce a proper answer. (Weizenbaum 1996.)

After ELIZA, business owners and computer programmers realized the value of chatbots, and there has been progress in the development of intelligent chatbots. In 1972, Kenneth

Colby at Stanford created PARRY chatbot, and in 1995, Richard Wallace created ALICE chatbot (Wallace 2009; Colby 2010).

3.3 Functions of Chatbots

Chatbots are one of the examples of Human-Computer Interaction (HCI). Human-computer interaction is a field of study dedicated to the interaction of humans and computers in a social context while also focusing on the development of the computing system. (Ghaouni 2006, xiv.)

According to Khanna (et al. 2015, 278-279), the program is divided into seven modules: introductory screen, the chat interface and manger, the database, productivity application, ambiguity handling, data handling, and error handling.

The introductory screen welcomes the users to the program and asks them to provide basic details like the name for future interactions. After the introduction, the user will then meet the chat manager. The next function is the central area where all inputs are managed. In this part, the program searches and displays the most appropriate answer from fetched data stored in the database. The database contains a programmed list of responses for expected questions asked by the users. It is the control center where all the data is processed and stored. (Khanna et al. 2015, 278-279.)

The chatbot functions, as well as the productivity applications, are written, like a simple calculator or a dictionary, to carry out simple tasks. These days, AI agents are increasingly more functional, and they are capable of booking flights, hotels, and open up programs on computers or mobiles based on user needs. (Khanna et al. 2015, 278-279.)

The next feature, ambiguity handling, is the process by which the program can improvise the response without any relevant data. This is because the user will occasionally ask questions that the database cannot answer. With the help of ambiguity handling and a diverse range of contexts, the end-users will be satisfied. Data handling is a complementary feature that makes the program more intelligent by keeping necessary information about a user to make future interactions more natural. Error handling, meanwhile, compensates for human error. For example, if the user uses the calculator to divides any number by zero, the program should be able to handle the error and continue operating. (Khanna et al. 2015, 278-279.) Figure 2 shows the interaction of these modules.

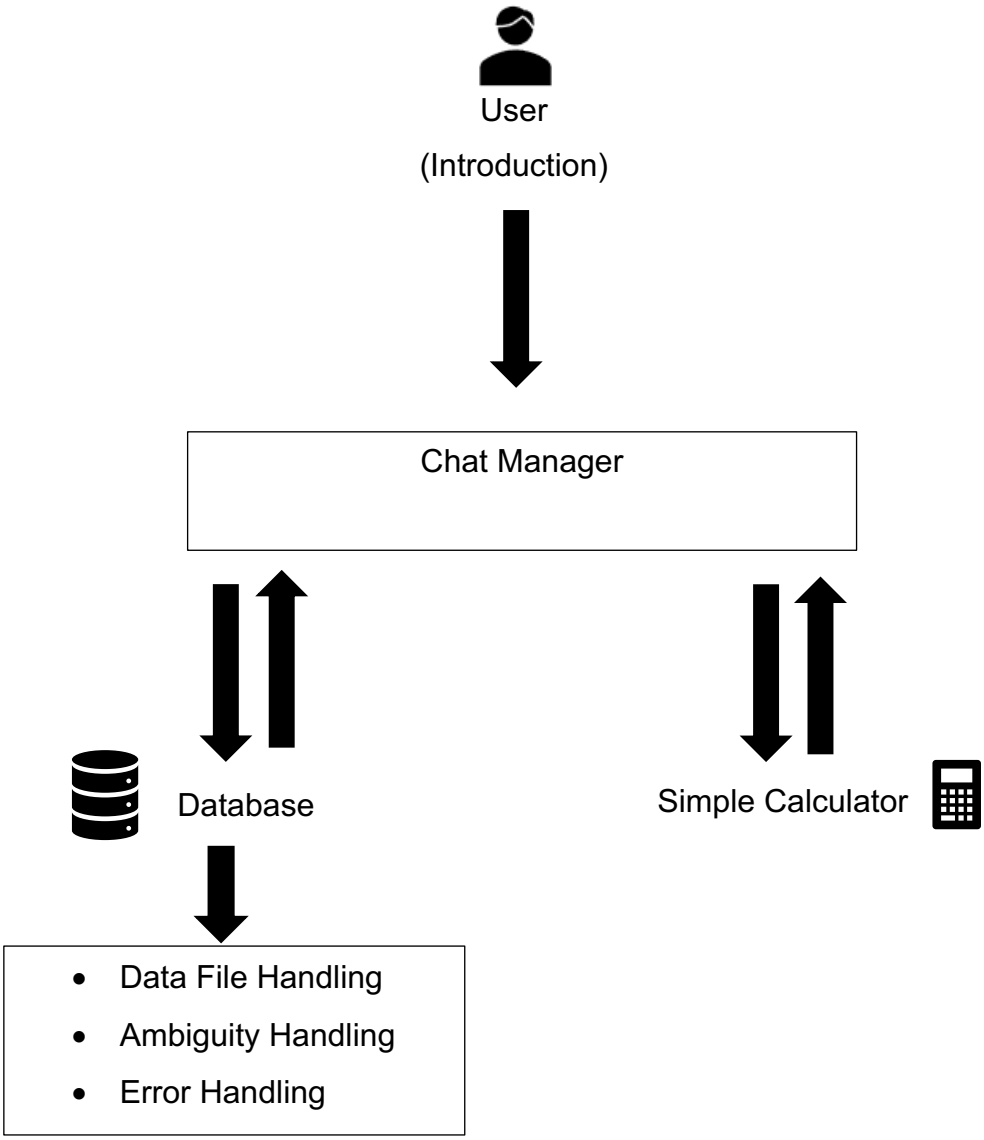

Figure 2. Interaction between the Various Modules (Based on Khanna et al. 2015)

