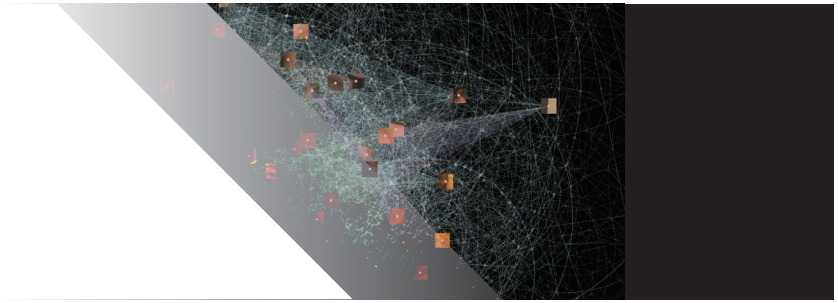
CODE AND MATERIALITY

XX. International Culture and Computer Science Conference
28, 29 September, 2023 - Lisbon, Portugal



THURSDAY, SEPTEMBER 28

08:30 Registration

09:30 **Conference Opening.** António Bandeira Araújo, Lucas Fabian Olivero, Johann Habakuk Israel, Christian Kassung, Jürgen Sieck, Mónica Mendes, António Oriol Trindade

09:45 **Keynote: Art ex machina: revisited.** Penousal Machado, University of Coimbra, Portugal

10:45 Coffee break

S1: ART AND SENSEMAKING THROUGH DIGITAL MEANS — Moderator: Jürgen Sieck

11:00 **Researching the body and movement through artistic performative installations for collaborative digital sensemaking.** Daniela Brill, Claudia Schnugg, Christian Stary, Antoni Rayzhekov

11:25 **EN TRAIN D'OUBLIER. Toward Affective Virtual Environments.** Jorge Forero, Mónica Mendes, Gilberto Bernardes

11:50 **"Entre Caminhos". Understanding local history through digital fragments of feminist narratives.** Isabel Carvalho, Adriana Nascimento

12:15 Lunch

13:45 Walk & Talk

S2: DIGITAL TOOLS FOR CULTURAL HERITAGE PRESERVATION AND LEARNING — Mod.: Johann Habakuk Israel

15:00 **MetaFraming: A Methodology for Democratizing Heritage Interpretation through Wiki Surveys.** Colter Wehmeier, Georgios Artopoulos

15:25 **The Earlier Mona Lisa: creating a tactile physical model for transversal sharing and learning during the exhibition.** Giorgio Verdiani, Alexia Charalambous, Francesco Algostino

15:50 **Unlocking Cultural Heritage: leveraging georeferenced tools and Open Data for enhanced cultural tourism experiences.** Stefano Bertocci, Federico Cioli, Anastasia Cottini

16:15 Coffee break

S3: HUMAN-COMPUTER INTERACTION IN CULTURAL CONTEXT — Moderator: Mónica Mendes

16:30 **Design Challenges and Opportunities of Fossil Preparation Tools and Methods.** Lucas Siqueira Rodrigues, John Nyakatura, Stefan Zachow, Johann Habakuk Israel

16:55 **An Empirical Study to Design Interactions with Historical Buildings Used for Everyday Activities.** Linda Hirsch, Daniel Buschek, Eileen Einwächter, Louisa Bekker, Andreas Butz

17:20 **AKN_Regie: Bridging Digital and Performing Arts.** Georges Gagneré, Anastasiia Ternova

20:00 Dinner at Hotel Mundial (Praça Martim Moniz 2, 1100-341 Lisboa, Portugal)

FRIDAY, SEPTEMBER 29

S4: GENERATIVE ART AND DIGITAL MEDIA INTEGRATION — Moderator: António Bandeira Araújo

09:30 **Generative Ominous Dataset. Testing the Current Public Perception of Generative Art.** Pedro Alves da Veiga

09:55 **ConformiTree: an artistic research on the expansion of photography to the third dimension.** Elke Reinhuber

10:20 **Exploratory multimethod evaluation of experience and behaviour in large public total media situations.** Patrick Tobias Fischer, Anke von der Heide

10:45 Coffee break

S5: DIGITAL TOOLS IN ART ANALYSIS AND CULTURAL HERITAGE — Moderator: Sónia Rafael

