

AN EXPERT DISCUSSION ON THE CURRENT AND FUTURE VALUE OF AI IN THE CONTEXT OF URBAN SOUND

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Abstract

As part of the International Noise Awareness Day, in January 2026 the DEGA and the UBA organized an expert panel to discuss the use of artificial intelligence (AI) across various fields related to sound. The goal was to identify from different disciplinary angles both challenges and useful applications to deal with urban sound. With this presentation it is intended to bring the discussion to the European level of expert groups. The panel focused on sharing experiences with AI in environmental acoustics, noise control, and soundscapes, highlighting applications, opportunities, obstacles and risks. It is evident that AI has already conquered personal and professional contexts, mainly as a support tool still requiring expert oversight. In the field of urban sound, AI offers potential to improve data quality, enable smarter traffic management, enhance urban and noise planning, and support more precise sound analysis and personalized noise assessments. The experts also recognized that AI can improve efficiency, support public communication, and enable new approaches like sensor-based monitoring and citizen science. However, identified key challenges include data privacy, legal constraints, dependency on high data quality and extensive training data, and the limited transparency of AI models. There is also concern about overreliance on AI without sufficient critical evaluation along with unclear implementation pathways. Survey results of the experts show positive attitudes toward AI, though risks-especially data privacy remain a concern. Stronger regulation and greater integration of AI into education and training are recommended.

Keywords: urban sound, soundscape, artificial intelligence, noise awareness

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1. Introduction - International Noise Awareness Day

The International Noise Awareness Day (INAD) is an initiative that for more than 30 years has highlighted the impact of environmental noise on quality of life and promoted the assessment of noise exposure across diverse populations and living environments. Since its inception in 1996, INAD has grown to include participants in every state in the USA where it was founded by the Center for Hearing and Communication, and in countries on virtually every continent around the globe. [1]

In Germany, the Noise Awareness Day was founded and established in 1998. Since then, the event has been held annually in April in coordination with the International Noise Awareness Day in USA. Its primary objectives are to raise public awareness of environmental noise and to improve understanding of its social and health-related impacts. It is widely known that the health impacts caused by noise remain a serious concern and that noise is one of the greatest environmental health risks, see for example [2], [3]. Therefore, through a broad range of activities organized in conjunction with Noise Awareness Day, the public is informed about environmental noise and encouraged to support measures that improve noise-affected living conditions. Over the past three decades, the Noise Awareness Day has become a well-established institution in Germany, receiving broad public recognition and occupying a permanent place in the national calendar of public awareness initiatives. In 2027, the International Noise Awareness Day will be held for the 30th time.

The Noise Awareness Day addresses all stakeholders concerned with environmental noise, including the public, individuals affected by noise, researchers and practitioners, industry representatives, and policymakers. Its focus encompasses the sources of noise, its impacts on health and well-being, and strategies for its mitigation. Through this annual awareness initiative, the German Acoustical Society (DEGA) provides

comprehensive information on the wide range of environmental noise exposures and their consequences, with particular emphasis on outreach to children and young people. Over the years, organized teaching sessions have even been held in more than 100 school classes to explain, in an age-appropriate way, the importance of sound in our lives and to illustrate the effects of noise on people. In 2020, a competition called “My world of sounds” was launched to encourage children to engage creatively with their acoustic environment. Contributions from 16 nations were received all around the world with more than 650 items been sent to national representatives. [4]

Annual events organized by the DEGA on selected topics bring together experts from academia, industry and public administration, and show ways to achieve a world with less noise. These events are usually also attended by citizens affected by noise. Topics like “The sound of tomorrow” with scientific talks about drone noise, new cost-effective construction and sound insulation or new sources of noise from new forms of mobility explore innovative and forward-looking approaches to noise management and sustainable urban sound planning. (see Fig. 1). In 2021 the annual event considered how the city of future will sound. In this context, the effects of the current restrictions and measures caused by the ongoing SARS-CoV-2-pandemic on the acoustics in everyday life were subject of discussion. [5] This example illustrates that International Noise Awareness Day is used to address most of the current issues that are of great importance to citizens and noise experts.

2. Expert discussion on the value of AI in the field of urban sound

The main theme of an expert discussion conducted in an online workshop format was how artificial intelligence can be used to achieve technological, environmental and health benefits in reducing noise, improving urban soundscapes and creating healthy acoustic environments. Thus, the workshop addressed the current theme of the German Noise Awareness Day as shown in Figure 1 with a chatbot recommending noise mitigation measures.

The workshop was held online on January 30, 2026, with more than 10 selected experts from different fields of acoustics ranging from consulting companies to academia to public institutions dealing with urban sound. The idea was to share experiences and discuss the role AI plays already in day-to-day work related to environmental noise and how challenges in the broad field of environmental noise can be tackled by AI technology. At the same time, risks and potential drawbacks were considered to think about the development of instruments to steer the technological opportunities in the appropriate direction and avoid conflicts. The open discussion was accompanied by short surveys conducted before and after the main discussion to gauge the group’s position and provide a starting point for discussion. Figure 2 illustrates



Figure 1: Poster announcing the German Noise Awareness Day in 2026 featuring the theme “The Sound of Tomorrow”. At the bottom of the poster are the logos of the public institutions and companies that are sponsoring the Noise Awareness Day initiative. ©Pornnappa. stock.adobe.com [1]

some of the results and shows that the joint discussion among experts from various fields of acoustics slightly shifted the group’s opinion. With regard to the idea that AI offers more opportunities and potential than risks in noise reduction, the results were slightly less positive after the discussion. It appears that the concerns and challenges raised during the workshop have changed the attitudes of some participants. On the other hand, after the discussion, the benefits of AI for noise measurements and improved signal analysis were viewed more positively. This shows that the workshop can have an impact on participants through the exchange of the experts’ opinions.