3.4 Chatbots and Conversational Interfaces

These days big tech companies continue to develop tools and frameworks to create chatbots with various functionalities. Currently, the chatbot developer community has created more than 200,000 chatbots for Facebook Messenger and more than 10,000 Amazon Alexa skills. (McTear 2018, 175.) They focus their energy on terminology and technologies for speech recognition and natural language understanding components of a chatbot. According to McTear (2018, 175-178), the next four subchapters present an overview of chatbots and conversational interfaces.

A conversational interface at its base operates on a turn-by-turn basis. For instance, the human and the computer take turns in a dialogue that may either be transactional or conversational. A transactional chatbot is capable of performing some tasks, such as booking a flight, making a purchase, or asking about the weather. On the other hand, a conversational chatbot engages in discussion to find a song or set the alarm. A text-based conversation is similar to a chat between two users on a messaging app, while the voice-based conversations are similar to a conversation between two users on the telephone. (McTear 2018, 175.)

A conversational interface offers several benefits over traditional graphical user interfaces, such as providing a unique process of doing things. It also facilitates extended communication like completing multiple-step tasks and following a normal human conversation. (McTear 2018, 175.) Although the conversational interface is becoming standard, there are difficulties with speech recognition since early speech recognition systems made frequent errors. In order to lower the number of errors, new methods limited the user's message to a certain number of words or phrases. Since then, speech recognition engines have greatly improved thanks to both deep learning and training data. (McTear 2018, 175.)

Current natural language understanding toolkits are used to identify the true intentions of the user; this can be finding a restaurant or library, making a reservation, or even booking a tour. Developers simulate requests by producing various example sentences that a user might ask. (McTear 2018, 175.)

Chatbots still struggle with some conversational abilities despite recent advancements in natural language understanding and speech recognition. These weaknesses include unexpected requests, follow-up questions, and error handling. This is controversial because while many consider a human interaction an easy thing to program, it is indeed quite complicated with leading experts in linguistics and conversation analysts dedicating their time to study this field. (McTear 2018, 175.) Figure 3 shows a typical architecture of a conversational interface.

