

Cloud House, Marlene-Dietrich-Allee 14, 14482 Potsdam, Germany, Nov 28-29, 2024



**German University
of Digital Science**

First Conference on Digital Science in Culture 2024

Programme Book

Welcome Message

Dear Participants, Colleagues, and Friends of Digital Science,

It is with great enthusiasm that we welcome you to the **inaugural International Conference on Digital Science in Culture (DSC'24)**, hosted by the German University of Digital Science in Potsdam. This event marks the launch of an exciting new **Conference Series** dedicated to exploring the role of Digital Science in various domains, beginning with cultural heritage. Our goal is to foster meaningful dialogue and inspire collaboration across disciplines.

The theme of this year's conference, *Digital Tools and Methods in Cultural Sectors and Implications for Society*, highlights the transformative potential of digital innovations in reshaping how we document, preserve, interact with, and evolve cultures. Alongside **state-of-the-art research**, DSC'24 also brings to the forefront **underrepresented voices**, bridging gaps in global discourse. With speakers from diverse continents – including North America, Asia, Europe, Africa, and Australia – we are proud to foster an international exchange of ideas and insights. By supporting select contributions and removing financial barriers, we aim to ensure that impactful perspectives from different regions and communities enrich our shared exploration of cultural and scientific innovation.

Over the two conference days, DSC'24 offers a dynamic program of **key-note speeches**, **research presentations**, and **interactive displays**, alongside valuable opportunities for **networking** and creative exchange.

We extend our gratitude to esteemed and thought-provoking speakers, and all contributors who have brought this vision to life. Your commitment and insights ensure that this conference serves as a platform for intriguing analyses, **critical inquiry**, future programmatic directions, and the **forging of new partnerships**.

For all conferences in the series *Digital Innovation in...*, we are furthermore proud to partner with **Springer-Nature** to publish the **Conference Proceedings**. Thus, we are delighted to provide you with a prominent platform to share and amplify the innovative research you present at DSC'24.

We hope that this conference provides not only a stage for intellectual growth, but also an invitation to shape the future of cultural practices through digital science.

Welcome to Potsdam, welcome to the German University of Digital Science, and welcome to DSC'24!

Warm regards!



Prof. Dr. Christoph Meinel and **Prof. Dr. Mike Friedrichsen**
Founding Directors of the German University of Digital Science



Dr. Sree Ganesh Thottempudi and **Dr. Julia von Thienen**
Co-Organizers of the First Conference on Digital Science in Culture

THURSDAY, NOVEMBER 28, 2024

9:00 – 9:30 am CET	Arrival & Coffee; Online Connection Check-In
9:30 – 10:30 am	DSC'24 Warm Welcome to the First Conference on Digital Science in Culture Prof. Christoph Meinel, Dr. Julia von Thienen, & Dr. Sree Ganesh
10:30 – 11:10 am	DSC Keynote Speech Dr. Chantal Eschenfelder <i>A Matter of Strategy - the Städel Museum and its Digital Extension</i>
11:10-11:30 am	Coffee Break and Networking
11:30 am – 12:30 pm	Session 1 Digital Science for Bridging Cultural and Historical Gaps Prof. K. Matusiak, A.R. Flynn, & Prof. R. Han <i>Addressing Archival Silence with Digital Exhibits: The Story of Chinese Communities in Park County, Colorado</i> Prof. J. D. Prabhakar: <i>Street Vendors in India: The Custodians of Indian Culture and Tradition</i>
12:30 – 1:00 pm	Impulse Talk led by Prof. Sonja Meyer D. Bohnet, P. Deckert, F. Fritzen, N. Kriessler, S. Meyer, M. Müller & M. Traber <i>Quantifying Energy Savings through IoT-Based Management in Historic University Buildings</i>
1:00 – 2:00 pm	Lunch Break and Networking
2:00 – 2:40 pm	DSC Keynote Speech Sandro Schwarz <i>museum4punkt0 - Enhancing Museum Education through Interactive Digital Experiences</i>
2:40 – 4:10 pm	Session 2 Cultural Narratives and Communication Challenges R. Bhat <i>Digital Animosity and Cultural Erosion: Understanding the Roots of Brahmin Community Hatred on Social Media</i> B. Bacon <i>Info-Notation: Music Notation's Infographic Future</i> P. Nair <i>Digital Age Challenges: Psychoanalysis and the Misrepresentation of Indian Cultural Heritage</i>

4:10 – 4:30 pm	Coffee Break and Networking
4:30 – 5:30 pm	<p>Session 3 From Digital Portrayals to Digital Science</p> <p>Y. Asadchy <i>Men's Descriptions are Shorter than Women's: Prompt Analysis of Gender Portrayals in Stable Diffusion</i></p> <p>D. Amana <i>Exploration of the Function of Ita Igala Contest on Social Media in Renewing Interest in Igala Language Amongst Young Igalas in Nigeria</i></p>
5:30 – 6:00 pm	<p>Impulse Talk</p> <p>Dr. Sree Ganesh Thottempudi <i>Digital Metrical Poetry with Machines</i></p>
	<i>End of Day 1</i>

FRIDAY, NOVEMBER 29, 2024

9:00 – 9:30 am CET	Arrival & Coffee; Online Connection Check-In
9:30-9:45	Warm Welcome and Recap of Day 1 Prof. Mike Friedrichsen
9:45 – 10:15 am	Invited Inspiration Talk Carolyn Stranz & Stefan Scholze - Museum Barberini <i>Music Walks</i>
10:15 – 10:45 am	Impulse Talk Prof. Steven Ney <i>Digital Innovation, Risk Perception and Culture: Avoiding Polarisation and Controversy about Digital Innovation</i>
10:45 – 11:30 am	Coffee, Showroom Visit and Demo of Exhibits
11:30 am – 1:00 pm	Session 4 Immersive Storytelling Hyunkyung Shin <i>Nuk (鬮) XR: Exploring Korean Collective Unconsciousness through Sound</i> N. Muzzammil <i>Decolonizing AI: Preserving Cultural Narratives in the Digital Age</i> Prof. R. Sharma <i>Tracing Women’s Presence in Their Absence: Culpability of Archiving Partition Narratives at the World’s First Partition Museum</i>
1:00 – 2:00 pm	Lunch Break and Networking
2:00 – 4:00 pm	Session 5 Ancient and New Technologies Dr. A. Pfeiffer, & N. Kirshna <i>Cultural Shifts in Music: Examining the Impact of AI on Semi-Professional Bands</i> L. Auri <i>Neural Networks as Catalysts for New Musical Cultures: A Study on Instrument Design</i> Prof. S. Banerjee, & R. Das <i>Unveiling the Silenced - Digitally Archiving the Legacy of Rebel Poet Kazi Nazrul Islam</i> D. K. Moulla, H. S. Olivier, D. Attipoe, Dr. S. G. Thottempudi, E. Mnkandla, & A. Abran <i>Redefining Traditional Architectural Heritage: Case Study of the Mousgoum Obus Hut in Far-North Cameroon</i>

