Artificial intelligence for visitor guidance | Episode 1 of the speciAlps podcast series

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Transcript:

Michael Gams, CIPRA International: Hello and welcome to our speciAlps podcast series „Guide visitors, preserve nature experience“. My name is Michael Gams and this is the first of four podcast episodes within this series, produced by CIPRA International in cooperation with the community network Alliance in the Alps. All episodes are in English. Additionally, each episode will be also available in one of the alpine languages French, Italian, German and Slovenian. We start off with Slovenian in this episode. So if you speak slovenian, feel free to choose the slovenian episode. How can artificial intelligence help to preserve nature in sensible areas? This is what we will talk about with several experts from Austria and from Slovenia in the next half hour.

Michael: When we explore nature in the Alps, we leave traces – in the real world and in the digital world. Theses traces of us can be tracked – through Global Nagivation Satellite Systems such as GPS, through voluntary Geographic Information, Mobile Device Data, Social Media Postings and so on. Here, artificial intelligence comes into play – it can for example help to guide visitors away from sensible areas. But how does this work? This is what I am going to ask todays first guest in our speciAlps podcast, Dr. Karolina Taczanowska. She is working at the University of Natural Resources and Life Sciences in Vienna, Austria. Her area of research includes Datafication in visitor monitoring and visitor management. Welcome and thank you for taking the time, Karolina!

Karolina: Thank you for the invitation.

Michael: Many of us like to go outdoors and explore nature. Sometimes it's too many. This is where visitor monitoring and visitor management come into play. But what exactly is visitor monitoring and visitor management?

Karolina: There is no monitoring without visitor management strategy. So first of all, we ask ourselves, why do we need the facts and figures about recreation, about tourism? What do we need this information for? And this is the first step that has implications of what type of data methods are we going to use to to collect information concerning visitors. On the one hand, we can focus on the bottlenecks of use, we can focus on overtourism, but we can also focus on different subjects such

as user conflicts, human wildlife, interaction, risk management in the Alps, especially important or like recently during Covid 19 pandemics, ensuring public health and simply safe distance between visitors. So there are different types of objectives and depending on that, we can select a combination of methods to collect data on visitation and design a visitor monitoring campaign.

Michael: When I visit nature, I leave a lot of digital traces. For example, when I use my GPS Watch or an outdoor app to navigate on hiking trails. Why is this data relevant for visitor management?

Karolina: Before we used to design data monitoring campaign, we were measuring visitors in the field, asking them questions, using questionnaires on site. We were using counting stations in the field. This we still do, but actually since a decade or maybe even 15 years, we discovered that the visitors started to leave not only physical traces, but also digital traces. And these include traces left through using technology. So on the one hand, we have GPS traces in different sorts of outdoor applications. We have also traces uploaded by visitors in social media or different sorts of sharing platforms. We have also passive data that actually we are not necessarily aware of that are being collected on our mobile phone. And interaction with the Internet is actually nowadays traced. So from the research perspective, we are interested to see what is the potential of this digital traces for visitor monitoring and visitor management. And we also are interested to validate this data. How reliable it is to take future decisions.

Michael: Artificial intelligence nowadays is something that everyone is talking about. How can artificial intelligence help us with visitor management?

Karolina: It's being successfully used for forecasting future behaviour or service performance. Within travel sector flight delays are being simulated and the forecasts are really well done within our visitor management sector. We can forecast crowding and bottlenecks of use at specific destinations. We can also use artificial intelligence models for demand prediction and pricing. I'm not sure in which parts of the Alps, but there are regions that introduced dynamic pricing, for instance, in ski resorts and other commercial services depending on the visitor load. So there is potential to use artificial intelligence models in that. Also provisioning automatic visitor information, which is very important if you can imagine. There are periods when there is not enough stuff in the region to provide tourist information. Automatic chat bots and online visitor services, voice based services are being used. Also, probably during this podcast you will meet colleagues providing digital recommender systems that are based on artificial intelligence. So within the information management, there are a lot of services currently based on artificial intelligence in our domain. In research, we use artificial intelligence in data processing and data analysis, trying to to profile visitors as adequate as possible.