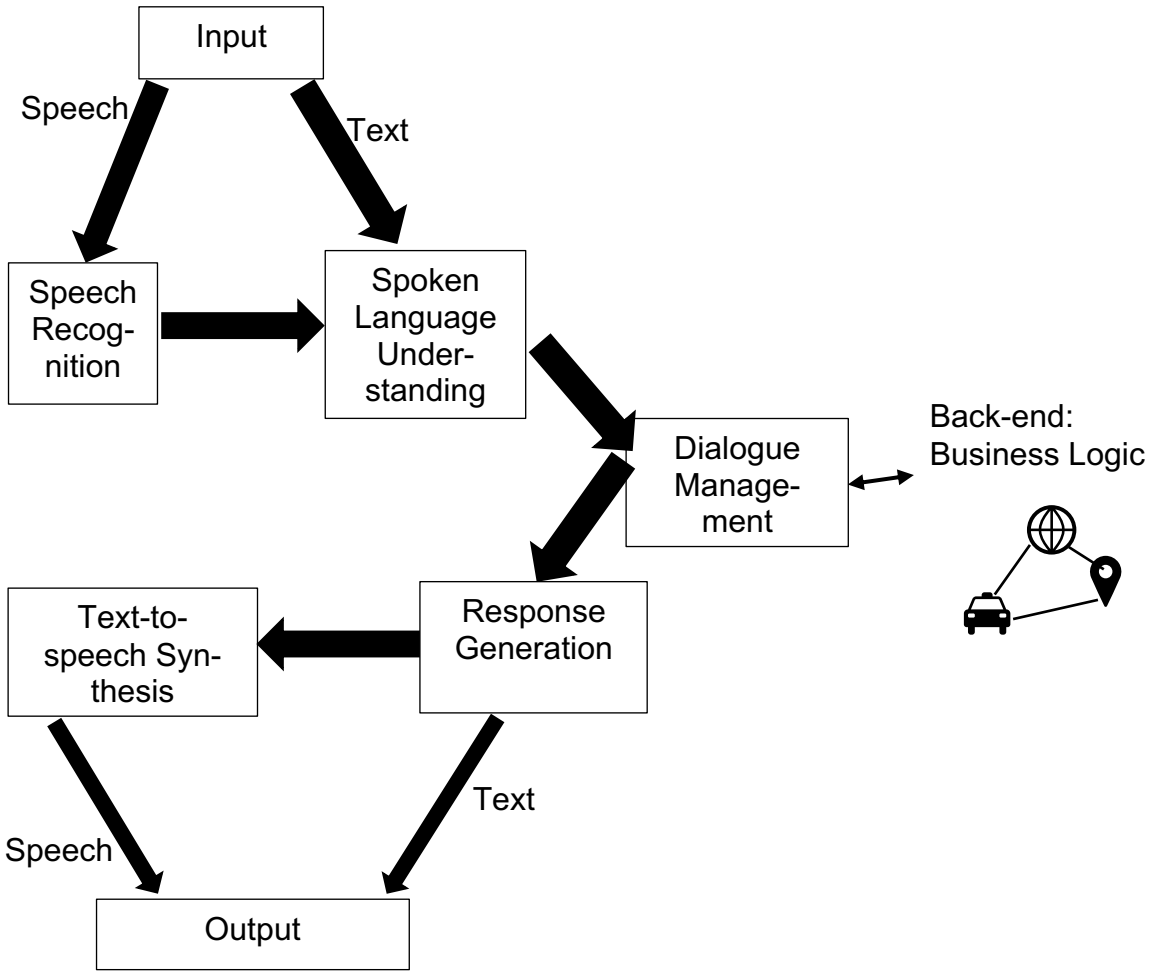

Figure 3. Typical architecture of a conversational interface (Based on McTear, 2018)

Many factors make up promoting a conversational interface from choosing the input and output to increasing engagement and customer experience. Additionally, guidelines help the interface to sound natural, to act collaboratively, and to measure the quality of communication.

4 DIGITALIZATION AND TOURISM

Artificial Intelligence deals with the ability of machines to understand and simulate the human mind. New AI systems appear in many areas and assist with several topics such as reasoning, learning, communication, and planning. Artificial Intelligence is an essential part of robotic technology, and modern chatbots are expected to reach a critical point in its development. (Hill, Ford & Farreras 2015, 245-250.)

The tourism industry is the scene for many technological advancements with the help of digitalization and service automation. A vast number of travel and hospitality companies have been adopting robots and service automation, which include services like delivery robots, robot-concierge, conveyor restaurants, and self-service information. (Ivanov & Webster 2017.) The following sections discuss digital trends and the growing demand for travel in tourism industry.

4.1 Industry Context and Digital Trends

Digital innovation consists of the aviation, travel, and tourism industry at the main level. Digital technology resulting from innovation is influencing most sectors and introducing new challenges and issues such as the pace of change, cultural transformation, old regulation, and the importance of funding both digital and physical infrastructure. Current trends in the industry suggest further changes, and these factors need to be considered by government leaders to unlock the actual benefits that digital offers society. (reports.weforum.org 2017.)

4.2 Growing Demand for Travel and Rises of the Digital Consumer

The tourism industry is a leader in e-commerce maturity, and the increase in the demand for travel means that it is an excellent place for implementing modern AI. The demographic developments such as the growing influence of the new generation and the ever-increasing middle class in some countries have sparked a desire for travel. While companies such as travel agencies and booking platforms are providing technological developments to create advanced platforms, and they are also challenging the aviation, travel, and tourism sectors. (reports.weforum.org 2017.)

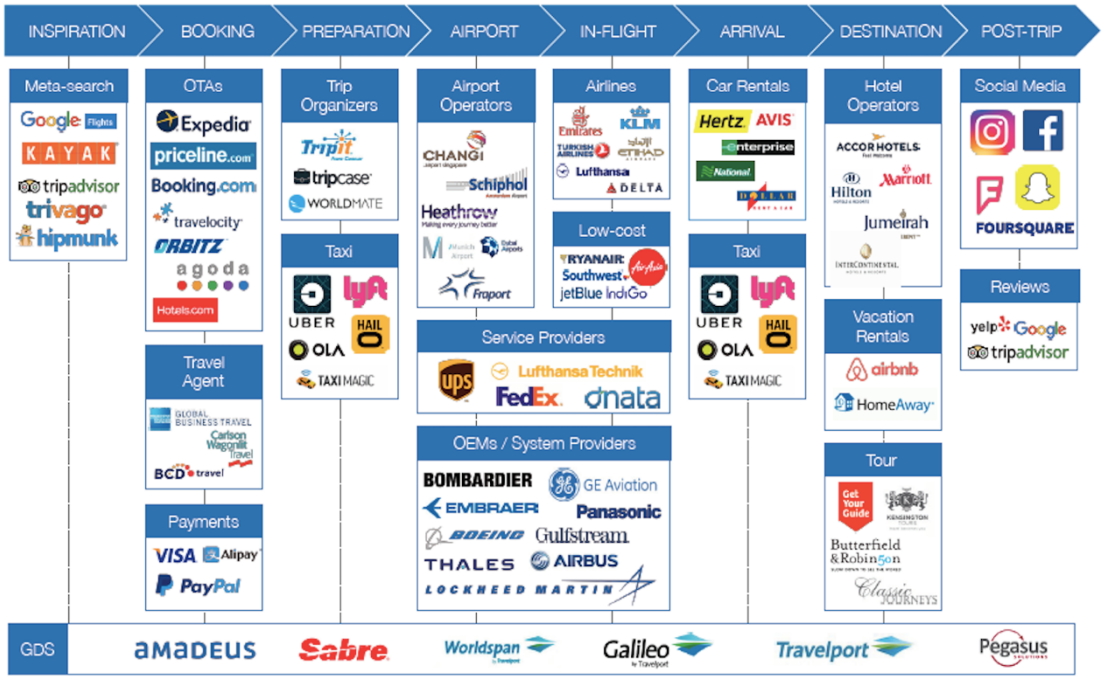

Figure 4. Tourism ecosystem (World Economic Forum/Accenture analysis)

The travel ecosystem (see Figure 4) has changed customer expectations for on-demand and available assistance through digital innovation. From established companies to new-age companies, all are taking advantage of modern AI technologies. Figure 4 presents how far-reaching this digitalization goes, and even pre digital-age companies are adopting these tools. From aviation companies such as Emirates, Lufthansa, KLM to hotels such as Hilton and Marriot, all are using smart systems for their services.