11:00 **The importance of software for the stereometric analysis of artworks. A case study with Pieter Saenredam.** António Oriol Trindade

11:25 **Tracking, Visualization, and Interaction for Virtual Reconstruction of Cultural Heritage in Mixed Reality. Comparison of Mixed-Reality and Virtual-Reality Approach.** Sophie Schauer, Jürgen Sieck

11:50 **Dematerializing materials: description of the first stages to digitize a museum exhibition with 3D technologies.** Rui d'Orey, Alexandre Martins, Jorge Carrega, Bruno Silva

12:15 Lunch

13:45 Walk & Talk + Social visit

S6: ART AND TECHNOLOGY INTEGRATION IN CULTURAL HERITAGE PRESERVATION — Mod: Pedro A. da Veiga

15:25 **From overtourism to REC-OVERtourism. A digital experience for sustainable tourism.** Sónia Rafael, Mattia Mertens, Pedro Ângelo, Mónica Mendes

15:50 **Experiencing the Architectural Evolution of a Heritage Museum in Extended Reality Application.** Molood Seifi, Sophie Schauer and Haris Fadzila Abd Rahman

16:15 Coffee break

S7: IMMERSIVE LEARNING AND VIRTUAL EDUCATION ENVIRONMENTS — Moderator: Christian Kassung

16:30 **Design inspiration translated from the "Proud to be Iban" probes.** Gary Loh Chee Wyai, Tariq Zaman, Khairuddin Ab Hamid, Marcathy Anak Gindau

16:55 **The Effect of Culture in Educational Games for School Students.** Mostafa Alaa, Nada Hammouda, Slim Abdennadher

17:20 **Extended Reality Authoring System for Creating Immersive Experiences: A Requirements Analysis.** Christoph Holtmann, Selina Wernike

17:45 **Enhancing the Teaching of Spherical Perspective with LiveSphere.** Lucas Fabian Olivero, António Bandeira Araújo

18:10 Closing of the conference and announcement of the next edition of KUI

Researching the body and movement through artistic performative installations for collaborative digital sensemaking

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ABSTRACT

When tackling digital transformation, Digital Sensemaking, as researched in the DIGI-Sense project, empowers humans to reflect on the meaning from an intertwined cognitive, aesthetic, and body perspective. Sensemaking is fundamental for meaningful (work) experience of individuals and organizations. Digital means can play a central role to give meaning to processes, shared experiences, and to rationalize established routines. As embodiment, materialities, movements, and aesthetics are core to sensemaking, we have designed and explored a corresponding artscience installation. It implements the idea that collective digital drawing is a form of participatory sense-making that emerges from embodied, dynamical and collaborative interactions between co-performers. Performers could exert control over expressing drawings, by coordinating their movements with one another. This functionality is integrated in a setting with increasing task complexity – to further stimulate social collaboration and create rich visual feedback. In this way digital sensemaking could become an essential means for the encounter between two persons to sketch a common ground of their activity spaces.

KEYWORDS: Sensemaking, embodiment, performative installation, art in scientific research, movement, Cyber-Physical Systems

EN TRAIN D'OUBLIER. Toward Affective Virtual Environments

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ABSTRACT

This study explores the development of intelligent affective virtual environments generated by bimodal emotion recognition techniques and multimodal feedback. A semantic and acoustic analysis predicts emotions conveyed by spoken language, fostering an expressive and transparent control structure. Textual contents and emotional predictions are mapped to virtual environments in real locations as audiovisual feedback.

To demonstrate the application of this system, we developed a case study titled *"En train d'oublier"*, focusing on a train cemetery in Uyuni, Bolivia. The train cemetery holds historical significance as a site where abandoned trains symbolize the passage of time and the interaction between human activities and nature's reclamation. The space is transformed into an immersive and emotionally poetic experience through oral language and affective virtual environments that activate memories, as the system utilizes the transcribed text to synthesize images and modifies the musical output based on the predicted emotional states.

The proposed bimodal emotion recognition techniques achieve 94% and 89% accuracy. The audiovisual mapping strategy allows for considering divergence in predictions generating an intended tension between the graphical and the musical representation. Using video and web art techniques, we experimented with the environments generated to create diverse poetic proposals.