4:00 – 4:30 pm	Coffee Break and Networking
4:30 – 6:00 pm	<p>Preserving Heritage through Innovation: Examples from Italy</p> <p>Arrigo Bertacchini <i>How Technologies Convey Intangible Values in Calabrian Corporate Museums</i></p> <p>DSC Keynote Speech</p> <p>Prof. Eleonora Bilotta <i>Phygital Storytelling in Museum Environments: Integrating Conversational AI and Immersive Media in the Stormed Project</i></p> <p>Closing Remarks</p>
	<i>End of Day 2</i>

KEYNOTES

A Matter of Strategy - the Städel Museum and its Digital Extension



DR. CHANTAL ESCHENFELDER

Leitung Bildung & Vermittlung und Digitale Sammlung
Head of Education and Digital Collection
(Image Copyright: Norbert Miguletz)

In a global and increasingly media-orientated world, museums today also take on social tasks that go beyond the mere mediation of art and aesthetics. The individual needs of an increasingly culturally heterogeneous public require a wide range of educational programmes that cater to different interests and experiences, as well as different levels of knowledge. In the course of digitalisation, traditional museum tasks such as education and mediation are also being redefined. The example of the Städel Museum shows how art education strategies can be transferred to the digital space. Digital mediation formats such as the Digitalorial, the online course on modern art, the digital collection or games open up the possibility of finding out about cultural content and deepening knowledge. The digital formats combine innovative storytelling with a multimedia interweaving of image, film, sound and text and open up new ways of narrating, presenting and communicating art. In addition, the use of visual effects serves to support didactic goals such as revealing artistic image strategies and promotes the 'visual literacy' of users. The digital extension of the Städel Museum thus also makes a methodological contribution to the creation of a digital learning centre that can be used regardless of time and place.

museum4punkt0 - Enhancing Museum Education through Interactive Digital Experiences



SANDRO SCHWARZ

Referent für IT-Strategie – Stiftung Preußischer
Kulturbesitz
IT Strategy- Prussian Cultural Heritage Foundation

"museum4punkt0" was a nationwide project aimed at enhancing educational offerings and improving visitor experiences in museums through the use of innovative digital tools. By integrating technologies such as virtual and augmented reality, interactive apps, and personalized digital platforms, the project successfully made cultural and historical content more accessible, engaging, and inclusive for diverse audiences. Museums from different disciplines and different organizational forms collaborated to share knowledge and develop transferable solutions, ensuring that digital resources could be implemented across various

institutions. A key focus of museum4punkt0 was promoting inclusion by removing barriers to access for people with differing abilities and creating user-friendly, immersive learning experiences for all visitors. This presentation will explore how the project transformed museum experiences, fostered deeper engagement, and broadened participation in cultural heritage.

Phyigital Storytelling in Museum Environments: Integrating Conversational AI and Immersive Media in the Stormed Project



PROF. ELEONORA BIOTTA

University of Calabria, Lead of the EU-Funded StorMed Project on Digital Storytelling in Corporate Museums

This presentation introduces the Stormed Project - *Storie dal Mediterraneo*, an innovative approach to phyigital storytelling in museum environments that combines physical and digital spaces to enhance engagement with Calabria's cultural heritage. In alignment with the themes of the International Conference on Digital Science in Culture, this project demonstrates how advanced digital technologies can revolutionize the dissemination and interactive experience of cultural assets. The project leverages cross-reality technologies to document and digitally reconstruct over ten Calabrian museums and libraries through 360-degree video and 3D models. Using a combination of 360-degree cameras and drone-captured footage, Stormed produces high-resolution visual records and detailed 3D reconstructions, seamlessly integrated into the Tourverse platform <https://www.wideverse.com/prodotti-tourverse>. This setup enables visitors to explore these environments in a blended, phyigital format that combines the realism of physical settings with digital enhancements, creating immersive and interactive engagement with the region's heritage. Central to this experience are Algo digital avatars, conversational agents (CAs) powered by large language models (LLMs), which facilitate dynamic, context-aware interactions. These avatars guide visitors through curated storylines, respond to real-time inquiries, and foster meaningful connections by weaving narratives around artifacts and cultural sites. By serving as responsive, interactive guides, these avatars exemplify the potential of AI-driven human-computer interaction in the cultural sector, aligning with the conference's focus on adaptive technologies in cultural heritage. Looking forward, the Stormed Project intends to expand the Algo avatars' capabilities by incorporating empathic responses, enhancing both cognitive and affective aspects of user engagement. This empathic adaptation will support deeper multisensory connections, fostering a more personalized and emotionally resonant experience. During the talk, the project's development will be showcased in depth, with a discussion of the theoretical and implementation challenges encountered. Key areas of focus include integrating conversational AI with immersive storytelling, achieving seamless user interaction, and addressing practical constraints within museum settings. Additionally, the exploration will cover how these technologies can serve educational purposes, offering transformative applications for training and learning within museum environments.

INVITED INSPIRATION TALK

Music Walks

CAROLIN STRANZ Referentin Presse und Öffentlichkeitsarbeit, Museum Barberini
Press and Public Relations Officer, Museum Barberini

STEFAL SCHOLZE IT-Projektmanager · Museen der Hasso Plattner Foundation gGmbH
IT Project Manager, Museums of the Hasso Plattner Foundation gGmbH

Music Walks is a unique museum experience that enhances the masterpieces of the Hasso Plattner Collection in the Museum Barberini, Potsdam, with an innovative musical layer, developed by composer and DJ Henrik Schwarz with the Museum Barberini, programmed by Micro Movie, and supported by the AI experts of the Hasso Plattner Institute (HPI, University of Potsdam). Music Walks, available from February 2025 on the Barberini App, offers an extraordinary auditory experience in the museum, with individualized soundtracks that enhance the encounter with visual art.

Modern compositions inspired by the style of the Impressionists form the basis for Music Walks. In collaboration with composer and arranger Zacharias Falkenberg, Henrik Schwarz has composed pieces for all the rooms of the collection. He took inspiration from a collaborative composing process with several AI applications, developing and modifying the resulting initial ideas further in the studio. As guests move through the Collection rooms of the Museum Barberini with their own smartphones, the app generates an individualized soundtrack for each visit by adapting the music to the guests movements, taking into consideration the duration of their stay, their changes in direction, and their speed while walking through the Collection rooms. The result is the ongoing creation of new compositions in real time. The project was preceded by a research semester with masters' students at the Hasso Plattner Institute, University of Potsdam, supervised by Prof. Felix Naumann and Prof. Ralf Krestel.

