

# Technological Pitfalls and Opportunities for Ecotourism

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## Abstract

"Is technology an ally to ecotourism or a dangerous enemy?" We discuss this question and explore the pitfalls and the opportunities of technology for ecotourism. We argue that while technology can standardize the way people value a place and increases feelings of deprivation and frustration, technology can also levels the playing field between different geographic locations and increases the diversity and availability of green alternatives. We conclude by presenting examples of applications that support our vision.

## Keywords

Ecotourism, Tourism, Cultural heritage, Cultural landscapes

## 1. Introduction

With the ecological crisis of the last decades, new forms of consumption appear which redefine our habits and in particular our way of traveling. Thus, ecotourism has grown rapidly in the last decades, also correlated to the increase of tourism in general [8]. While Human-Computer Interaction (HCI) practitioners are interested in applying technological products to ecotourism [5], a certain paradox arises. Is technology an ally to ecotourism or a dangerous enemy?

As pointed by Greenpeace in 2017 in the *Clicking Clean* report, the Information Technology (IT) sector is an important actor of the carbon footprint. With over 4 billion people active users of the internet, the energy footprint of the IT sector is already estimated to consume approximately 7% of global electricity. This calls into question the use of technology in nature-based, environment-respectful approaches, such as ecotourism. Yet technology can also be a powerful ally for the environment, as discussed by Kaltschmitt et al. [4]. HCI researchers, being at the forefront of technological evolution, must be aware of these questions and should lead the way to ideological evolution. Our primary audience consists of HCI researchers and designers who are interested in building new tools for ecotourism.

We suggest developing tools to turn current tourists into ecotourists by providing or proposing alternatives to traditional tourism. However, technology can also cause new issues such as standardizing our vision and practice of tourism or increasing the sense of deprivation and frustration. We present these two visions and try to provide elements to understand pitfalls of

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**Figure 1:** Some tourists have been accused of spoiling the "super bloom" by taking pictures with flowers.

current technologies but also design opportunities. These pitfalls and opportunities are derived from a discussion with a researcher in landscape architecture and urban planning, which we seek to illustrate with existing technological approaches.

## 2. Technological pitfalls for tourism

Technology can be used to bring people closer to nature, however, there may be pernicious effects to technology. We present two particular points where technology can be detrimental to tourism: i) how technology standardizes the way people value a place or an object; and ii) how technology increases the sense of deprivation and frustration.

### 2.1. Technology can standardize the way people value a place or an object

As theorized by Walter Benjamin in his seminal essay "*the art of work in the age of its technological reproduction*", "*the desire of contemporary masses to bring things 'closer' spatially and humanly, [...] is just as ardent as their bent toward overcoming the uniqueness of every reality by accepting its reproduction*" [1]. In other terms, the greater the availability and the fidelity of a copy, the more people will need to experience the authentic in their life.

When applied to tourism and heritage sites (monuments, cities, natural and cultural landscapes...), this statement rings in a unique way: Indeed, places (i.e. realities) that attract the largest influx of tourists are by and large the places whose pictures (i.e. reproductions) are the most widely available. The visitor numbers and the reproduction fueling each other.

To reuse Walter Benjamin's terminology, the cultic value of a genuine cultural landscape is reinforced by the availability and the fidelity of its pictorial reproductions. The rise of social media has amplified this phenomenon in ways that Walter Benjamin himself could not possibly have anticipated. Since Walter Benjamin wrote these lines in 1936, the intertwined development of technology and culture has never been so true.

### 2.2. Technology can increase the sense of deprivation and frustration

Today, the improvement of technology (VR, smartphone, etc) and its access in greater quantity (Youtube, etc.) push the massification of tourism and the standardization of tourist interests.



**Figure 2:** Ogilvy's data driven add campaign for Deutsche Bahn. This campaign suggested lookalike places in Germany based on popular pictures of touristic areas

While virtual reality can offer tourism many useful applications [2], it can also lead to increase users' desire to visit the real site. However, undertaking such trips may be hindered by economic conditions (trips are expensive) or ideological convictions (e.g. to refrain from flying for ecological reasons). Although, the representation of touristic sites can support "motionless trip", it can also increase the sense of deprivation and the frustration of not being able to visit such places.

Technology can also lead to the massification of tourism, which can be detrimental to nature and ecology. Each site has a *carrying capacity* [3, 7] that cannot be exceeded without consequences. An example of such overcharge has been seen in California in 2016, where thousands of wildflowers bloom all at once, transforming arid landscapes into vast fields of flowers. When the town of Lake Elsinore experienced such a phenomenon called the "super bloom", it also experienced an influx of an estimated 50,000 visitors. Social network influencers were accused of ruining flowers by taking photos Fig. 1 which were posted on the networks and thus increased the awareness of this place.