4.3 Chatbots and Robotic Assistance Devices

The chatbot development is growing fast in the travel industry and enables users to interact with digital assistants, using natural language to answer travel-related questions and process bookings. (Sheffield 2016.)

As of this moment, users of mobile travel applications find themselves complaining due to the lack of an app that does all of the tasks required when traveling. For example, according to Farkash (2018), one app can give information about the transport system while the other app focuses on restaurants. However, these applications may become necessary after trips. Additionally, the young generation of travelers prefers to receive their information from one app compared to an in-person interaction. Moreover, getting the necessary information for the trip would be very time-consuming if they had to navigate

numerous websites. In this situation, a chatbot can provide a modern method for travelers to search for information by giving an appropriate response. (Farkash 2018.)

4.3.1 Use Cases of Travel Chatbot

According to AlexSoft (2018), the use cases of a travel chatbot goes under the five followings categories:

- Reservation Bots: Many reservation companies like Kayak, booking.com, and Expedia have presented chatbots to tourists in order to search for accommodation and flight through Facebook Messenger. These chatbots enhance the customer experience in comparison with other websites and search engines.
- Customer Support: Companies support their customers via chatbots, which allows users to gain information or complain about issues privately with someone who is in charge.
- Online Travel Agency: With the development of Artificial Intelligence (AI), travel chatbots can assist travelers and provide suggestions or services according to their needs. The typical example of these offers is hotel suggestions, transportation, flights, and restaurants.
- Expense management: Tourists can collect their travel receipts and also analysis of trip expenses with the help of some modern AI chatbots.
- Local Insider: With the recent advancement of travel-related technologies, visitors are looking for new adventures and experiences such as taste local foods and places. These chatbots can suggest multiple activities to travelers based on their location. In that way, holidaymakers find the data easier while they do not have to search for different web pages manually.

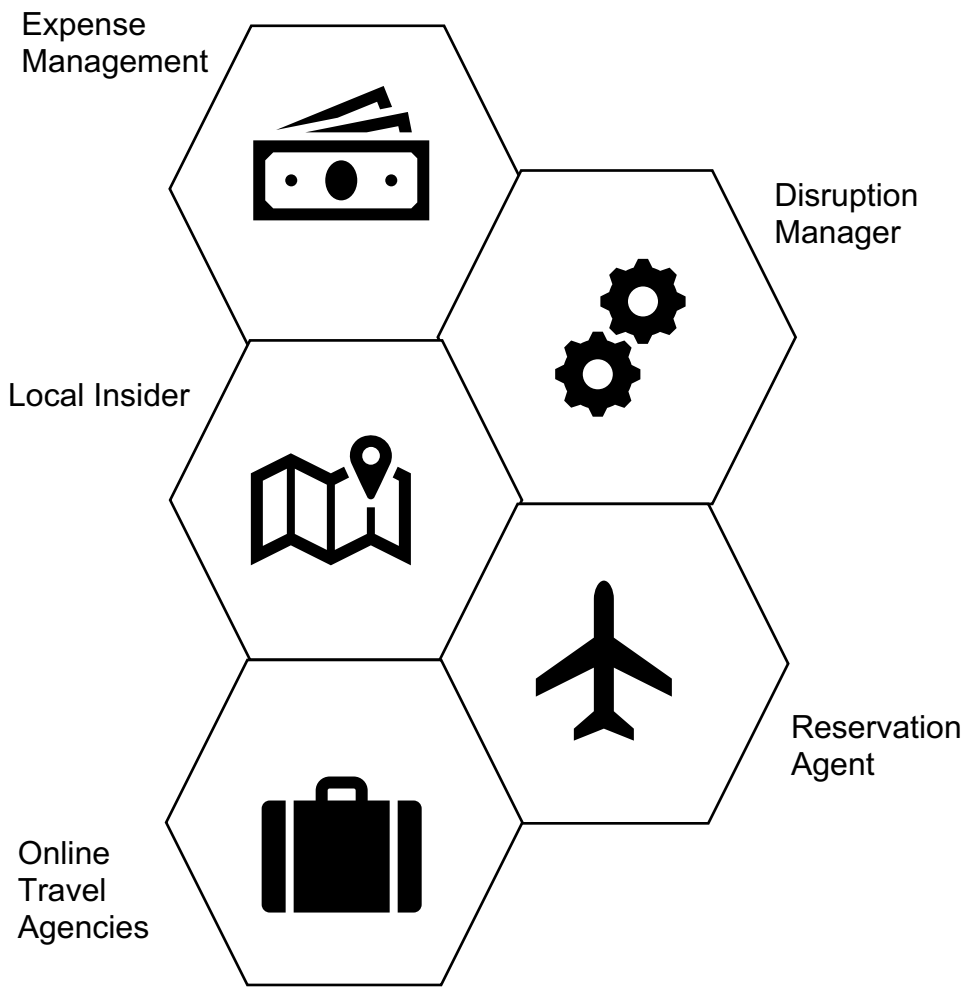

Figure 5. Travel chatbots' use cases (Based on AlexSoft 2018)

4.3.2 Example of Travel Chatbots

The following examples are some popular chatbots in the travel industry:

Expedia (Figure 6): Expedia is an Online Travel Agency (OTA) that offers a bot on the Facebook platform. Travelers enter the destination, travel dates, and the chatbot provides available results about hotels and flights. Users can also reserve a hotel straightaway on the Expedia website. (Street 2016.)