IMPULSE TALKS

Quantifying Energy Savings through IoT-Based Management in Historic University Buildings



Hosted by
PROF. SONJA MEYER

German University of Digital Science, Chair for Algorithmic Foundations of Digital Business Processes

Authors: Doris Bohnet, Patrick Deckert, Fabian Fritzen, Nico Kriessler, Sonja Meyer, Miles Müller, Marco Traber* *Hochschule Konstanz

Many public university buildings in Europe have stood for centuries and hold significant historical and cultural importance. While sometimes even their architectural beauty is undeniable, maintaining these old public spaces energyefficient has become challenging. Integrating modern IoT technologies, such as smart thermostats, to permanently installed central heating system radiators offers a practicable solution to optimize energy use while preserving the cultural integrity of these spaces.

Our study investigates the energy-saving potential of smart thermostats in older university buildings, using a seminar room at Konstanz University of Applied Sciences as a case study. Simulations and real-world data were used to evaluate various control scenarios, including automatic window state detection, occupancy-based heating regulation, and weather-responsive heating. The results show that increased energy savings of up to 16% can be gained through intelligent windows and occupancy detectors without sacrificing user comfort. The results exemplify the chance of applying Internet-connected solutions to reduce the energy demand of historically meaningful facilities without establishing a comprehensive digital infrastructure or extensive refurbishment of the building walls, often subject to heritage protection.

This analysis handles typical challenges of cultural buildings and demonstrates how non-permanently installed IoT technologies can play a crucial role in reducing public buildings' carbon footprint. Thus, our work contributes to the discourse on how flexible, battery-based IoT solutions can significantly improve the energy consumption of older buildings within clear boundaries while ensuring that essential structures remain untouched and protect their appearance in the long term.

Digital Metrical Poetry with Machines

Dr. SREE GANESH THOTTEMPUDI SRH University

The rise of computerization has revolutionized the literature and publishing industries, yet there remains significant untapped potential in the development of linguistic tools, particularly for Indian languages. This paper explores an innovative approach to bridging this gap by focusing on tools that enhance the creation, analysis, and appreciation of metrical poetry in Telugu literature.

“Chandassu,” the metrical poetry framework in Telugu, is deeply rooted in tradition and requires advanced expertise in language and a precise application of complex computational rules. Our research presents the design and implementation of machine-based tools for verifying and identifying Chandassu patterns, streamlining what has traditionally been a labor-intensive process. We discuss the technical challenges faced during development, the limitations of current methodologies, and the immense potential for integrating such tools with broader linguistic frameworks and applications across diverse languages.

To ground our findings in real-world contexts, we present case studies that showcase the promising potential of these tools for a poet striving for precision, a publisher optimizing editorial workflows, and a researcher delving into the nuances of Telugu linguistics. Through this exploration, we aim to demonstrate how digital tools can not only preserve but also enrich the heritage of metrical poetry, making it more accessible to contemporary audiences while fostering innovation in literary practices.

Digital Innovation, Risk Perception and Culture: Avoiding Polarisation and Controversy about Digital Innovation



PROF. STEVEN NEY

German University of Digital Science, Design Thinking;
Formerly Jacobs University, Chair for Policy Science and Social Entrepreneurship

Digital innovation – for a long time seen as an undisputed boon – is increasingly subject to socio-political contention and controversy. Rather than the level-headed discussion we would need, public debate is in jeopardy of polarising and deteriorating into what the scholars have called an “intractable policy controversy” (Rein and Schön, 1994). In these types of public debates, societal learning – vital for coping with the complexities, uncertainties and ambiguities of digital innovation – is very difficult.

At the heart of this emergent controversy are contradictory risk perceptions about digital innovation. Much like biotechnology or nuclear energy, competing social groups perceive risks of digital innovation in fundamentally conflicting ways.

The paper argues that making sense of these contending, conflicting and potentially polarising risk perception requires taking a systematic look at how culture – specifically organisational cultures – mediates and construct contending risk perceptions about digital innovation (Douglas, 1996; Thompson et al., 1990). By applying the Mary Douglas’ typology of organisational cultures to the ongoing public debate about digital innovation, the paper explores how competition between contending cultural risk perceptions creates the discursive space in which this public debate takes place. The paper also discusses how that space enables and constrains societal learning and the generation of constructive policy responses. Based on a discourse analysis of policy and policy-relevant literature on digital innovation, the paper will show how the internal dynamics of policy contention can lead to polarisation and intractable policy controversy. Last, the paper will discuss strategies for avoiding polarisation and promoting policy-oriented learning across contending discursive eco-systems. In particular, the paper will look at the potential of approaches such as design thinking – which forges effective solutions to wicked problems from within diverse teams – to enable policy-oriented learning across cultural and political divides.

SESSION ABSTRACTS

Addressing Archival Silence with Digital Exhibits: The Story of Chinese Communities in Park County, Colorado

By Krystyna Matusiak, A. R. Flynn, and Ruohua Han

Archival silences refer to deliberate erasures or unintentional omissions in archival collections. Archival silences particularly affect marginalized groups, whose voices are missing or underrepresented (Moss & Thomas, 2021). Digital technologies can amplify the gaps in archival records or provide new avenues for addressing them. Digital exhibits offer the potential to tell stories about marginalized populations or present other social justice themes (Choi & Hastings, 2023). This presentation discusses the role of digital exhibits in uncovering and addressing archival silences and presents the case of constructing an exhibit about the Chinese communities in Park County, Colorado. The exhibit, *Chinese Immigrants in Park County*, was built as part of the *Park County Local History Digital Archive*. Chinese immigrant communities lived in Park County at the end of the 19th century and into the early 20th century, contributing to the development of the region through their work in agriculture, mining, and railroad construction. The Park County Local History Archive has extensive photographic and manuscript collections but contains only a handful of documents representing the Chinese residents. Community members who participated in the study evaluating the Digital Archive commented on the lack of records about the Chinese communities and other minority groups (Matusiak, 2022). In response, the project team conducted extensive research about the experiences of the Chinese communities in Park County and created the digital exhibit. They implemented several strategies to address the absence of records in the physical archive. External sources such as digitized newspapers, photographs, and maps were incorporated into the exhibit. The authors also created a new visual record by photographing the traces of the Chinese communities in the area, including the remains of settlements, abandoned buildings, and grave markers. This case illustrates the ways that digital exhibits can provide opportunities for acknowledging and addressing absences, extending coverage, and documenting almost forgotten stories.

References

- Choi, Y., & Hastings, E. B. (2023). Digital exhibits for justice: Analyzing public library digital exhibits with diversity and social justice themes. *Public Library Quarterly*, 42(6), 622-649. <https://doi.org/10.1080/01616846.2022.2153530>
- Matusiak, K.K. (2022). Evaluating a digital community archive from the user perspective: The case of formative multifaceted evaluation. *Library & Information Science Research* 44 (3). <https://doi.org/10.1016/j.lisr.2022.101159>
- Moss, M., & Thomas, D. (2021). Theorising the silences. In M. Moos & D. Thomas (Eds.), *Archival silences: Missing, lost and uncreated archives* (pp. 10-25). Routledge.

