

How high-performance computing and artificial intelligence are shaping the future of tourism

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In recent years, artificial intelligence (AI) has dramatically changed various industries, including tourism. The integration of advanced technologies such as high-performance computing (HPC) and machine learning has enabled tourism companies to improve user experience, optimize processes and adapt marketing strategies.

The tourism industry faces many challenges that can be addressed by advanced technologies. One of the main problems is processing the huge amounts of data generated by tourism providers such as hotels, airlines and travel agencies. Managing this data requires powerful systems that can analyze and predict customer behavior and optimize operational processes in real time. In addition, the tourism sector faces the need to improve the user experience at all customer touch points, from travel planning to post-service feedback. The key is for companies to understand customer preferences and behavior, which is no easy task in such a dynamic environment.

HPC combined with AI offers solutions to the above challenges and enables the rapid processing of large amounts of data, which is crucial for predicting future trends and optimizing resources. AI offers a wide range of solutions for the optimization of tourist services. Advanced machine learning algorithms can predict demand trends, adjust prices in real time and create personalized travel experiences. One of the key AI applications in tourism is the personalization of services. By analyzing data on past bookings and customer preferences, companies can offer personalized services that meet the specific needs of individual tourists. This leads to greater customer satisfaction and an improvement in their overall experience.

Personalization: HPC enables an advanced system for personalizing tourist experiences, where huge amounts of data about past trips, preferences and interests of individuals are processed. With the help of AI and machine learning algorithms, booking platforms can analyze this data and recommend personalized destinations, activities and accommodation that best suit the individual's preferences. This level of personalization not only improves the user experience, but also increases the likelihood of repeat visits and recommendations.

Demand Forecasting: HPC enables advanced tourism demand forecasting by processing complex data such as historical visitation data, weather forecasts, events and trends. With the help of advanced analytical models and simulations, tourism companies can predict seasonal peaks and troughs and optimize their offer and prices in real time, helping to better manage resources and increase profits.

Customer support: HPC improves customer support in tourism with the help of advanced chatbots and natural language processing systems that provide fast and efficient assistance. These systems can process large volumes of requests and questions, provide immediate responses and solve problems without queues, increasing customer satisfaction and reducing workload on support staff.

Figure 1 shows an example of a query for a 3-day tourist visit to the city of Maribor for a young family with children using ChatGPT.

Družinski obisk Maribora

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Pripravi program za turistični obisk maribora. Ciljna skupina so mlade družine z otroki. Planiraj trodnevni pogram.



Pripravil bom trodnevni program za turistični obisk Maribora, prilagojen za mlade družine z otroki. Program bo vključeval aktivnosti, ki so zanimive za otroke, a tudi sproščujoče in zabavne za starše.

1. dan: Prihod in raziskovanje mestnega jedra

Dopoldne:

- **Prihod v Maribor:** Namestitev v družinam prijaznem hotelu ali apartmaju v centru mesta.
- **Sprehod po mestnem jedru:** Začnite z obiskom **Glavnega trga**, kjer lahko občudujete **Rotovž** (mestna hiša) in **Kužno znamenje**. Otrokom bo zanimivo raziskovati ulice starega mestnega jedra, kjer lahko najdete različne trgovine in kavarne.

Kosilo:

- Priporočam obisk ene izmed družinam prijaznih restavracij v centru, kot je **Restavracija Rožmarin** ali **Gostišče Maribor**, kjer nudijo jedi, prilagojene tudi otrokom.

Popoldne:

- **Obisk Mestnega parka:** To je velik park z otroškimi igrišči, ribnikom in promenado. Tukaj se lahko otroci igrajo na prostem, starši pa se sprehodijo po lepo urejenih poteh.
- **Vožnja z ladjico po Dravi:** Po obisku parka lahko obiščete pristan na Dravi in se podate na kratko vožnjo z ladjico. To bo zanimiva izkušnja za otroke, saj bodo lahko opazovali mesto iz drugačne perspektive.

Večerja:

- Večerja v hotelu ali restavraciji s pogledom na Dravo, kot je **Restavracija Novi Svet pri Stolnici**.

Figure 1: An example of a 3-day program for a tourist visit to the city of Maribor for a young family with children. The full program is available: <https://chatgpt.com/share/4078dd51-65d4-48a6-86e5-df5ae404da6e>.

HPC and AI in tourism represent an exceptional opportunity to improve user experience, increase efficiency and sustainable management of tourist destinations. With the help of advanced tools such as ChatGPT, the tourism industry can not only better meet the needs of modern travelers, but also contribute to the preservation of cultural heritage and the protection of the environment. In the future, the integration of HPC and AI will become crucial for success in the increasingly competitive world of tourism.