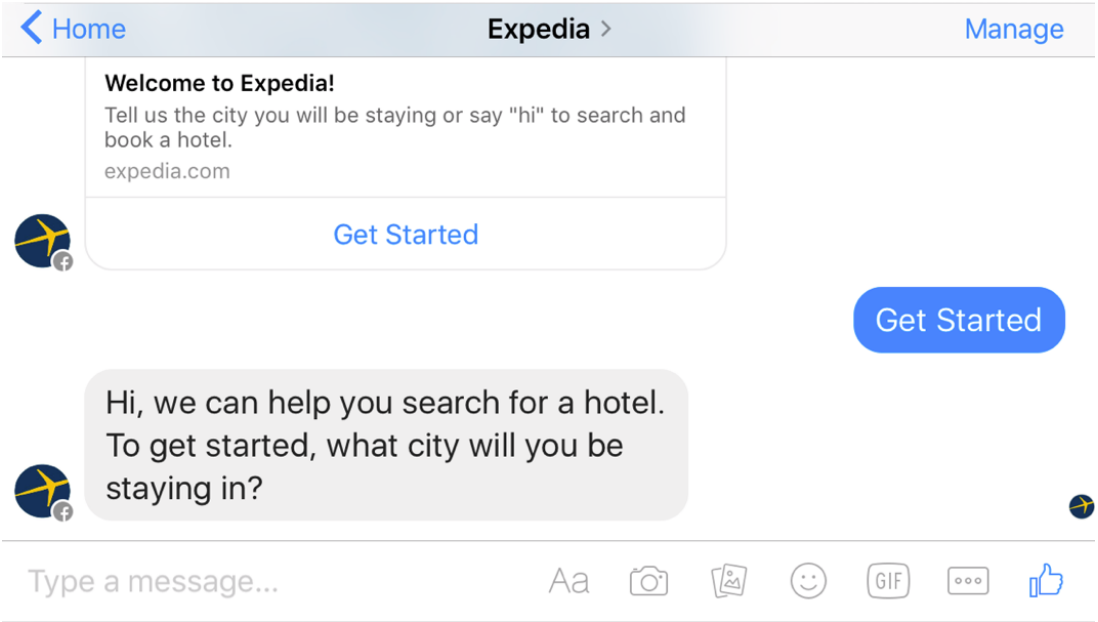

Figure 6. Travel chatbot of Expedia.com (Marques 2018)

- Kayak (Figure 7): This chatbot help travelers to search for accommodation, flights, and transportation. Kayak's chatbot is working on the Slack platform, and with the Slack bot, travelers can find flight terminal gates (Sheffield 2016).

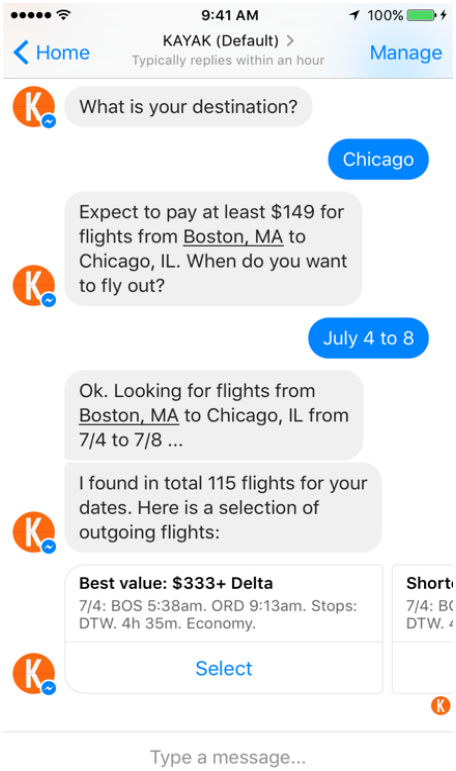

Figure 7. Kayak's travel chatbot (Kayak 2020)

- The chatbot of Skyscanner is designed to perform on Facebook Messenger. This chatbot offers possible low-cost flights, and users can book a flight easily.
- Finnair (Figure 8): Finnair's bot helps users get their flight status and also book future flights and engage with customer service. Furthermore, the bot can answer frequently asked questions. (chatbotguide.org 2020.)

Figure 8. Finnair's Chatbot (Chatbotguide.org 2020)

4.4 Travelers Expectation by 2020

In order to understand the travel industry better, Travelzoo, a global media commerce company, surveyed 6,000 travelers. The study used an online questionnaire, and it was completed by 6,211 travelers in Brazil, Canada, China, France, Germany, Japan, Spain, the United Kingdom, and the United States. They interviewed this group to explore the travelers' acceptance of robots in the tourism industry. The results show that nearly 80% of respondents expect robots for their travel-related requirements to play a big part in their lives by 2020. Almost two-thirds of travelers would be comfortable with the usage of robots while planning a vacation. (travelzoo.com 2016.)

Among the nine countries attending the survey, Chinese and Brazilians were the most positive nations. All in all, robots seemed to be a positive addition to travel planning in the

eyes of international travelers. The result showed that some nations appear more cautious than others. (travelzoo.com 2016.)