In addition, table 1 shows some of the most frequently cited comments on the benefits and risks of AI in the areas of urban sound, noise control, and environmental noise assessment. As expected, the comments refer, on the one hand, to the point that AI offers new technological advances in signal processing, source identification, and management of large datasets; at the same time, however, the risk that this technology poses a significant threat to data protection was highlighted as a great risk. In addition, it was frequently mentioned that there is the risk that measurements,

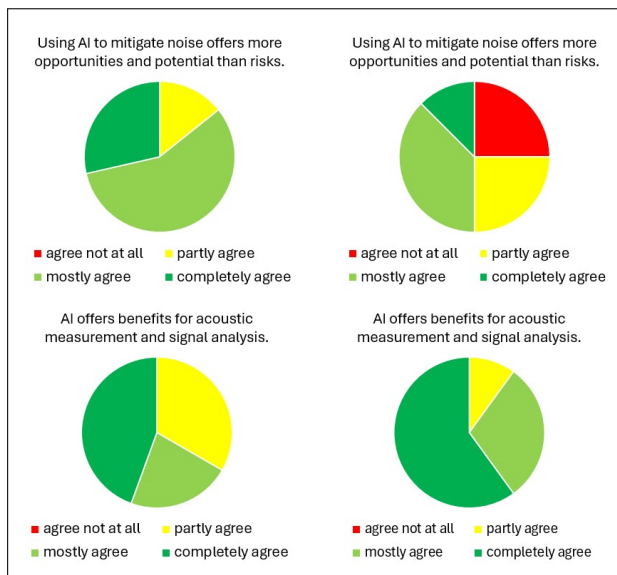


Figure 2: Survey results from the expert workshop before (left) and after (right) the workshop discussions about different issues related to the use of AI in the field of acoustics in general and urban sound in particular. Top: Agreement with the statement "Using AI to mitigate noise offers more opportunities than risks"; bottom: Agreement with the statement "AI offers benefits for acoustic measurement and signal analysis".

monitoring, and signal processing will be based on AI without their accuracy being adequately checked.

The conclusion of the expert discussion was that there is a certain degree of uncertainty regarding the use of AI. While its potential benefits are evident, its practical application still needs to be evaluated. There were also concerns that reliance on AI could lead to neglecting the traditional scientific approach in favor of AI's rapid results.

For this reason, there is a recognized need to engage with AI progressively and systematically to better understand its capabilities and limitations. For this, it is necessary to have regular exchanges on that topic, to develop guidelines on the appropriate use of AI, and structured sessions at the DAGA, the annual acoustical conference in Germany, needs to be organized. In particular, good scientific practice in the handling and use of AI must be addressed more thoroughly. For it, the expert group concluded that acoustics societies need to draft and establish guidelines to provide clear guidance on this matter of AI, particularly for early-career academics.

It was agreed that discussions on the use of AI in relation to the measurement, analysis and assessment of environmental noise should continue and must form an integral part of future considerations within national acoustics societies and beyond.

Table 1: Mentioned aspects of potential benefits and risks of AI in the context of the urban sound, highlighted by the experts during the workshop.

BENEFIT
improved data analysis
improved noise mapping
improved traffic counts
management of large data sets
automatic source separation
lower costs
RISK
data privacy
unknown data quality
data use unclear
faulty conclusions based on inadequate data
focus on data analysis instead of understanding
ownership of data

3. Future directions of International Noise Awareness Day

Of particular importance will be defining the future direction of International Noise Awareness Day. Strengthening the connection between noise awareness, climate-related issues, and emerging models of living and working will be essential, as the overarching goal is to enhance quality of life. Addressing these challenges requires a broader perspective that recognizes the close relationship between environmental noise, sustainable development, and the design of healthy, livable communities. Fundamental societal questions about the conditions needed to create high-quality living environments will therefore play a central role in shaping future discussions and initiatives in the context of the International Noise Awareness Day. In future times the focus needs to extend beyond simply identifying where and when noise becomes a problem. It is equally important to highlight practical solutions for managing noise exposure, improving quality of life, and creating pleasant acoustic environments. Achieving these goals requires close collaboration between those affected by noise and the researchers, practitioners, and policymakers.

The objective is to demonstrate how effective measures can not only reduce the burden of noise exposure but also provide strategies for coping with its impacts. More importantly, the aim is to show how well-designed interventions can proactively manage, mitigate, and ultimately prevent the adverse effects of environmental noise. As we mark this milestone, it is time to look ahead and address the challenges of the future. This includes exploring the latest advances in noise effects research while examining the opportunities and challenges presented by artificial intelligence in noise measurement, monitoring, analysis, prediction, and mitigation. By bringing these perspec-

tives together, the 30th International Noise Awareness Day aims to foster dialogue, inspire innovation, and promote collaborative solutions for creating healthier and quieter environments. Thus, the International Noise Awareness Day initiative summarized the overall goal of joint efforts and increased awareness as follows: “Together, our voices will resonate and we will realize our vision for a quieter world.” [1]

4. Note

In preparation of this work, ChatGPT (OpenAI) and DeepL were used as an AI-assisted tool for language editing. The authors are solely responsible for the selection, evaluation, and accuracy of all content presented in this work.

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