

Chapter 4

Artificial Intelligence and Machine Learning in Travel Health

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ABSTRACT

In recent years, artificial intelligence (AI) and machine learning (ML) have become a crucial part of various industries, including travel. As travelers become increasingly sophisticated in their needs and demands, travel companies must keep up with the ever-changing market. By integrating AI and ML into their operations, travel companies can gather and analyze vast amounts of data to better understand their customers and improve the overall travel experience. Travel health management is increasingly complex due to global mobility, emerging diseases, and the need for personalized health solutions anywhere, anyplace, and anytime (3As). This chapter will explore how AI and ML technologies are revolutionizing travel healthcare in the 21st Century. The chapter will deal with predictive analytics, personalized health recommendations, real-time monitoring, ethical concerns, and the next decade's travel healthcare challenges with innovative solutions using AI and ML.

1. INTRODUCTION

In today's interconnected world, travel health has emerged as a critical concern due to the increasing frequency and diversity of global travel with 8.7 billion passengers in 2023 according to the data Airports Council International (ACI) World (*Airports Council International World Latest Data: The 20 Most Trafficked Airports in 2023 - Travel And Tour World*, 2024). Travelers face various health risks, including infectious diseases, environmental hazards, and chronic conditions aggravated by travel (Patel & Simons, 2019). Traditional methods of managing these risks are often reactive and insufficient for the dynamic nature and frequency of modern travel. The integration of AI and ML into travel health management offers a proactive and data-driven approach to addressing these challenges. By leveraging AI and ML

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technologies, health professionals and travelers can anticipate risks, receive personalized health advice, and monitor health in real time (Doğan & Niyet, 2024).

According to authors (Bulchand-Gidumal, 2022), intelligence is a collection of skills, including the capacity to comprehend the world and the events that take place, to draw on prior experiences, and to integrate existing knowledge to effectively address a novel issue. These skills are summarized by authors (Gretzel, 2011), who claim that intelligent systems can perceive their surroundings, learn, and apply what they have learned in new circumstances.

There are several uses for AI systems in the travel industry. From a consumer viewpoint, AI enhances decision-making, increases mobility, helps consumers find better and more relevant information, and ultimately results in a better travel experience (J. Rudas & Fodor, 2008; Tussyadiah & Miller, 2019). From the business point of view, AI can be used in practically all areas of management, particularly in productivity and promotion. By persuading clients to adopt a more social viewpoint, AI is also anticipated to promote more environmentally friendly travel (Tussyadiah & Miller, 2019).

One of the most promising aspects of AI and ML in travel health is their ability to provide real-time health monitoring. Wearable devices, such as smartwatches, health bands, and fitness trackers, are equipped with sensors that continuously measure various health metrics like heart rate, blood pressure, body temperature, oxygen saturation, and sleep patterns. These devices are paired with AI algorithms that analyze the data to identify any anomalies or potential health risks. For example, suppose a traveler's heart rate spikes or oxygen levels drop unexpectedly. In that case, the system can send alerts, prompting immediate intervention, whether that means seeking medical attention or taking precautionary measures. This ability to monitor health in real time gives travelers peace of mind and enhances their ability to manage their health while on the go.

Beyond monitoring vital signs, AI and ML enable personalized health recommendations tailored to the traveler's needs. Using data from wearables, mobile applications can analyze a range of factors, including activity levels, environmental conditions, and even the traveler's location, to provide customized guidance. For instance, when traveling to a high-altitude destination, the app could recommend strategies to mitigate the effects of altitude sickness. Similarly, AI systems can prompt hydration reminders in hot and humid climates based on the traveler's physical activity and the prevailing weather conditions. These personalized recommendations not only enhance the travel experience but also serve as preventive measures, reducing the likelihood of health complications.

2. ROLE OF AI IN TRAVEL AND TOURISM

It is now even more obvious that tourism relies heavily on technical solutions due to the COVID-19 epidemic. Institutional innovation is required to conceptualize robust, agile, and adaptable strategic initiatives and operations in light of the past crisis. AI and robots are two smart technologies driving the travel, hospitality, and leisure (THL) industry both during and after the epidemic. These technologies are opening up new business models, consumer touchpoints, and potential for value (co-)creation. These technologies support vital company operations, provide significant governance features, and enhance human experience (Gretzel, 2021; Koo et al., 2021).

AI technologies in the travel and tourism sector can be integrated into pre-existing applications and systems or used independently. These systems include forecasting tools, autonomous agents, language translation apps, conversational systems (chatbots and voice assistants), recommender systems, personalization systems and approaches, and smart travel destinations. Even while we examine each system independently, it is important to note that visitors typically engage with technologies that combine many systems. For instance, depending on the needs, a visitor may engage with a robot incorporating a conversational system with an autonomous agent, recommender system, or personalization method. The user conversation might be based on voice help or a chatbot (Bulchand-Gidumal, 2022).

Traveling to enhance one's health is known as health tourism. Globalization, increased health spending, international travel, lower health expenditures, and the use of ICT and the Internet are the main drivers of health tourism. Customers are concerned about eating healthily as they deal with conditions including high blood pressure, diabetes, obesity, cholesterol, and calorie intake. To accommodate health tourists, hospitality and tourism establishments are providing healthy menus, portion control, customer education, healthy food and beverage manufacturing methods, as well as gyms and exercise centers (Kariru, 2023)

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