4.5 Benefits of the Adoption of Robots by Tourism Industry

Robots, Artificial Intelligence, and Service Automation (RAISA) entered our lives and had a significant impact on many areas, especially the tourism industry. Companies from various economic sectors start to use RAISA after the progress in its development. They use robots to improve operation processes, optimize their costs, create a customer experience, expand their service capacity. (Ivanov, Webster & Berezina, 2017.) In the following sections, this research discusses the financial and non-financial benefits of the adoption of robots in the tourism industry.

4.5.1 Financial Benefits

One of the leading financial benefits resulting from the adoption of Robots, Artificial Intelligence, and Service Automation (RAISA) is labor costs savings. The human employees only work around forty hours per week, and they require breaks, but chatbots can work twenty-four hours and seven days a week in unsafe/unhygienic conditions since they do not have human rights yet. Additionally, considering the 24/7 availability of robots, more orders can be processed than with human employees. RAISA could contribute positively to sales as well as perform different tasks without complaining or forgetting to do the duty. (Ivanov, Webster & Berezina, 2017.)

Although robots are more cost-efficient, they are no substitute for workers. They are only enhancing employee productivity, like a technological extension. Technology at this time does not allow robots to perform tasks independently, and as a result, tourism and hospitality companies are not likely to replace their human employees with robots. (Ivanov, Webster & Berezina, 2017.)

4.5.2 Non-Financial Benefits

Apart from the financial benefits, there are several non-financial benefits that Robots, Artificial Intelligence, and Service Automation (RAISA) produces. As mentioned earlier, RAISA can improve customer interaction, and unlike the average human worker, communicates in multiple languages. Also, RAISA frees up employees' time from performing repetitive tasks, and consequently, they can use that time to help the company in other areas better. (Ivanov, Webster & Berezina, 2017.)

Finally, from a legal perspective, hiring and firing a robot requires less time and energy. For example, terminating a robot contract can be as simple as ending a car rental contract. Because of human labor laws and regulations in developed economies, using robots for some routine tasks instead of a human employee might be a financial option. Social democratic economies in Scandinavia, for example, can expect to see the replacement of human employees by robots that require less time consuming from a legal standpoint. (Ivanov, Webster & Berezina, 2017.)

5 CHATBOT: AN IMPLEMENTATION

The emergence of instant messaging platforms like Telegram and Facebook's Messenger brings a new opportunity for chatbots to interact with users. Telegram, with over four hundred million active users, is one of the most popular messaging apps in the world. It draws in users with its multi-platform interface and security. Telegram then becomes a conducive place for different businesses to increase engagement and, ultimately, sales. (Grasseli & Zupancic 2018.)

5.1 Creation Process

Overall, the creation process responsibility was divided between myself and an industry expert. I was in charge of designing the workflows of the chatbot, for example, what answer a user would receive if they request nearby restaurants, and he was in charge of the programming of the chatbot using the Python library.

Also, as I was the one designing the chatbot workflows, my decisions influenced which features were implemented first and what answers would be given to users' requests based on the result of my research.

On a high level, the following steps were taken by him and myself during the creation process:

- I chose Telegram as the chatbot platform.
- I created a new Chatbot by asking Telegram's own chatbot for chatbot creation, named "BotFather."
- I suggested using a Python library instead of communicating with Telegram servers directly, and he chose the pyTelegramBotAPI Python library to communicate with Telegram API.
- I created a Python module called server.py, which would contain the logic behind how the chatbot would answer to user requests.
- He created a function that would handle replies if a user sends a /start command.
- He, similarly, created other functions which would handle replies if a user asks about restaurant and libraries, for example.
- I gave him the secret token of the chatbot so he could then start the chatbot so that the users could start sending messages to the chatbot.

The fundamental reasons behind the technology choices made were as follows:

- We wanted to create a prototype as soon as possible, and Python is a useful tool for that as it enables software developers to build a prototype quickly.
- We wanted to abstract away the details behind Telegram API, and that is why I suggested using a Python library instead of him writing his own logic of communication with Telegram API.
- We wanted to test whether the chatbot works quickly, and therefore he ran the server.py module on his own laptop instead of deploying it to a cloud computer.

5.2 Telegram Chatbot

"Telegram chatbots are small programs that run inside the Telegram environment and do not require any additional installation procedures" (Roshchinskaya 2020).

The success of Telegram bots comes from its easy to use interface in comparison with different available applications and services. These bots are timesaving through the easy signup and log in, along with simple communication, with timely replies. Telegram chatbots are finally minimally promotional and include limited advertising, while the main goal is the user's needs. (Roshchinskaya 2020.)

5.3 Chatbot Creation

To create a chatbot on Telegram, the user first needs to search for @BotFather and start the chat. BotFather chatbot is a chatbot designed to create automatically, edit, and remove chatbots for users. Then the user should send the /new bot command and follow the instructions. After completing the initial steps, they will get:

- Their chatbot secret token
- Link to documentation

The next action is to write the chatbot logic in a Python module named server.py. The industry expert started to implement the underlying logic behind the chatbot.

5.4 Figures of Implemented Chatbot

In the beginning, the user should run the bot and type /start command. Then the bot starts the conversation and introduces its name and a sentence as a greeting. After that, the chatbot starts its main task and asks a question about the city in which travelers want to

visit Finland. Therefore the user can answer the question by typing into the input box. Figure 9 shows the chatbot starting the conversation.