KEYWORDS: Affective Computing, Media Arts, Virtual Reality, Speech Emotion, Recognition

"Entre Caminhos". Understanding local history through digital fragments of feminist narratives

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ABSTRACT

This paper presents some of the results of fieldwork conducted during an artistic residency. It discusses the resultant video installation "Entre Caminhos: Escuta-Narrativa, Percursos e Temp(l)os de Memórias Vivas" ("Between Paths: Narrative-Listening, Routes, and Temporal Spaces of Living Memories"). The work explored the living memories of the first women who attended a primary girls' school in early 20th century Mamarrosa, Portugal. Through a detailed oral and gesture collection, the video installation captured testimonies and sounds of women who witnessed the transition and ruptures in education and teaching during that period. The first-person, intersectional narratives unveiled aspects of collective memory, enriching the understanding of intangible cultural heritage. Five main recurring topics were identified from the testimonies of the participants: Walking to School, Autonomy versus Violence in School, Break in the Educational Process, The Weight of the Female Condition and Living Memory. This process highlighted the power of video art in social representation and historic preservation from a female perspective, often underrepresented in

historical narratives. It allows for a broader view of the community's history and a more inclusive and diverse representation of intangible cultural heritage and experimental procedures in image capture and editing. The paper reflects on the impact of women's digital narratives in the production of urban space. It proposes new modes of integrating plural narratives into the registry and collective memory of intangible cultural heritage. This work aims to contribute to the intersection of digital art and studies on intangible cultural heritage.

KEYWORDS: Digital storytelling, Feminine sonorities, Intangible cultural heritage, Video art

MetaFraming: A Methodology for Democratizing Heritage Interpretation through Wiki Surveys

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ABSTRACT

Recent developments in the Digital Humanities reveal how traditional survey methods, when applied to the study of cultural heritage, often struggle to encapsulate the intricate social dynamics of our interactions with built environments and artefacts. Despite the allure of digital tools promising scalability, nonlinearity, and increased engagement, their fit for heritage interpretation remains an open question. To address this gap, we introduce MetaFraming—a contribution to participatory methodology designed to leverage computational social science tools such as artificial intelligence and wiki surveys, towards inclusive and democratic approaches in heritage interpretation.

MetaFraming enables researchers to transform extensive preliminary research notes into a metadata-rich, semantically structured dataset using an AI processing pipeline, thereby modelling diverse perspectives on heritage artefacts. Following manual refinement, this dataset serves as the initial 'seed' state for a wiki survey (a user-editable, collaborative survey). Such a survey enables the crowd to rank propositions, comment, and contribute new ideas. Notably, participant input itself contains metadata, allowing for a subsequent automated pipeline to reconstruct the context of actions such as comments. This secondary process provides rich insights into recommendations, specific user/actor experiences, group interests, and the complex relationships between them.

Through a design-research framework, we apply MetaFraming to a case study in architectural heritage: our artefact of study is Le Corbusier's renowned Unité d'habitation (1952), a seminal prototype for social housing and urbanism in post-war France. This exploration enables us to contrast our novel web-based survey method with traditional approaches, thereby highlighting new opportunities for computer-aided collaboration in heritage interpretation. By fostering reflective exploration of built environments and societal legacies, our work contributes to the growing discourse on digital technologies in cultural heritage, advocating for interdisciplinary research and dialogue.

KEYWORDS: Participatory Heritage, MetaFraming, Wiki Surveys, Modern Architectural Heritage

The Earlier Mona Lisa: creating a tactile physical model for transversal sharing and learning during the exhibition

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ABSTRACT

In 2019 the Architecture Models Laboratory from the DiDALabs System at the Dipartimento di Architettura, University of Florence, was called to realise a tactile model of a very special artwork, the “Early Mona Lisa”, a masterpiece attributed to Leonardo da Vinci, but still at the centre of certain debate between technical investigations and art historians’ evaluations. The occasion was exploited for developing more than a simple touchable reproduction, but to create a complete learning desktop presenting a series of 3D printed models. The desktop was aimed to support the understanding of this masterpiece in parallel with the Louvre’s Mona Lisa. The adopted solution was developed creating a common shared experience between blind, partially impaired, and people with normal sight. The whole project was brought on starting from an accurate component design, with well-defined learning experiences. When the whole desktop design was finished, the 3D digital modelling was followed by a complete 3D printing process, stepping through a series of tests with blind people, so to refine and enhance the final result. The exhibition took place in Florence, Italy in April-December 2019, with very positive feedback from the visitors.

