Analytical study on use of AI techniques in tourism sector for smarter customer experience management

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Abstract

Artificial Intelligence is the new prime factor for paradigm shift of the new age technologies. It has created a new realm in every field- from education to entertainment or from biotechnology to manufacturing industry. Though tourism is a late runner in this race, but this sector has also witnessed a huge change with the magical touch of AI. This sector being one of the highly emerging sectors, contributing very high GDP , has adapted several machine learning techniques or data analytics, which has made tourism model smarter and dynamic. In India , tourism has an ample scope to grow and Indian tourism sectors are also adapting several popular AI techniques like deep learning, Artificial neural network, predictive analytics, robotics or new technologies like virtual reality or augmented reality. This technological adaptation has made their services much better, heled in dynamic pricing, or for smart customer experience management. This paper has conducted a study on Indian tourism sectors providing online services and discusses about the current AI technologies used by them while exploring the pros and cons faced by them . The paper is alienated in three different segments- section 1 contains introduction part, section 2 discusses about related works in similar area, third section deliberates about different AI techniques adapted by Indian tourism sectors along with their pro and cons.

Keywords : ChatBot; Artificial neural network; Machine Learning; Robotics; Predictive Analytics; Recommendation System

I. INTRODUCTION

Tourism sector has witnessed a paradigm shift with the rapid adaptation of AI technologies like automation, virtual reality, machine learning algorithms which has made the tourism sector more smart and dynamic. Specially for the last few years tourism sector, being one of the highest commercial sectors, gaining competitive advantages by adapting AI techniques to solve their problems.

A. E Commerce sectors in Tourism

E commerce sectors are of several types, like B2B, B2C, C2C, B2G, G2B E commerce(See figure 1). This paper mainly emphases on Business to Customer (B2C) E commerce as tourism sectors are mostly customer centric

and there are many E Commerce websites running their businesses in India like GoIbibo.com, makemytrip.com, yatra.com etc. Nowadays they are using AI applications for dynamic price fixing, recommendation engine, better customer management, facilitating customized booking etc. Mostly Business to consumer sectors work in tourism industry.
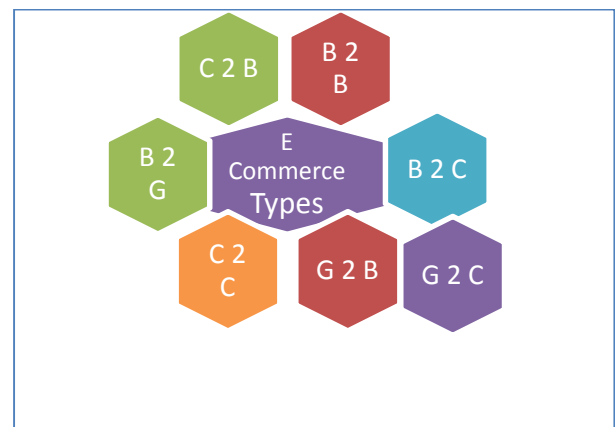

Figure 1: Types of E Commerce

E Commerce services have the facilities like 24x7 customer support, better customer management and improved service etc. and with the addition of technologies like natural language processing, robotics or data analytics this sector is being influenced to achieve a higher competitive advantage. By a report of Business line on use of AI by Indian Tourism sector online E Commerce sites like MakeMyTrip and GoIbibo are using voice based intelligent chatbots for online ticket booking and they are able to customize the booking options also[2]. According to the report, by 2020 , Make My Trip could be one step place for booking by 2020.

B. Several AI applications in tourism sector

Tourism sector is focusing on artificial intelligence for the last few years. The industry has been revolutionized. Mainly in few areas have got the focus- Robotics, Automation of services, recommendation engine, chatbot or intelligent agents etc. Nowadays the hotels are using robotic science

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also for service automation and many improved technologies are being used for smart tourism.

In this highly competitive era, customer satisfaction is the primary condition of getting business, so generating travel lists depending upon the customers' behavior is a new trick applied by the tourism industries and giants like GoIbibo, makemytrip.com or oyo.com are also using such strategies to attract more customers and to get the competitive advantage. In section 3, will discuss more detailed about several techniques of AI are used in Indian tourism scenario.