### **3. Technological opportunities for tourism**

On the other hand, technology can help change the traditional view of tourism and mentalities. These offer design opportunities for technological tools, including leveling the playing field between different geographic locations.

#### **3.1. Level the playing field between different geographic locations**

While some locations are attractive because of the many photos and advertisements online, technology has the ability to level the playing field between different geographic locations. In

this direction, the German public railway company (Deutsche Bahn) produced an advertising campaign where they used an algorithm to find German lookalike landscape photos of popular touristic sites<sup>1</sup> Fig. 2. By increasing the diversity and availability of sources, the Deutsche Bahn offers cheaper travel destinations that are closer to the users. In doing so, they promote local tourism, give visibility to local tourist sites and support the spread of tourists across different locations, thus lightening the pressure on the most visited areas.

Such technology is a great tool to increase the diversity and availability of different locations, reducing the feeling of frustration or deprivation while promoting local tourism. This advertising campaign was a great success for Deutsche Bahn and the reason was that Germany has enough cultural heritage to allow such algorithms to work.

## 4. Discussion

As researchers and designers, we need to be mindful of the socio-technical context in which technologies are designed and employed. On one hand, technology can play a role in reinforcing mass tourism and mass capitalism, with its known environmental issues. On the other hand, technology can complement the ecosystem and reinforce good environmental practices. Thus, our aim was not to provide an exhaustive list of pitfalls and opportunities for ecotourism, but rather to question the impact of current technologies and to open up new design possibilities and opportunities.

We argued that technology can increase the sense of deprivation and frustration of users. Similarly, Guttentag et al. [2] raised this issue, arguing that: *[potentially] an attempted VR substitute would have the exact opposite of its desired preservationist impact and increase users' desire to visit the real site*". However, the pitfalls and opportunities presented are not ground truth, but rather dynamic and evolve according to the socio-technical and economical context. For example, in times of global pandemics (e.g. SARS-CoV-2), where the world is subject to travel restrictions, technology can support the access of inaccessible sites and potentially alleviate the sense of deprivation.

We illustrated how technology can level the playing field between different tourist locations and thus, turn current tourists into ecotourists. Technological tools have the power to redirect the influx of tourists from one place to another. However, how to control this flow of people remains an open question. One solution is to develop tools for people that act every day for tourism, land use planning, tourism regulation, and nature preservation. Because they know the local problems, they should be able to better visualize and control the touristic traffic in their area. How can we take into account the interests of the different stakeholders (local residents, heritage conservationist, etc.) is an important question, as these interests may be diverse or even contradictory [6].

## 5. Conclusion

We believe that technology has its place in promoting ecotourism and we propose that technology should not be used to increase the availability and fidelity of copies, which can result in

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<sup>1</sup>[https://www.youtube.com/watch?v=\\_hnPov9fdcs](https://www.youtube.com/watch?v=_hnPov9fdcs)

frustration, standardization of tourist sites, mass tourism, and their associated ecological issues. Instead, we believe it is necessary to increase the diversity and availability of sources and to level the playing field between different geographical locations. Thus, it would promote healthier, sustainable, and ecological tourism.

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## References

- [1] Benjamin, W. 2. *The Work of Art in the Age of Its Technological Reproducibility*. Columbia University Press, 2020.
- [2] Guttentag, D. A. Virtual reality: Applications and implications for tourism. *Tourism management* 31, 5 (2010), 637–651.
- [3] Jorgensen, S. E., and Fath, B. D. *Encyclopedia of ecology*. Newnes, 2014.
- [4] Kaltschmitt, M., Streicher, W., and Wiese, A. *Renewable energy: technology, economics and environment*. Springer Science & Business Media, 2007.
- [5] Lee, C.-F., and Chang, C. Hci design of technological products for eco-tourism. In *International Conference on Human-Computer Interaction* (2014), Springer, pp. 513–518.
- [6] Lee, J.-h., Kim, S.-h., and Kwon, H.-s. Mapping interests by stakeholders' subjectivities toward ecotourism resources: The case of seocheon-gun, korea. *Sustainability* 9, 1 (2017), 93.
- [7] Mitchell, N., Rossler, M., and Tricaud, P.-M. *World Heritage paper*№ 26. *World Heritage Cultural Landscapes. A hand book for conservation and management*. 4/2/UNESCO/Cult/09/E, 2009.
- [8] Wood, M. *Ecotourism: Principles, practices and policies for sustainability*. UNEP, 2002.