KEYWORDS: Monna Lisa, 3D Printing, Digital Museum, Touchable Physical Models, Leonardo Da Vinci, Isleworth Mona Lisa

Unlocking Cultural Heritage: leveraging georeferenced tools and Open Data for enhanced cultural tourism experiences

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ABSTRACT

This article underscores the importance of digitally preserving and accessing Cultural Heritage through techniques like 3D modelling, WebGIS, and cloud storage. It explores collaborative efforts using crowdsourcing and Linked Data initiatives. The second part focuses on integrated digitisation strategies, advocating an integrated approach involving computer and human sciences, addressing tangible and intangible heritage, globalisation's impact, and UNESCO guidelines. The article shares insights from the research group's experiences in digitising Cultural Heritage, encompassing projects at territorial and urban scales. These initiatives encompass diverse documentation methods, 3D modeling, and innovative technologies for disseminating data and creating virtual experiences. Ultimately, the article concludes by underlining how digital technologies have the potential to enrich Cultural Heritage, for example, fostering sustainable tourism.

KEYWORDS: Georeferenced instruments for Cultural Heritage, Web-geographic information systems (WebGIS), Web repositories and cloud-based storage, Semantic Web and Linked Data initiative

Design Challenges and Opportunities of Fossil Preparation Tools and Methods

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ABSTRACT

Fossil preparation is the activity of processing paleontological specimens for research and exhibition. Alongside traditional mechanical extraction methods, fossil preparation presently comprises non-destructive digital techniques within the emerging field of virtual paleontology. Despite significant technological advances, traditional and digital preparation remain cumbersome and time-consuming. However, this field has received scarce attention from a human-computer interaction standpoint. This study aims to present the current state of paleontological fossil preparation, highlighting its key challenges and initiating a dialogue about innovative designs to address current issues. Our research comprises a qualitative study involving technical preparators and virtual paleontologists. The study consists of two main parts: Firstly, a focus group session brought together preparators and researchers to discuss their workflows, obtain a preliminary understanding of their issues, and ideate solutions based on their counterparts' experiences. Subsequently, a series of contextual inquiries involved direct observations and semi-structured in-depth interviews. By transcribing and analyzing the data through theoretical and inductive thematic analysis, we clustered emerging themes and applied concepts from human-computer interaction and related fields. Our findings report on challenges traditional and digital fossil preparators encounter, shedding light on potential opportunities to enhance their tools and workflows. This work contributes a novel analysis of fossil preparation from an HCI perspective.

KEYWORDS: fossil preparation, virtual paleontology, design opportunities, human-computer interaction

An Empirical Study to Design Interactions with Historical Buildings Used for Everyday Activities

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ABSTRACT

Many historical buildings are challenged to comply with their dual purpose of being society's living memory and being used for everyday activities, such as a place to work or study. Direct interactions with such buildings could counteract this challenge and integrate their historical significance with contemporary needs. However, there is a lack of knowledge about designing this. We approached the gap in an iterative design process by conducting four expert interviews and two building walks with N=16 building users at a public historical building. Our results highlight the importance for building users to integrate historical significance and contemporary needs into their routines to increase their connection to the building and its past users. We provide three design implications for designing the interaction with historical buildings in everyday life and emphasize research implications for future projects. Our findings emphasize the need for interdisciplinary collaboration between Human-computer interaction research areas.

KEYWORDS: Historical Built Environment, Preservation, Engagement, Human-Building Interaction, Cultural Heritage

AKN_Regie: Bridging Digital and Performing Arts

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ABSTRACT

AvatarStaging framework consists in directing avatars on a mixed theatrical stage, enabling a co-presence between the materiality of the physical actor and the virtuality of avatars controlled in real time by motion capture or specific animation players. It led to the implementation of the AKN_Regie authoring tool, programmed with the Blueprint visual language as a plugin for the Unreal Engine (UE) video game engine. The paper describes AKN_Regie main functionalities as a tool for non-programmer theatrical people. It gives insights of its implementation in the Blueprint visual language specific to UE. It details how the tool evolved along with its use in around ten theater productions. A circulation process between a non-programming point of view on AKN_Regie called Plugin Perspective and a programming acculturation to its development called Blueprint Perspective is discussed. Finally, a C++ Perspective is suggested to enhance the cultural appropriation of technological issues, bridging the gap between performing arts deeply involved in human materiality and avatars inviting to discover new worlds.