II.RELATED BACKGROUND WORK

Service automation, robotics and AI techniques have created new opportunities. Considering the decision making process related complexity, intelligent system can be applied very appropriately[21]. The impact of intelligent system in travel and tourism have been discussed by Werthner H[3]

Neha Soni and et. al[4]. The authors have discussed about the influence of AI in tourism industry, which is one of the leading business sectors generating more than 50% revenue. They have discussed about chatbots and intelligent agents in their works. They mostly use the algorithms like Neive Bayse, Support Vector Machine, Artificial Neural Network(ANN),Deep learning network etc. But this field is an emerging one and changing day by day, so there are a lot of challenges to be faced and the networks are changing, so change in algorithms is expected.

Many of researchers worked on development of ChatBot for travel sector. Researchers working in chatbot sectors had given a clear vision about the use of chatbot and the procedure[6,7,8]. The researchers have shown the use of chatbots in several sectors including travel, education and technological sectors and how they are changing the game. With the flavor of machine intelligence in it chatbots are becoming more smart and intelligent in decision making and problem solving. Khanna A. and et. al, in their survey based paper have discussed about the current approach of AI and how this is increasing intelligent Human Computer Interaction. They have mentioned SARANG chatbot program in their work. The authors have discussed about some properties like sense, consciousness and perception. But the authors have given a theorical aspect giving idea about the current trends in chatbots.

Chatbot based tourist recommendation model is also very popular and researchers have worked on this. [5-7][20-22]. Some authors have shown model based reasoning and recommendation system using chatbot for having better customer experience [21-22].

Other paper by Ellis Prat discusses about the working procedure of chatbots and it is a technical paper to show how a chatbot may be developed and which technologies are the base of making a chatbot.

Though the idea of chatbot has begun in the era of 1960s, but nowadays with the huge enhancement of AI applications, chatbots are becoming useful, specially the tourism sector has witnessed a huge paradigm shift in this area[7-10].

Elisabeth E and et al. has demonstrated the recommendation system[23]. The authors used a personal device based GPS tracker. They have applied k-means algorithm.

Another area of AI application in tourism is recommendation engine to provide personalized booking option or travel plan depending upon the consumer behavior or past booking pattern. Researcher have done plenty of research in this area. Sarwar B. and et. al has given an idea about several algorithms are being used to develop recommendation system in E commerce sector. Main algorithms are used to develop recommendation system are collaborative filtering, K nearest neighbor algorithm etc.[12].

Hybrid recommendation model is another model for development of recommendation engine in E Commerce system and it is creating an impact in E commerce sector including tourism also.[13]. The authors discussed about hybrid recommendation model and their impact on E commerce. But as in tourism sector the demographic data matters a lot and the tourism data is dynamic in nature, it is not very relevant in tourism recommendation.

For building personalized recommendation model few researchers have applied unsupervised machine learning model to analyze their dataset and recommend on basis of the learning[24] , whereas some researchers have given idea about conversational recommendation model based on feature extraction[25]

Sruthi S. and Grispy J. has discussed about hybrid recommendation system, the authors have discussed about product based recommendation system and they have shown how hybrid recommendation system has enhanced the overall effectiveness in hybrid recommendation system[13].

Another area for better customer experience is robotics. Using robotics they perform service automation[26-27].Some researchers have shown the use of robotics for service automation in tourism sector, for car rental, travel agent booking and how the companies are facing challenges for adoption of robots for better service in tourism sector[26].

Tourism sectors mostly experience better customer experience in service automation using robotics science, recommendation system using intelligent algorithms, chatbots are another agents presently travel sectors are using for better customer service.

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Name of Chat Bot	Used By	Special Features	Technology Used	Benefits
Askdisha	IRCTC	24x7 customer support, Easy query handling,	Natural Language Processing	Query from user has increased, reduce query response time
Cyril Bot	Expedia	Used for hotel search options, used with FB messenger	AI	Better customer service
Kayak	Expedia-facebook Messenger chatbot	Used for hotel, car rental, flight booking and give future travel plan based on prediction	NLP and Predictive Analytics	Intelligent customer service, futuristic travel plan

Table 1: Example of chatbots using in tourism sector

III. DIFFERENT AI MODELS USED BY INDIAN TOURISM SECTOR

A. Chatbot

- What is a chatbot?