Michael: Are there any examples from your research or other projects concerning the use of artificial intelligence in visitor management? Visitor guidance?

Karolina: Already in 2006, 2008, we were involved in agent based modeling using artificial agents to simulate visitor behavior within a trail network in national parks. In Austria it was the representation of an artificial environment with an artificial population of visitors and we were able to simulate behavior: Which trails are being used by which population groups with specific profiles and so on. So it was a dynamic model. This was possible thanks to cooperation with colleagues from Wageningen University in the Netherlands, especially with Rene Johan, who developed the “MASOOR” Model (multi-agent simulation of outdoor recreation) and actually now during the current project related to big data, we are getting back to MASOOR and this modeling platform and will simulate visitors again with new types of data. So it was quite interesting. These models were done also in the Alps, like agent based model from Switzerland, also like ten years back. These models are done to forecast how the spatial temporal distribution of visitors within trail networks work. Another example of artificial intelligence application is machine learning approaches based on large datasets in data classification. And we use this self-organizing maps technique in particular in a research project in the Carpathian Mountains, also a neighbor region of the Alps in the Tatra National Park. And we were using this for not marketing purposes but for social marketing to determine the difference between nature based tourism and mass tourism in nature.

Michael: And you just mentioned your running project, which just started concerning big data. It's called ForRest. So what is this exactly about?

Karolina: The development over the last years inspired us to start this project related to big data in forest recreation monitoring. In this project, we validate various data resources, digital data resources, because we have noticed that there is a need from the regions, from outdoor recreation destinations that people would like to have very quick ready to use decisions without the necessity of collecting additional data so that just imagine you have a cloud of data from. Internet and you take it and you are able to make strategic management decisions based on that within one day. Our objective is to validate and compare different sources of data and see how it correlates with reality.

Michael: And this is especially taking place around Vienna or in the Wienerwald area?

Karolina: Yeah, exactly. This is this is taking place in Vienna metropolitan area. We have also partner research institutions from Poland, Technical University of Warsaw and the Forest Research Institute. So it's like the same approach is being used also in the Warsaw metropolitan area. So we compare case studies across Europe because digitalization differs across regions. So if there are further regions interested to compare their resources, we have the differences in the urban areas. We have

different sorts of users, different types of visitors, users, also different types of digital use. In tourist destinations it's a little bit different. In case of leisure destinations close to the cities and different types of digital use in pure tourist destinations. So there are different systems that are being used, different digital traces used. You can imagine like if you go for a walk with your dog, maybe you do not need a navigation system, but if you hike in the Alps, probably you will use one of the outdoor apps. We are also very interested in the topic of a Digital Gap. Actually what is not covered by this digital data because this is especially important in case of artificial intelligence that we are aware of phenomena that are missing in the digital world.

Michael: People have also negative thoughts concerning the use of artificial intelligence. So what risks and errors are there really concerning artificial intelligence and how can visitors be helped to overcome their skepticism?

Karolina: Artificial intelligence is like any technology. It depends if you use it for good or for bad. So there is some risk, of course, in my opinion, kind of area where we need to be a little bit cautious is the fact that development of artificial intelligence and multiple applications within tourism domain are related to commercial services, and especially if we are talking about sustainable development of the Alps, we have to have also a look closer look at the environmental justice and social justice within this development. So, you know, artificial intelligence, there is industry, there is money behind. So we have to defend the rights of non-commercial applications within this domain.

Michael: So the commercialization might be something we have to be cautious about and not so much artificial intelligence itself because it's also depending on how we use it?

Karolina: Let me use an example: nature protection. If we disregard this aspect within the current development of trip recommender systems or other services designed for tourists, I think we are losing very important quality and actually we are drifting away from the objectives of sustainable development within the Alpine region. So I think we have to really find a solution to integrate commercial and non-commercial sector within artificial intelligence developments in the Alps.