KEYWORDS: Avatar, digital art, motion capture, performing arts, software architecture, Unreal Engine

Generative Ominous Dataset
Testing the Current Public Perception of Generative Art

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ABSTRACT

The advent of generative AI artworks has paved the way for ground-breaking explorations in the realm of digital creativity. This article delves into the multifaceted dimensions of G.O.D., an abbreviation for the art project Generative Ominous Dataset. G.O.D. aims at critically engaging with contemporary AI generative image systems and their intricate interplay with copyright issues, artistic autonomy, and the ethical implications of data collection, unravelling its conceptual underpinnings and its implications for the broader discourse on artificial intelligence, artistic agency, and the evolving contours of digital art. G.O.D. is a generative artwork, entirely coded in Processing, and developed within a/r/cography, a creative research methodology. G.O.D. scrutinizes and questions the ethics of contemporary text-to-image AI-based systems, such as Midjourney, DALL-E, or Firefly. These systems have been at the centre of controversies concerning the datasets used for their training, which encompass online sourced copyrighted materials, without authorization or attribution, masking questionable approaches with technological dazzlement. Many artists and authors find their works repurposed by these systems for the mass production of digital derivatives. G.O.D. aims at critically exposing art audiences to these concerns.

KEYWORDS: Generative art, Dataset, Ethics, Copyright

ConformiTree. An artistic research on the expansion of photography to the third dimension

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ABSTRACT

The artistic research project *ConformiTree* serves as an example to evaluate the current possibilities of capturing the spatial dimension with generally accessible devices. As several of Hong Kong's roadside trees are unique in their shape and style, a photographic recording with a two-dimensional image of their roots hardly does justice to its sculptural complexity. Therefore, several possibilities have been explored to record these structures in the third dimension – without specialised equipment. With a hybrid derived from archaic photographic media, analogue large format plates and current 3D scanning technologies, the project results in an engaging, concrete but virtual representation with sculptural quality, celebrating the impressive power of those majestic trees.

KEYWORDS: Hybrid media, Expanded Photography, 3D Scan, TrueDepth, photogrammetry, stereoscopic imaging, multi-view reconstruction, artistic research

Exploratory Multimethod Evaluation of Experience and Behaviour in Large Public Total Media Situations

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ABSTRACT

Interactive large-scale media installations are difficult to evaluate the bigger the venue, larger the audience, more media elements, and shorter the presentation time. We report on a multi-method evaluation of one such event that combined standard evaluation methods (observation, interviews, etc.) and two novel exploratory methods (self-reflective spatial mapping and 5-word elicitation). We describe findings to demonstrate strength and weaknesses of methods when applied to a complex situation. Findings highlight the situation's richness and dynamics, but also inconsistence in results gained from the methods. Among other recommendations, we conclude that, for the time being, researchers should utilize inductive approaches, as we still lack a comprehensive set of strong concepts and dynamic patterns, which are needed to understand such situations better and to develop novel deductive methods for a more cost effective user experience evaluation of large public total media situations.

KEYWORDS: Media Intervention, Projection Mapping, Public Space, Media Architecture, Urban HCI, Evaluation Methods

The importance of software for the stereometric analysis of artworks. A case study with Pieter Saenredam

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ABSTRACT

This paper, which is a development of a part of our Ph.D. project, completed in 2008, tells us the importance of using computer-aided design software in the analysis of works of art and particularly in easel paintings that show compositions with geometric perspective. In the text we emphasize the importance of the computer-aided drawing tool that allows for verifying the coherence of the construction of the perspective representation of certain paintings from a certain historical period. In this way, we try to demonstrate that computer-aided design has the advantage of being able to signal with great accuracy the coherence of the geometric lines of certain painting compositions that represent real or illusory spaces and in this way classify the degree of erudition of certain workshops and artistic currents. In summary, we show in this article that computer-aided drawing can be an excellent tool for art historians, allowing them to conclude results in relation to the preparatory drawing that was practiced in the pictorial workshops of one or several historical times. Finally, in the text we present a case study with the analysis of a painting by the dutch artist Pieter Saenredam. This artist is a paradigmatic example of the exhaustive use of linear perspective drawing that organises the composition of his paintings. For this reason, we present him here as a case study.