Figure 9. First screenshot of implemented chatbot

Next, the chatbot gives narrow information about the mentioned city, and after that, the chatbot will ask some questions like" What attractions would you like to experience while visiting Helsinki." In this stage, chatbot presents some recommendations of places to go like museums, bars, restaurants, and libraries. Later user needs to choose and click on the chosen button.

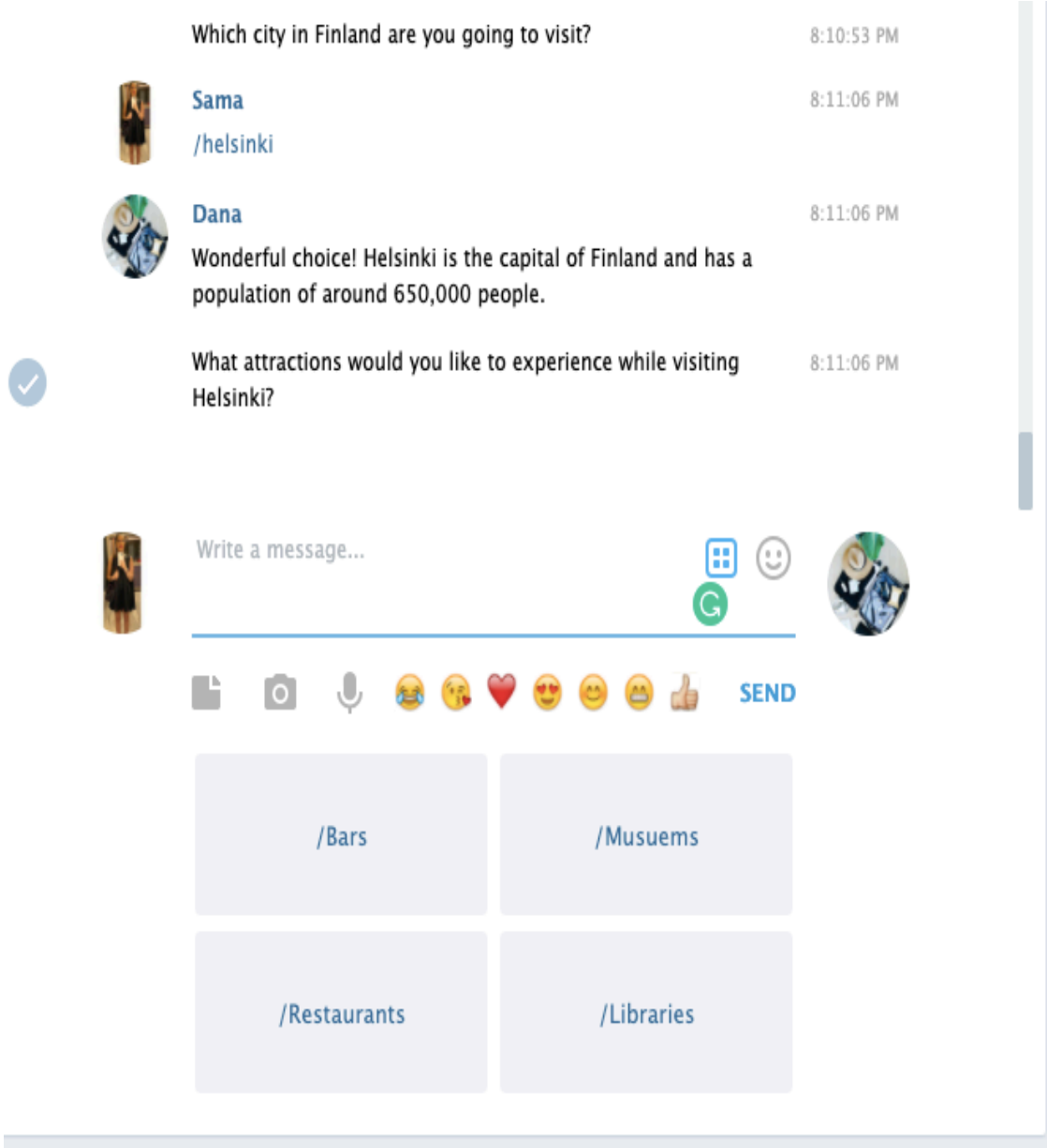

Figure 10. Second screenshot of implemented chatbot

In this step, if the user needs more information about bars, museums, restaurants, and libraries, the chatbot will present details about selected places to go by the user. For instance, the user chooses the library, and the bot will suggest the list of top 3 libraries in Helsinki.