A chatbot is a service or an application program where people interact with the application using a chat interface. User can ask their question using your voice or typing as like as you would ask a person. The chatbot will habitually respond with a natural conversation, and it may carry out the action against the conversation. Some social media platforms are using chatbots for promoting their service. ChatBots will provide 24 x 7 service availability[15-17].

The AI chatbot known as **AskDisha** launched by IRCTC last year, is allowed with voice calling, attending thousands of customers' query per day. When you start composing your query, Ask Disha agent start mining related inquiries from all parts of administrations offered by IRCTC Tourism. The service provides flexibility, user friendliness.

Expedia.com is also another travel-based company to use AI as their weapon to expand their business. They used to book aircraft tickets, or book reservations, vehicle rentals, travels, and excursion bundles[17]. Its Facebook Messenger bot, right now, scans for inns. Users essentially need to open Facebook Messenger and educate the bot a tad concerning their touring plans. When it has enough data, the five most famous inn alternatives in the picked area will have appeared. By tapping on any of the lodgings recommended, the client will be re-coordinated to Expedia's site where can book directly. The

moment the booking is done, the clients will get a message in Messenger with a link to the itinerary.

KLM is not quite the same as others by utilizing Facebook Messenger's checkbox module on the checkout page with the goal that individuals can select in to get booking affirmation, registration notice, ticket and flight notices by means of Messenger[16-17].

There is one prominent element in the Booking.Com chatbot that merits referencing: the two-sided nature which enables clients to start a discussion including their record and gives hotels chance to send notices. This chatbot was worked with the expectation of being a vehicle to encourage a considerably progressively customized, satisfying and consistent travel understanding.

B. Recommendation Engine

All the travel companies are following the path shown by Amazon or Netflix, i.e , AI driven recommendation Engine which can personalized service taken insights from the past data collected from several users. Oyo, makemytrip or Goibibo,trivago, everybody is applying AI and machine learning algorithms or sentiment analysis to get higher competitive advantage[14] Famous tourism sector like Expedia uses algorithms like Support vector machine or decision tree in this perspective. The following diagram shows the architecture of recommendation engine[Figure 2]
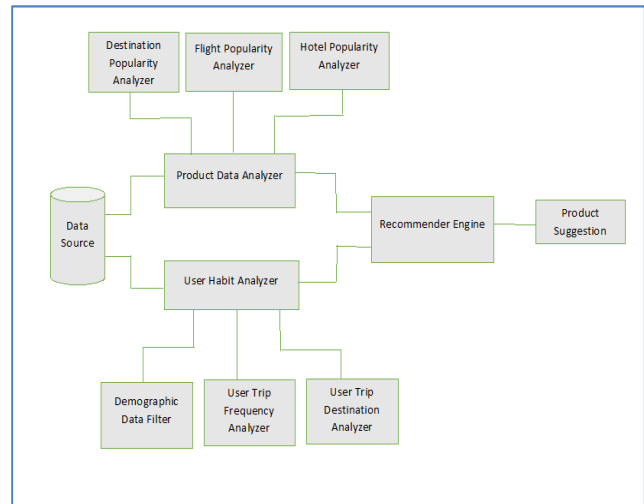

Figure 2: Recommendation engine for tourism

Our scientists made an engaging, intelligent and personalized mobile app, but we have to focus on recommendation engine by using machine learning models-

Clients will be prescribed with places they might want to visit dependent on their past movement history or with close-by vacation spots when they visit a specific spot or their taste or get proposals from comparative voyagers who share similar interests.

IV.CONCLUSION AND FUTURE DIRECTION

Tourism sector in India is one of the highly emerging sectors contributing very high GDP and this sector has witnessed a paradigm shift with the inclusion of AI technologies. From using robotics in service automation or by using IoT for smart travel products to use of predictive analytics in dynamic prising or forecasting model for arrival of tourist or for innovative technique for better customer management-everywhere this field has visited a new horizon. Today personalized customer service or personalized recommendation is preferred to gain more competitive advantage. This paper has covered a broad aspect of three major areas for experiencing better customer service in tourism- chatbot, robotics and personalized recommendation service. In future, using prescriptive analytics new decision making model may be generated for making better decision in this field and also it will be able to protect overtourism with the help of AI technique and such applications leave enormous scope of research in this field.

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