KEYWORDS: Software, Drawing, Painting, Linear Perspective, Geometry

Tracking, Visualisation and Interaction for Virtual Reconstruction of Cultural Heritage in Mixed Reality. Comparison of Mixed-Reality and Virtual-Reality Approach

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ABSTRACT

This paper explores the use of mixed reality (MR) technology in the virtual reconstruction of cultural heritage sites. Specifically, it focuses on the areas of tracking, visualisation, and interaction, which are key components in creating an immersive and engaging MR experience. Through a review of the latest developments in the field, the paper presents a state-of-the-art analysis on a few chosen examples of MR technology in cultural heritage applications. The development of an MR application virtualising a digitalised scenography piece of the "Othello" play is explained, consisting of concept design, implementation, demonstration and testing. It discusses the benefits of using MR for cultural heritage in comparison to virtual reality (VR). Additionally, the paper highlights future trends and directions for the field. Overall, a comprehensive overview of the current state and potential of MR technology in the virtual reconstruction of cultural heritage sites is provided.

KEYWORDS: Digitalisation, Mixed Reality, HoloLens, Virtual Reality, Cultural Heritage

Dematerializing materials: description of the first stages to digitize a museum exhibition with 3D technologies

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ABSTRACT

The following paper delves into the development of a virtual exhibition planned to be simultaneously inaugurated with a physical exhibit, which will open in March 2024 in the Municipal Museum of Faro, Portugal. This double presentation, dedicated to a set of rare Italian cinema posters from the early 20th century, is planned to be displayed concurrently in one of the temporary exhibit rooms of the Museum and in an online 3D recreation of the same space. This project is one of several initiatives brought forward by a collaboration, initiated in 2022, between CIAC - Research Center for Arts and Communication and the Faro Museum. This cooperation is built upon an unique legacy composed of 330 posters that the Museum inherited from Joaquim António Viegas, a Portuguese painter and scenographer. In this paper we will describe the first stages of the production of a 3D real-time virtual exhibition by listing the tasks developed so far and presenting other concepts we intend to explore in the following months. We expect that this virtual display can serve not only as a digital replica of a physical place and event, but to also be a complement to its physical counterpart by presenting unique information and objects that are not possible to be shown in the material dimension due to common constraints like space limitations or conservation issues. Besides that, we also hope that the prototype and experiments we are currently working on might provide us with a model for future digital exhibitions of this singular heritage.

KEYWORDS: Virtual exhibition, physical exhibition, 3D simulation, 3D scans, interactive multimedia, Unity

From Overtourism to REC-OVERtourism. A Digital Experience for Sustainable Tourism

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ABSTRACT

Access to various locations in recent years has been restricted. Some places have had to close due to overtourism, which was fueled by TV shows, movies, and Instagram posts, as well as unsustainable practices that surpassed the projected tourism capacity. These locations now require a period of recovery without any tourists. Before reopening, different policies are being implemented to limit the number of visitors and protect the ecosystem. In this article, we propose an alternative that transforms the travel experience into a digital one. We have developed an experience called REC-OVERtourism, which allows people to explore highly sought-after locations that had to be closed due to excessive visitor numbers and unsustainable practices over time. Through live camera streams, users will be able to explore these sites and enjoy the views.

KEYWORDS: Overtourism, Digital Experience, Multimedia

Experiencing the Architectural Evolution of a Heritage Museum in Extended Reality Application