Street Vendors in India: The Custodians of Indian Culture and Tradition

By J.D. Prabhakar

Street vendors in India often serve as the beating heart of urban economies, providing essential goods and services that foster local entrepreneurship. Their work is far more than a mere transaction; it functions as a vital mechanism for stimulating local markets and significantly augmenting the national GDP. Hailing from diverse backgrounds, these vendors exemplify remarkable resilience and dedication, adeptly navigating the intricacies of market demands in bustling metropolitan spaces. Their activities not only bolster the economy but also celebrate India's rich cultural heritage through an array of handicrafts, culinary delights, and traditional wears. Each item sold encapsulates stories and traditions that reflect the diverse tapestry of the nation, making street vending an integral part of urban identity.

The evolution of street vending in India has experienced a remarkable transformation, especially with the advent of technology. Over the past decade, there has been a notable shift in how hawkers conduct their business, particularly in the realms of promotion and customer engagement. Many have integrated vocal advertising techniques in local dialects, showcasing a blend of tradition and modernity. This practice is especially prominent in regions like Andhra Pradesh, and Telangana where the Telugu language plays a significant role in local commerce. The integration of culturally relevant expressions into the digital landscape has not only reshaped sales interactions but also revitalized the marketplace by creating a sense of familiarity and connectivity between vendors and consumers.

This research paper examines the impact of speech digitization on street vendors in Vijayawada, Andhra Pradesh, highlighting how 100 Street Wonders have embraced technology to enhance their marketing and transactions. This paper also identifies and analyzes the various dynamics of digitisation by street vendors in Vijayawada. The data drawn from 100 respondents has been digitized. This initiative serves as a testament to the innovative application of speech digitization by street vendors. The results of this paper show that the vendors have enhanced not just consumer engagement but also refined their business operations as the use of digital platforms and voice-based marketing, street vendors can reach a wider audience while maintaining their cultural resonance. The adoption of such technology allows for real-time feedback and customer interaction, ensuring that vendors can adapt their offerings to meet changing demands seamlessly.

Moreover, embracing digitization has empowered these vendors to thrive rather than merely survive. It propels them into a modern economic landscape that acknowledges their contribution while providing them with the tools to enhance their operational efficiencies. This technological embrace not only aids individual vendors but collectively redefines the street vending ecosystem, contributing to a more vibrant and dynamic urban economy.

References

Mathews, F. and Bhosale, A., 2021, September. Understanding the factors influencing street vendors towards use of digital payment systems in India. In *2021 9th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions)(ICRITO)* (pp. 1-7). IEEE.

Singh, S., Alok, S. and Banerjee, S., 2023. Qualitative Exploration of Enabler, Purpose, and Benefits of Digitalisation in the Informal Sector: Understanding the Role of Bricolage Among Women Entrepreneurs. *SEDME (Small Enterprises Development, Management & Extension Journal)*, 50(3), pp.211-226.

Digital Animosity and Cultural Erosion: Understanding the Roots of Brahmin Community Hatred on Social Media

By Ramakrishna Bhat

In the digital age, social media plays a critical role in shaping public opinion and influencing cultural dynamics. By early 2024, India, with 751.5 million internet users and 462 million social media users, reflects diverse communities and cultural practices. While platforms like Facebook and Twitter facilitate open spaces for easy and effective communication, they also contribute to the spread of misinformation, ridicule, and hate. In a society like India, where numerous traditions and rituals form the bedrock of its cultural fabric, social media has the potential to either preserve and enrich these practices or distort them, fostering negative portrayals and a sense of cultural inferiority.

This paper examines the growing trend of hostility and mockery targeting Brahmins and their community practices on social media. By exploring the root causes of this phenomenon, it seeks to understand how digital platforms can become breeding grounds for inter-community animosity. The resulting demotivation among practitioners threatens the survival and transmission of cultural knowledge and undermines the spirit of coexistence and religious freedom guaranteed by the Indian Constitution.

The origins of this hostility toward the Brahmin community are not rooted in individual social media users or platforms, but in European cultural experience of priestly class that have shaped social scientific research, influencing how the Brahmin community is perceived. This historical image, accepted as scientific truth, has influenced public consciousness, including that of social media users. Despite counterarguments, Brahmin hatred persists, highlighting two key issues: the lack of meaningful dialogue on social media and the questionable role of reasoning among its users. Without addressing these deeper causes of digital animosity, efforts to regulate hate speech or develop filtering technologies will be insufficient. This study paves the way for future research on how social media can overcome entrenched stereotypes, preserving cultural practices while promoting coexistence.

References

Balagangadhara, S. N., Roover, J. de, & Rao, S. (2022). *Cultures differ differently: Selected essays of S.N. Balagangadhara* (First South Asia edition). Routledge, Taylor & Francis Group.

De Roover, J. (2008). The Indian Jews. *Outlookindia.com*. <http://hdl.handle.net/1854/LU-426582>

Gelders, R., & Derde, W. (2003). Mantras of Anti-Brahmanism: Colonial Experience of Indian Intellectuals. *Economic and Political Weekly*, 38(43), 4611–4617.

Info-notation - Music Notation's Infographic Future

By Benjamin K. Bacon

Music notation is undergoing a period of significant divergence and experimentation. This paper explores the role of information graphics in the development of future notation systems. Traditional music notation has dominated cultural practice for the past century, with roots extending over 300 years of gradual evolution. The standardization of musical instruments in 19th-century Western Europe reinforced the relevance of the pitch and duration paradigm, which lies at the core of traditional staff notation. In this system, each note head on the staff represents a fixed relationship between pitch and duration, assuming the well known behavior of acoustic instruments. However, the rise of electronic sound-producing technologies, accelerated by digital technology, has disrupted past assumptions. Traditional staff notation is ultimately designed for acoustic instruments, whereby the physical characteristics of sound production, such as a clarinet's timbre, are well understood by composers. In contrast, modern digital signal processing and synthesis techniques allow any instrument to produce virtually any sound. A digital instrument can, with the press of a button, transform from projecting the sound of a piano to mimicking the human voice, or something in between. These new capabilities have become deeply integrated into contemporary music composition, yet composers are grappling with how to visually represent these new sonic possibilities. Traditional notation is not able to capture the complexity of contemporary digital sounds, which clearly surpass its representational limits. This paper argues that information graphics provide multiple pathways for future notation development. Drawing from fields such as cartography and user-interface design, information graphics can offer new forms of documentation. Ultimately, the future of music notation may lie in the integration of information graphics and human-computer interaction (HCI), blending digital information display techniques with human creativity to create innovative and effective musical notations.

References

Magnusson, T., 2019. *Sonic Writing: Technologies of Material, Symbolic, and Signal Inscriptions*. New York: Bloomsbury Academic.

Tufte, E.R., 1990. *Envisioning Information*. Cheshire, CT: Graphics Press.