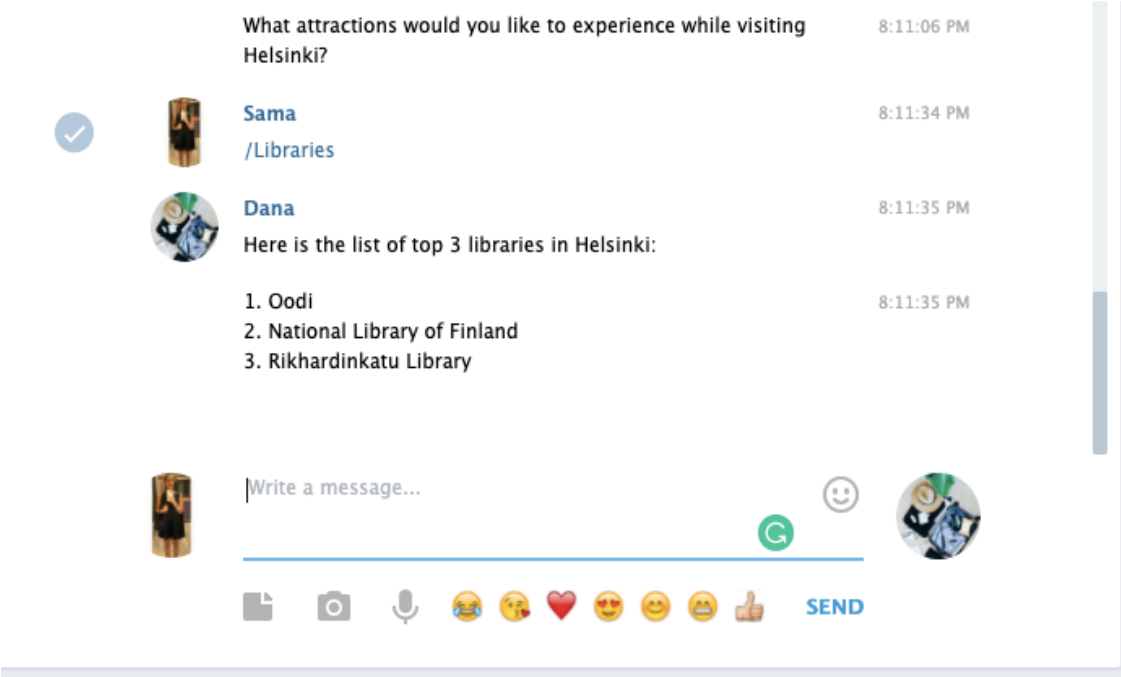

Figure 11. Third screenshot of implemented chatbot

5.5 Benchmarking Results

I interviewed a student in the field of Business Information Technology at LAB University of Applied Sciences and asked her to use the implemented chatbot. At first, she was hesitant about using the chatbot, and the idea behind the technology was new for her. After the initial explanation of what is a chatbot and how one can use it, and precisely how this chatbot could potentially give her answers to the questions she would potentially have while traveling in Finland without having to ask another person, she seemed interested and started using the chatbot.

After going through the steps within the chatbot, I asked her three questions:

1. What are the benefits offered by the chatbot?
2. What are the shortcomings of the chatbot?
3. Would you, in general, say a chatbot is a viable tool, and you would use it?

She mentioned that the most crucial benefit of the chatbot for her had access to it twenty-four hours every day. The main shortcoming of the chatbot for her was the chatbot being in the early stages of development and having only limited information about restaurants,

libraries, and bars. While this shortcoming is understandable from a user's perspective, it was expected from my perspective as I had intended for the chatbot to be a basic version to prove its value and not for it to be ready to be published for everyone in Finland.

Finally, she mentioned that she thinks a chatbot is a tool she is now interested to learn more about and something she would use in the future, especially the implemented chatbot with which she became familiar with chatbots in the first place.

6 CONCLUSIONS

Here the role of chatbots across the tourism and hospitality industry has been examined to acknowledge the great utility of chatbots in today's digital world, particularly in the travel industry. The potential of embracing Artificial Intelligence systems is evident in the increasing number of users who prefer interacting with chatbots over the traditional way of communication. Now is the time to learn about how these technologies will affect employers, employees, and customers' views. While the future is unpredictable, adopting Robots, Artificial Intelligence, and Service Automation (RAISA) in the tourism and hospitality industry will change many aspects, including how to serve customers and how corporate cultures will be impacted.

This project aimed to develop a simple version of Telegram travel chatbot to offer the travelers certain information about their travel destinations to make their experience more pleasant while they are in Finland. An industry expert, a senior software developer, helped me with the implementation part of the chatbot.

6.1 Demonstration of Chatbot Solution Working

As a demonstration of the chatbot solution working, a user interview was conducted in which the user tried to get travel-related information from the chatbot. Feedback of the user interview was overall positive. The primary objective of the thesis was to assess whether chatbot can potentially help travelers in Finland, and based on the result of the user interview, it can be concluded that the research looks like it has reached its objective to a limited extent. The limitation of achieving the thesis objective was due to a single interview being conducted only.

6.2 Examination of Applicability Scope

To examine the applicability scope of the thesis, we can take into account the result of the user interview. Since the applicability scope of the thesis was to determine whether a chatbot is a useful tool for getting travel-related information, based on the user interview result, we can conclude that the thesis applicability scope was chosen correctly.

However, given that only a single user interview was conducted, the reliability of the results is not ideal. Ideally, one has to conduct at least ten user interviews from users of multiple technological backgrounds to be able to have a basis of reliability upon which further research can be built. Similarly, whether or not the implementation has validated the

applicability scope of the thesis remains at a less than ideal situation, for the same reason of only one user interview being conducted.

6.3 Ideas for Further Research

To further research chatbots and their use cases in answering the modern needs of users in the travel industry, I suggest:

- Designing multiple different prototypes solving a basic problem of a traveler in Finland.
- Ensuring that user interviews are conducted with at least ten people.
- Studying the underlying principles and the pillars of a chatbot as a technology to be able to understand the technology truly and, as a result, be able to offer modern solutions for modern needs.

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