Michael: So let's take a look into the near future. When I go hiking, maybe in 5 or 10 years, ideally I'm sitting on a train, not driving by car. Maybe my smartphone tells me: “Hey, the tour you want to make and this place where you want to go is overcrowded because there is an event taking place. Why don't you go to another less crowded place?” And it lists three suggested hiking alternatives nearby. Is this something that could totally be realistic?

Karolina: Yes, definitely. Everything is going that direction within the tourism sector. We speak of designing travel experiences. So actually, experience starts at your

desktop when during a hard working week or day you are attracted by an advertisement or somehow an idea comes to your mind: “I would like to to go for a hike in the Alps or to do a mountain bike trip”. And the entire journey, including the way you access destination, is guided by your intelligent recommender system. So this is actually the reality. It's slowly going on within five years. I think we are definitely surrounded by different intelligent systems and it's our choice what to choose how to use. But within this development, I underline the importance to take care of the environment. It's not about to guide us into commercially attractive destinations. Regions that invest in artificial intelligence will guide us there and maybe redirect us from the other regions. You know, we really have to be cautious about that, about the equality in the development of of such systems. Starting to think about those aspects now is definitely not too late. But in five years I think we might be surprised. So I think it's a good moment to to start thinking of that. And there are good best practice examples that develop commercial services, also respecting sustainable development objectives and even promoting sustainable behavior transition towards sustainability. So I think if we manage to combine the technological development with transition to sustainability, then we can really provide very attractive and sustainable destinations in the Alps in future.

Michael: As mentioned by Katarina Taczanowska, several projects across the Alpine countries are already testing Artificial Intelligence for visitor guidance. One example is a project from Germany named "AIR - Artificial Intelligence based recommender for sustainable tourism“. It aims to advance forecasting models for more efficient visitor guidance as early as the tour planning stage. The Allgäu in Germany as a pilot region in the project is testing a "flexible adventure bus," which is supposed to be smarter than conventional bus routes with their rigid schedules. Dynamic, data-based scheduling takes into account weather influences and traffic and encourages users to leave their cars at home. But Artificial Intelligence could also forecast Parking space occupancy. This is being tested in Oberstaufen in the Allgäu region of Germany, where the high volume of leisure traffic in tourist and excursion areas regularly overloads tourist infrastructures.

Michael: Let‘s zoom into another touristic region, the Slovenian Alps: Some of the most visited hiking trails in Slovenia are located in the middle of the Triglav national park. Many of them start in the sensible area around Vrsic Pass, 1600 meter above sea level. Too many cars and too many visitors also cause a negative impact on the fauna and flora there. Our second podcast guests Vešna Kobal and Urška Starc Peceny from the high-tech company Arctur explain how the use of AI could relieve Slovenia's tourist hotspots. Within their project „Mountaineering 4.0“, they combine footfall monitoring sensors with other data sources, as Vesna Kobal explains:

Vesna: The idea is that we collect the data about real time visits in the selected mountain areas that cover quite different mountain and outdoor areas in Slovenia, like in the Julian Alps and Kamnik-savinja Alps and also in Podgoria and in some

other areas like Orsk, which is famous climbing area, and that we find for the first time what is the real time visit in the field. So we have selected footfall sensors that are collecting the visit. Every passenger who goes by on in any direction is counted and then the data is sent in almost real time to our infrastructure where the software analyzes and organize the data. This data then is collected with an aggregated with some other data like traffic weather, for example, mountain accidents and will be used to make analysis and forecasts about the visits in the future.

Michael: You said you collect the data. How do you use artificial intelligence in this project then? For which kind of forecasts? Can you explain this a little bit more?

Vesna: We will use this data and annotate them with carrying capacities and limitations and so on, which will depend on what information we would like to train the artificial intelligence model. And then we will use these models on the real data. This data will help visitors to decide which destination to use, according to, for example, weather forecast or according to holidays in Austria and Italy, which quite strongly affect the visit. And perhaps destination managers or trail managers will have a tool that they will use to plan the maintenance or how to promote other points of interest and redirect users to some other more interesting and not so overcrowded destination and so on.