Wishart, T., 1996. *On Sonic Art*. Amsterdam: Harwood Academic Publishers.

Digital Age Challenges: Psychoanalysis and the Misrepresentation of Indian Cultural Heritage

By Priya Nair

The rise of digital platforms has transformed global cultural engagement, providing easy access to information about various traditions. However, concerns about the authenticity and accuracy of this content are increasing. AI technologies often perpetuate biases, stereotypes, and distortions of societies. These platforms frequently misrepresent gurus, deities, rituals, and other aspects of Indian traditions, making it harder for people, both in India and abroad, to understand them properly. Instead of fostering cultural appreciation, such depictions deepen misunderstandings and widen cultural divides.

Indian culture transmits its knowledge and heritage across generations through rituals, practices, and performances upheld with fundamental commitment to their lived realities.

However, vulgar and inappropriate depictions of devatas like Shiva, Ganesha, and Kali are increasingly common on digital platforms. For example, the Shivalinga is equated with a *phallus*, Ganesha is labelled a *eunuch*, Kali as a *prostitute*, Shiva as a *notorious womanizer*, Aghoris as *drug addicts* and *cannibals*, Sri Ramakrishna Paramahansa as *homosexual*, etc. These misrepresentations, often spread as memes or dark humour, trivialize and disrespect Indian culture, undermining its significance.

The distorted images of India stem from various sources, primarily rooted in the European way of experiencing Indian culture. Modern psychoanalysis has further reinforced these pre-existing misconceptions about Indian traditions, rituals, and culture. Scholars like Wendy Doniger, Paul B. Courtright, Jeffrey Kripal, David Gordon White, etc., have employed these psychoanalytical frameworks in the study of Indian gurus and devatas, that consequently distorts the Indian cultural heritage. This raises critical questions: Can digital platforms be reimagined to eliminate ideological biases and cultural asymmetries, creating spaces that reflect the experiences of individuals? How can we foster representations of Indian culture that honor its depth and complexity while embracing the advantages of the digital age? Addressing these questions is essential for preserving Indian cultural heritage in an increasingly digital world.

References

Balagangadhara, S. N. (2012). Chapter- 5 Indian and her Traditions: An Open Letter to Jeffrey Kripal. In *Reconceptualizing India studies*. Oxford University Press.

Courtright, P. B. (1985). *Ganésa. Lord of obstacles, lord of beginnings*. Oxford Univ. Press.

Kripal, J. J. (1998). *Kali's child: The mystical and the erotic in the life and teachings of Ramakrishna* (2nd ed). The University of Chicago Press.

Men's Descriptions are Shorter than Women's: Prompt Analysis of Gender Portrayals in Stable Diffusion

By Yan Asadchy

Generative AI for image creation is becoming a staple in the toolkit of digital artists, visual designers, and the general public who want to be represented through gen AI. Social media users have many tools to shape their visual representation: image editing tools, filters, face masks, face swaps, avatars, and AI-generated images. The importance of the right profile image can not be understated: it is crucial for creating the right first impression, sustains trust, and enables communication. Correct representation of individuals, groups of people, and collectives helps to foster inclusivity, understanding, and respect in society, ensuring that diverse perspectives are acknowledged and valued. While previous research revealed the biases in large image datasets such as ImageNet and inherited biases in the AI systems trained on it, in this work, we look at the biases and stereotypes as they emerge from textual prompts used for generating images on Discord with StableDiffusion model. We analyze over 2.5 million prompts depicting men and women and use statistical methods to uncover how prompts describing men and women are constructed and what words constitute the portrayals of respective genders. Our findings suggest uniform practice of prompting regarding word length; however, the optimal men's descriptions are shorter than those of women. When it comes to the word and topic analysis, our findings suggest the existence of classic stereotypes in which men are described using dominant qualities

such as "*strong*" and "*rugged*". In contrast, women are represented with concepts related to body and submission: "*beautiful*", "*pretty*", etc. These results highlight the importance of considering the original intent of the prompting and suggest that cultural practices on platforms such as Discord should be considered when designing the interfaces for AI image generation, as well as in general discussions of biases of representation in AI models.

References

Jääskeläinen, P., & Åsberg, C. (2024, May). What's the Look of "Negative Gender" and "Max Ethnicity" in AI-Generated Images? A Critical Visual Analysis of the Intersectional Politics of Portrayal. In *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems* (pp. 1-9).

Sham, A. H., Aktas, K., Rizhinashvili, D., Kuklianov, D., Alisanoglu, F., Ofodile, I., ... & Anbarjafari, G. (2023). Ethical AI in facial expression analysis: racial bias. *Signal, Image and Video Processing*, 17(2), 399-406.

Torricelli, M., Martino, M., Baronchelli, A., & Aiello, L. M. (2024, May). The role of interface design on prompt-mediated creativity in Generative AI. In *Proceedings of the 16th ACM Web Science Conference* (pp. 235-240).

Exploration of the Function of *Ita Igala* Contest on Social Media in Renewing Interest in Igala Language Amongst Young Igalas in Nigeria

By Damian Amana

The Igalas in Nigeria form the dominant tribal group in Kogi State, Nigeria with a population of about three million. The Igalas are ruled by a traditional ruler, the Attah of Igala. The Igala elite and literati of the 1970s to the 2001 demonstrated a preference for the English language and ensured that their children do not speak the vernacular language in the bid to encourage their children to learn the 'white man's language, thanks to the Canadian Missionaries who brought education to the area and the effect of the policies of the colonial Masters, notably Lord Fredrick Lugard. In schools in Igala land from the 1970s to the 1990s, any student who spoke the vernacular Igala was shamed by wearing a depreciative placard with word such as, 'I am the most stupid student of the week.' This treatment had some impact, Igalas were beginning to lose interest in their mother tongue and to gradually forget many words. However, in recent times, in collaboration with the Attah Igala- the tribal chief, the Ukomu Igala (Igala Voice Group) and the interest of a Catholic Priest now popularly known as Igala Fada-a local social influencer, the creation of Ita Igala (Igala Proverbs) contest on the social media has to a large extent reversed the trend, leading to the creation of Igala cultural festival. This paper therefore seeks to investigate the role of this online tribal proverb contest in the renewal of interest in the language. The study adopts a combination of ethnographic methodologies, depth interviews and content analysis to explore the dynamics of the functionality of the Ita Igala contest with the aim to model such a pattern for generating interest in local languages.