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ABSTRACT

Although the use of Mixed Reality technology in knowledge, leisure, and cultural domains is ubiquitous, it has remained limited in heritage contexts. Museums are the DNA of each culture and contain exquisite heritage collections worth premier exhibit to be perceived, absorbed, and appreciated. When the heritage of the past is located within an architectural heritage, the connection and attachment to the roots of a culture are magnified. Hence, the heritage building of museums necessitates documentation and demonstration to visitors as much as the heritage artifacts. This paper uses a case study from the recent 2023 DIKE (Digitization of Indigenous Knowledge for Extended Reality (XR) and Culture), German Summer School to present a novel approach to utilizing Augmented Reality (AR) to develop a mobile application that facilitates the experience of the architectural evolution of Sarawak Museum in Kuching, Malaysia to its visitors. The Sarawak Museum building is referred to as a heritage gem, which was built in 1891 in a Neo-Palladian architectural style with prominent features such as symmetrical classical architectural elements and a grand appearance reflecting the colonial state identity of the city of Kuching. The architectural aesthetic and cultural significance of the Sarawak Museum has made it one of the most cherished landmarks in the city. Many architectural changes have been made to the museum during the past centuries. The museum has a collection of local fauna and artifacts that inspired the creation of this museum, and it eventually displayed extensive ethnographical (clothing, tools, weapons, musical instruments) and natural (specimens found in Sarawak) history artifacts that aimed to teach people about the rich history, biodiversity, and culture of indigenous people. However, this museum has been closed since Oct 23, 2017, for renovation and restoration works and recently has been opened to the public but with limited acceptance of visitors. People of Sarawak believe there must be other ways to experience this building to revive history and learn the changes it has been through while waiting for the museum to open at its total capacity. The augmented reality mobile application »Museum Time Machine« showcases the architectural changes of Sarawak's heritage museum from 1891 to 2022. The App incorporates audio-visual components and 3D models to present the climatic, historical, and construction rationales behind the changes in the architectural features. The seven stages of evolution in the physical appearance of the museum are explained in the App. The AR APP allows users to interactively immerse themselves in the museum's rich history and witness the architectural transformations in the past 131 years.

KEYWORDS: Architectural Evolution, Heritage Buildings, Museums, Augmented reality, Cultural heritage, Natural heritage

Design inspiration translated from the "Proud to be Iban" probes

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ABSTRACT

The purpose of this paper is to present the co-design probes in collaboration with the community and apply the semiotic triangle model to analyse the design probes co-created to simulate design ideas that can be used for future prototyping of the community networks' setup. Five (5) members of the community participated in three (3) activities: one online via a WhatsApp group and two in-person workshops at the community longhouse. The community collected twenty-five (25) values and created seven "Proud to be Iban" design probes. Following the semiotic triangle model, the design probes were analysed with the community and then mapped with the 25 values. Through this generative design process, a few good design ideas were generated, which will be recommendation to the technology design for the implementation of the Bawang Assan community networks in the later stage. It is anticipated that the design of technology based on these findings will assist the community in adopting technology as part of their culture and promote the sustainability of community networks.

KEYWORDS: Design Probes, Semiotic, Community-Based Co-Design, Community-Based of Community Networks

The Effect of Culture in Educational Games for School Students

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ABSTRACT

In this study, we aimed to determine whether incorporating a student's cultural background into gamified educational content would positively impact their learning achievements and overall experience. To do so, we created two versions of a game - one that reflected Egyptian culture and one that did not - while keeping the learning content consistent. Through experimentation and analysis, our findings showed that students who played the culturally relevant Egyptian version demonstrated greater learning achievements and overall satisfaction compared to those who played the other version.

KEYWORDS: Education, Culture, Gamification, E-Learning, Serious Games

Extended Reality Authoring System for Creating Immersive Experiences: A Requirements Analysis

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ABSTRACT

This paper discusses the challenges and complex processes related to creating content for Extended Reality applications. More specifically, the paper focuses on the challenges and processes involved in developing mixed reality applications using the Unity engine and the Microsoft HoloLens 2 device. To design and develop immersive Extended Reality experiences, specific skills and knowledge of tools and their interfaces and compatibility are required. The proposed concept could considerably improve the efficiency and effectiveness of XR development by facilitating cross-device collaboration and design. This could be beneficial for creating immersive experiences, such as content-driven art projects, for devices like the HoloLens.

KEYWORDS: Extended Reality, Mixed Reality, cross-device, HoloLens, content creation, human computer interaction

Enhancing the Teaching of Spherical Perspective with LiveSphere

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ABSTRACT

Spherical perspectives and the practice of immersive drawing are going through a period of rapid development along with a concurrent growth of interest in their applications to various fields. The teaching of new practitioners must often be done in short workshops lateral to established curricula, which is a challenge due to the complexity of the subject. We present a digital tool for performative immersive drawing that can be instrumental in enabling a quick and informative transmission of the principles of immersive drawing to a student audience.

KEYWORDS: Spherical perspective, handmade drawing, digital art, VR art, LiveSphere