Michael: And how could they be directed?

Urska: The idea is here that we put data in some place and then we can reuse it for different purposes. So whatever app or website or other points of information within the Alps and also in other countries can then take this data, you know, and make them available for different purposes. And I hope that within Alps we can make a region, a demonstration region where, we start using this smartness of technologies to make really this pilot projects running also with our border cooperation to really see how then this data comes into life and make these experiences in in Alps better for all - for local community and for visitors.

Michael: So transnational cooperation would be really helpful in future. What are the main challenges while collecting data?

Vesna: There are quite some challenges because there is much data available. However, it is not prepared to be used by artificial intelligence because it needs to be in proper format, machine readable and available online. So here in Slovenia we have quite a challenge to gather data. For example, quite useful data would be overnight stays in mountain huts. This data is not publicly available, although it exists. Much data is available on online platforms which needs to be bought. It's not freely available as open data. So you have to buy this data which is also a quite big limitation for many associations or NGOs that would like to use this data. These are just a few of them. However, we try to find data that is open and available. For example, data from traffic counters or about mountain accidents. It's not really

counting mountain accidents, it's not really counting visitor flows, but it's one of the effects that is really connected to the visits in the mountain. So we try to find other data that illustrates what is happening in mountain areas.

Urska: So what is funny is actually that at the end, with all, you know, technological issues, the weak point is us people in really understanding the added value that like all stakeholders, really understand this and see a win win situation and start sharing and collaborating and make the legislation that this data can flow and once the maturity of all stakeholders will be. Technology is always just the means.

Michael: Maybe it's a little bit of fear that your data is being used for something you don't want it to be used. So what I also wanted to ask you is what fascinates you personally about artificial intelligence?

Vesna: I was quite surprised by the power of ChatGPT when it came out a few months ago, and I was really happy that me and my team are working very closely on on this topic before that, and we recognize this opportunity and it opens really new dimensions also in debt analysis and in other fields as well. So I think this is something that will change quite a lot our way of life.

Michael: Urska, what fascinates you about artificial intelligence?

Urska: It fascinates me that actually with the project that I was mentioning at the beginning, we have somehow foreseen so many things also before Covid with this idea of putting in the center the quality of life of local communities and sustainable tourism, which was not obvious at that time. Everyone was like: “What do these guys want? Everything is perfect in tourism, just, tourists and profit. And now everyone is talking about these limitations.” We see that legislation is coming in the Alps where some destinations limit the numbers of accommodation and so on - to really strict things, which is, I think, the perfect time to start using this kind of technologies such as artificial intelligence that makes possible to learn or find all these combinations and suggest us the best ones - again for us to make the best decisions.

Michael: This was an interview with Vešna Kobal and Urška Starc Peceny from the Slovenian high tech company Arctur. Used in the right way, Artificial Intelligence can help us to take the right decisions in terms of sustainable tourism and outdoor activities.

This was the first episode of our speciAlps podcast series „guide visitors, preserve nature experience“. The second episode will be published in August 2023 and focuses on the topic of mobility. Visitor management starts at home, with travel playing an important role. In many tourist destinations, car traffic leads to traffic chaos and overcrowded parking lots. Avoiding this problem and arriving by public transport is a challenge for visitors in some destinations - especially on the "last mile" to the starting point.

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(de, fr, it,sl)

Have you ever heard of nudging? This is what our webinar on September 21st will be all about: Where is nudging used in visitor management and in what forms? How effective is it for sustainable tourism? We invite all of our podcast listeners to join in this webinar as well! Nudging is also the topic of the third podcast episode in November 2023.

How many visitors are too many? Where exactly is the limit of nature's carrying capacity reached? This is the subject of the fourth and final podcast episode in January 2024. You can find more information about this podcast series on CIPRA.org and alpenallianz.org. My name is Michael Gams, thanks for listening and also many thanks to Magdalena Holzer and Kathrin Holstein.

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