Nuk (누크) XR: A Framework for Exploring Korean Collective Unconsciousness and Cultural Narratives through Sound

By Hyunkyung Shin

This paper introduces a novel framework to explore the cultural collective unconsciousness through sound within extended reality (XR) environments, specifically focusing on Korean cultural contexts. As digital platforms increasingly mediate cultural expressions and experiences, XR technologies offer a unique opportunity to immerse users in multisensory environments where sound plays a crucial role in evoking collective memory and shaping cultural narratives. Centered on Korean auditory cultural elements, this framework leverages XR's spatial and auditory capabilities to reconstruct archetypal and culturally resonant soundscapes, facilitating access to the collective unconscious as theorized by Carl Jung. Here, sound serves not merely as ambient noise but as an active agent that constructs cultural narratives and interacts with users' cognitive and emotional states to evoke shared, intergenerational elements of Korean cultural identity.

Key components of this framework include the design of Korea-specific soundscapes, the integration of adaptive sound synthesis techniques, and the use of spatial audio to enhance immersion. Korean-specific soundscapes are developed through ethnographic research and sound analysis, focusing on auditory elements central to Korean culture, such as traditional instruments (e.g., gayageum, janggu) and nature sounds (e.g., mountain streams, temple bells) that carry significant cultural meaning. Adaptive sound design, responsive to real-time user interactions and environmental changes within the XR space, personalizes the experience to deepen engagement with Korean cultural symbols. Spatial audio technology positions sounds within a three-dimensional field, simulating real-world acoustic dynamics and enhancing sensory immersion.

This framework not only provides insights into the Korean collective unconscious but also demonstrates how XR-enabled soundscapes can shape and communicate cultural narratives, allowing individuals to connect with ancestral memories and shared identity constructs. This study has implications for cultural studies, psychology, and XR design, offering new pathways to bridge personal and communal narratives through virtualized, multisensory engagement specific to Korean heritage, thus fostering cultural empathy and understanding in an immersive storytelling context.

References

- Jung, C. G. (1936). The concept of the collective unconscious. *Collected works*, 9(1), 42.
- Ferreira, C. R. D. (2021). *Creating Immersive Audio in a Historical Soundscape Context* (Universidade NOVA de Lisboa (Portugal)).
- Kelly, C. (2023, September). A Study on Sound and Sound Design for Accessibility in Cultural Heritage Contexts in Ireland. In *2023 Immersive and 3D Audio: from Architecture to Automotive (I3DA)* (pp. 1-9). IEEE.

Decolonizing AI: Preserving Cultural Narratives in the Digital Age

By Nawaar Muzzammil

This paper critically examines the integration of artificial intelligence (AI) within cultural sectors in the Global South, with particular focus on the ethical, social, and cultural impli-

cations. As AI-driven technologies increasingly influence cultural preservation, digital archiving, and storytelling, the risk of reinforcing existing power imbalances grows. AI systems can replicate biases in data, which threatens to marginalize underrepresented cultural narratives. This issue is especially pressing in regions with rich and diverse historical contexts where the digital representation of cultural identities must be handled with sensitivity and care.

Focusing on the conference theme of digital tools and methods in cultural sectors, this paper explores how AI technologies intersect with existing social structures and cultural institutions in the Global South. It highlights the potential for AI to both disrupt traditional modes of cultural engagement and to offer new avenues for cultural expression and preservation. By analyzing specific examples from digital storytelling and archiving efforts, the paper underscores the need for AI to be adapted to local contexts, fostering inclusivity and cultural integrity.

The central argument emphasizes that while AI offers promising tools for enhancing digital cultural methods, its role should be carefully considered to avoid erasing or distorting the identities and histories of marginalized groups. The paper advocates for a more socially conscious and decolonial approach to AI development in cultural contexts, ensuring that these technologies empower communities rather than perpetuate existing inequalities. In doing so, it calls for AI practices that are mindful of ethical considerations and rooted in a deep respect for the cultural complexities of the Global South.

This contribution seeks to advance the conversation on how AI can be responsibly integrated into cultural sectors, advocating for methods that prioritize equity, diversity, and cultural preservation.

Tracing Women's Presence in Their Absence: Culpability of Archiving Partition Narratives at the World's First Partition Museum

By Ruchi Sharma

In India, current digital humanities conversation centers on collecting narratives in memory archives, access, and digital technologies. The present era has witnessed archiving expand a range of methods and technologies to preserve history at the world's first Partition Museum at Town Hall Amritsar. The museum has become a significant repository of the stories and history of partition since it was inaugurated on 25 August 2017. This research proposes that the representation of women in history at the museum, however, reflects that narratives of women have been under-represented. The study shall explore the intricate relationship between represented perceptions of partition narratives by the elites and tension between curators and the interactive ideologies of gendered viewership when it comes to preserving history.

Viewing the Partition Museum in the context of when and where it was established informs us of gender prejudice where men have always established their superiority in the narratives written to preserve the nation's history. This study shall attempt to break the mould by offering an insight into how curation at the museum unquestioningly fixes biased views for the visitors. Both at the conscious and unconscious levels we shall examine the writings, oral histories, paintings, and artifacts at the museum that do not have enough representation of women during the time. It is not only the words (both spoken and written) that reflect this bias but can also be seen in pictorial presentation as well. Much of the material displayed includes photographs. This effectively reflects how visual images portray a gendered bias by eliminating photographs with women's presence and by excluding their

voices. Since this museum is an interactive medium of imagined experience this professional initiative of addressing archival silences, biases, and gaps in the partition museum is directed at bringing equal representation to understanding partition from the glimpses the museum allows—through gendered eyes. The study further envisions new and creative ways of scholarly engagement with history by further exploring the museum as a text of digital humanities.

References

Giannini, Tula, editor. *Museums and Digital Culture: New Perspectives and Research*. Springer, 2019.

Losh, Elizabeth, and Jacqueline Wernimont, editors. *Bodies of Information: Intersectional Feminism and the Digital Humanities*. U of Minnesota P, 2019.

Partition Museum. *Partition Museum*. <https://www.partitionmuseum.org/>. Accessed 15 Oct. 2024.

Cultural Shifts in Music: Examining the Impact of AI on Semi-Professional Bands

By Alexander Pfeiffer, and Nanditha Kirshna

This paper explores the role of artificial intelligence (AI) in music reconstruction and preservation, focusing on case studies with Vienna-based bands Schattenparker aus Wien and The Banana Trees. We utilized AI for tasks ranging from remastering and virtual instrumentation to creating new lyrics and musical elements in recordings from 1995 to 2007. When AI significantly altered original works, or when we used virtual vocals over our reconstructed original recordings, we credited the fictitious AI artist Aria Turing as co-producer or singer to address (authorship) issues. Our results are comparable to notable AI-assisted music projects like the 2024 re-release of Queen's debut album "Queen I," restored with modern AI technologies to align with the band's original vision, albeit on a smaller budget.

Musicians like Taryn Southern have embraced AI, using it to compose entire albums, exemplifying AI's expanding role in creative music processes. The historical debate between new and old media often centers on accessibility and convenience over quality, shifting from concerns about AI replicating artists like Drake to its efficiency and scalability in creative roles (Levine, 2023).

Looking forward, the future of music technology explores AI's impact on creativity and distribution. Concerns about AI replacing artists persist, yet its potential in mastering and distribution is increasingly acknowledged (Bonini & Magaudda, 2024). There are also fears about the production of "homogenized mush." Like all generative AI, issues range from bias to the origin of training data.

We initiated a focus group of musicians, AI experts, ethicists, and fans to develop an ethical "traffic light" guidance system for AI music production. This system aims to provide nuanced oversight in a field evolving similarly to synthesizer music—from its 1950s experimental beginnings to its 1980s mainstream adoption—highlighting how AI is reshaping creative processes and cultural perceptions in the music industry, for better or worse.

References

- Bonini, T., & Magaudda, P. (2024). Artificial Intelligence: Where the Music of the Future Is Heading. In T. Bonini & P. Magaudda (Eds.), *Platformed! How Streaming, Algorithms and Artificial Intelligence are Shaping Music Cultures* (pp. 121–148). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-43965-0_6
- Levine, R. (2023, April 26). The Real Problem With Fake Drake. *Billboard*. <https://www.billboard.com/pro/fake-drake-song-generative-ai-music-debate-problems/>
- Plaugic, L. (2017, August 27). *Musician Taryn Southern on composing her new album entirely with AI*. The Verge. <https://www.theverge.com/2017/8/27/16197196/taryn-southern-album-artificial-intelligence-interview>

Neural Networks as Catalysts for New Musical Cultures: A Study on Instrument Design

By Leonardo Auri

Digital developments, particularly artificial neural networks, are most commonly known today for their practical applications in areas like language processing, targeted advertising, and data analysis. However, their influence extends far beyond these fields, reshaping artistic expression in ways that are less prominently considered. One such field is music, where AI is not only transforming how sound is generated and manipulated, but also redefining the tools musicians use, offering new avenues for creativity and cultural innovation.

For millennia, musical sound was tied to the physical characteristics of instruments, their shapes defining the sounds they produced. In the 20th century, synthesisers began to decouple sound from physical form, allowing sound design and instrument shape to evolve independently, though sounds were still largely pre-determined before release.

Today, artificial neural networks are propelling this evolution even further, enabling dynamic sound creation where instruments can be continuously shaped through real-time interaction with machine learning models. By integrating neural networks into instrument design, this study explores how these technologies open up new possibilities for musical expression and artistic culture. A prototype neural network-based instrument was tested by musicians in a user experience study, revealing how AI can redefine the relationship between sound generation, interaction, and mapping.

Participant feedback uncovered guiding principles related to methodology, conceptualisation, and cultural relevance, highlighting the potential for AI to reshape performance practices. These insights demonstrate the transformative role of AI in driving innovation within music, fostering collaboration, and expanding the boundaries of artistic expression, thus contributing to the ongoing cultural heritage of music in the digital age.

References

- Bovermann, T., De Campo, A., Egermann, H., Hardjowirogo, S.-I., & Weinzierl, S. (Eds.). (2017). *Musical Instruments in the 21st Century*. Springer Singapore. <https://doi.org/10.1007/978-981-10-2951-6>
- Bryan-Kinns, N., Wang, W., & Wu, Y. (2018, July). *Thematic Analysis for Sonic Interaction Design*. Proceedings of the 32nd International BCS Human Computer Interaction Conference. <https://doi.org/10.14236/ewic/HCI2018.214>

Caillon, A., & Esling, P. (2021). *RAVE: A variational autoencoder for fast and high-quality neural audio synthesis* (No. arXiv:2111.05011). arXiv. <https://doi.org/10.48550/arXiv.2111.05011>

Jordà, S. (2004). Instruments and Players: Some Thoughts on Digital Lutherie. *Journal of New Music Research*, 33(3), 321–341. <https://doi.org/10.1080/0929821042000317886>

Jourdan, T., & Caramiaux, B. (2023). *Machine Learning for Musical Expression: A Systematic Literature Review*. <https://doi.org/10.5281/ZENODO.11189198>

Unveiling the Silenced: Digitally Archiving the Legacy of Rebel Poet Kazi Nazrul Islam

By Santanu Banerjee, and Rajarshi Das

This paper examines the archival silences and biases surrounding the legacy of Bengali poet and musician Kazi Nazrul Islam, utilising the British Library's EAP-1612 digitisation project of Nazrul's exercise books as a case study. Nazrul, a revolutionary poet and musician whose contributions to Bengali literature and music remain profound, faced systemic marginalisation due to religious and political biases of his time. This marginalisation, alongside colonial influences, resulted in significant gaps in the documentation and recognition of his work.

While conventional archiving often presents materials as neutral evidence, this project, through its focus on digital materiality and exhaustive metadata, reveals the complex socio-political and industrial contexts that shaped Nazrul's work and uncovers the missing voices of those who contributed to his artistic production.

The analysis of watermarked paper, locally produced ink, and even the types of pens used reveals the paradoxical nature of the Swadeshi (anti-colonial self-reliance) movement and the constraints faced by nationalist artists within colonial structures. Furthermore, the project highlights the contributions of musicians, sound engineers, and recordists, whose labour facilitated Nazrul's reach but remained largely unacknowledged in historical narratives. By attending to the materiality of the archive, this project reveals how seemingly insignificant details can challenge dominant narratives, illuminate the influence of market forces on artistic output, and provide a more inclusive and nuanced understanding of cultural production in colonial and postcolonial Bengal. In addressing these archival silences, this study suggests inclusive metadata practices, as demonstrated by the project, which seek to correct errors and provide a more nuanced understanding of Nazrul's creative process. By critically analysing these gaps, the paper outlines strategies for inclusivity in cultural heritage collections, contributing to a broader, more equitable narrative.

References

Benjamin, Walter. 'Work of Art in the Age of Mechanical Reproduction.' *Illuminations: Essays and Reflections*, edited by Hannah Arendt, translated by Harry

Zohn, New York: Schocken Books, 1968.

Chatterjee, P. (1986). *Nationalist Thought in the Colonial World: A Derivative Discourse*. Zed Books Ltd.

Murshed, G. "বিদ্রোহী রণক্লান্ত নজরুল-জীবনী"

Redefining Traditional Architectural Heritage: Case Study of the Mousgoum Obus Hut in Far-North Cameroon

By Donatien Koulla Moulla, Hamana Soumai Olivier, David Attipoe, Sree Ganesh Thottempudi, Ernest Mnkandla, and Alain Abran

The obus hut is a unique architectural structure developed by the Mousgoum people of Cameroon, representing an important part of cultural heritage through advanced vernacular engineering. These cylindrical, earthen structures reflect both an adaptive climatic response and a distinctive aesthetic tradition unique to this ethnic group. This study aims to explore the cultural and technical significance of the obus hut, employing digital analysis to provide a modern perspective on its preservation and potential relevance to contemporary sustainability contexts. Utilizing advanced technologies such as laser scanning, 3D modeling, and climate simulation, this research documents and analyzes the obus huts in a digital format. These methods enable virtual preservation, offering a model for investigating the interplay between traditional architecture and modern climate challenges. Through this digital approach, the study documents the obus hut's design and climatic adaptability, establishing a dialogue between tradition and modernity. The findings underscore the hut's potential to inspire modern sustainable architectural practices, highlighting its value as a source of cultural knowledge and technical insight. By integrating digital technologies into the study of traditional structures, this research contributes to the preservation of the Mousgoum heritage and fosters public awareness of African craftsmanship. The obus hut serves as a model for how indigenous architectural knowledge can inform sustainable design solutions in the face of contemporary climate challenges.

How Technologies Convey Intangible Values in Calabrian Corporate Museums

By Arrigo Bertacchini, Federico De Francesca, and Pietro Pantano

In an era where tangible resources often dominate, the value of intangible assets—such as traditions, stories, and cultural values—remains profound. Intangible heritage (Lenzerini, 2011) captures the essence of communities, shaping their identity and continuity. As custodians of the past of company histories and traditions, corporate museums have the potential to transform into dynamic engines of cultural resilience and growth. A successful company often becomes a symbol of a small territory, driving not only economic progress but also cultural and social evolution. As the company grows, it can shape the development of local infrastructure, educational opportunities, and cultural initiatives. This close synergy between the business and its territory fosters a mutual evolution of the unique characteristics of the territory that contribute to the company's identity and values. This study explores the potential of five corporate museums in the Calabria region as innovative informal learning spaces. As part of the "Stormed" project (Inest, 2024), funded by the Piano Nazionale di Ripresa e Resilienza (PNRR), these corporate museums are set to become hubs for preserving heritage, culture, and stories. By integrating advanced technologies such as avatars, VR/AR, and interactive displays, they will create engaging experiences that connect visitors with local traditions and the companies behind them. This paper examines how these corporate museums transform their exhibitions, adding value to their narratives through technologies that not only foster empathy with visitors, but also cultivate a deep connection with the local territory and its history. Their approach seeks to blend innovative storytelling techniques with the needs of stakeholders, creating "territorial empathy" through corporate museums, where the design process embraces both emotional and historical ties to the land. This fosters a deeper understanding of the relationship between people and their environment in the digital and technological age (Nazir, 2024).

References

Lenzerini, Federico. "Intangible cultural heritage: The living culture of peoples." *European Journal of International Law* 22.1 (2011): 101-120.

Consorzio Inest, 2024

Nazir, C., & Lin, M. (2023). Beyond empathy: how curiosity promotes greater care. *Connectivity and creativity in times of conflict, Kristof Vaes and Jouke Verlinden (Eds.)*. Academia Press. <https://doi.org/10.26530/9789401496476-115> Accepted, 11, 37Z.

INTERACTIVE INSTALLATIONS

AI-Driven Innovation in Music and Entertainment: Enhancing Audio-Visual Experiences via Real-Time Image Generation Based on Audio Features and Human Interaction

By Bui Minh Hao Nguyen

The Neural Audio Sculptor (NAS) is an interactive installation that blends deep learning, music analysis, and human-computer interaction to create real-time audio-visual experiences. By processing audio features from music or other sounds, NAS generates corresponding visuals that change dynamically with the audio input.

Using advanced deep learning models like StyleGAN and StreamDiffusion, the system produces synchronized visualizations that respond to the audio in real time. The user interface allows visitors to interact with the system by influencing the visuals, mapping audio features or physical movements to modify the images. This provides an engaging, hands-on experience for users to explore the relationship between sound and vision.

NAS is designed to be accessible and intuitive, making it suitable for various settings such as live performances, installations, and events. It offers a creative space for artists and audiences to experiment with audio-visual creation, demonstrating the potential of AI to enhance creative expression in an interactive environment.

Exploring New Sonic Frontiers: An Interactive Exhibit of Neural Network-Based Musical Instruments

By Leonardo Auri

This interactive exhibit showcases the potential of artificial neural networks as creative tools in music-making, offering participants the chance to engage directly with a prototype instrument that uses artificial neural networks as the sound-generative component. Building on research exploring the intersection of artificial intelligence and music, this installation allows visitors to experience how neural networks redefine the boundaries of musical performance and instrument design.

Participants will be able to explore various iterations of the prototype developed in response to feedback from expert musicians. These instruments enable real-time interaction with trained neural networks, offering novel affordances for sound creation that transcend traditional instrument constraints. The exhibit presents a unique opportunity to experiment with this cutting-edge technology, comparing different neural network architectures and observing how each shapes the sonic and interactive experience.

Alongside the hands-on demonstration, explanatory displays will detail the underlying principles of neural network integration in music. Through a combination of practical engagement and conceptual exploration, the exhibit invites musicians, researchers, and technologists alike to reflect on how artificial intelligence can expand the creative toolkit of musicians and foster new forms of artistic expression.

This exhibit not only demonstrates the technical advancements of neural networks in instrument development but also encourages an open dialogue on the future role of AI in shaping musical culture. Visitors will leave with a deeper understanding of how these emerging technologies are transforming sound production, interaction, and performance practices in the digital age.

References

Bovermann, T., De Campo, A., Egermann, H., Hardjowirogo, S.-I., & Weinzierl, S. (Eds.). (2017). *Musical Instruments in the 21st Century*. Springer Singapore. <https://doi.org/10.1007/978-981-10-2951-6>

Bryan-Kinns, N., Wang, W., & Wu, Y. (2018, July). *Thematic Analysis for Sonic Interaction Design*. Proceedings of the 32nd International BCS Human Computer Interaction Conference. <https://doi.org/10.14236/ewic/HCI2018.214>

Caillon, A., & Esling, P. (2021). *RAVE: A variational autoencoder for fast and high-quality neural audio synthesis* (No. arXiv:2111.05011). arXiv. <https://doi.org/10.48550/arXiv.2111.05011>

Jordà, S. (2004). Instruments and Players: Some Thoughts on Digital Lutherie. *Journal of New Music Research*, 33(3), 321–341. <https://doi.org/10.1080/0929821042000317886>

Jourdan, T., & Caramiaux, B. (2023). *Machine Learning for Musical Expression: A Systematic Literature Review*. <https://doi.org/10.5281/ZENODO.11189198>

VENUE INFORMATION

On-Site Visitors:

Please join us at the **German University of Digital Science** gGmbH
Marlene-Dietrich-Allee 14, 14482 Potsdam, Germany.
For additional directions, please click [HERE](#).

Online Participants:

Login credentials will be sent via email.

Time Zone:

All event times are provided in Central European Time (CET).

Further information is also provided on the [CONFERENCE WEBSITE](#).

For any inquiries, please contact us at: conf-office@german-uds.de.

PARTNER ORGANISATIONS

This event has been realized in partnership with:



Berliner
Wissenschaftliche
Gesellschaft e.V.

