

Qirsi: Reimagining Tigrayan Heritage Through an Interactive Spatial Virtual Experience

by
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Abstract

"Qirsi" (ቅርሱ), translating to "heritage" in Tigrinya, encapsulates a deeply personal and creative effort to preserve and re-envision the cultural heritage of Tigray, Ethiopia, amidst recent regional conflicts. Originating from a profound connection to Tigray and driven by the need to reconnect with one's own roots and confront the harsh realities imposed by the Tigray War—which inflicted significant damage on Tigrayan cultural heritage—Qirsi seeks to mend physical and cultural divides using spatial computing. In this project, the author converts over 55 Tigrayan cultural artifacts, from everyday items to significant historical landmarks, into 3D models in a virtual setting. Featured on Mozilla Hubs and Meta Horizon Worlds platforms, Qirsi offers an immersive, interactive experience that not only preserves but revitalizes Tigrayan cultural elements, allowing global users to explore and appreciate the rich cultural mosaic of Tigray. This initiative transcends conventional digital archiving, creating a vibrant space where history is not just observed but lived. Qirsi aims to deepen connections to heritage, encourage personal explorations, and redefine cultural narratives. This project aspires to motivate and enable individuals to engage with their heritage, contributing positively to digital humanities and celebrating Tigrayan culture.

Keywords: Tigrayan heritage, Spatial Computing, Cultural Preservation, Virtual Reality (VR), Interactive Spatial Experience

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Table of Contents

Declaration of Committee.....	ii
Abstract.....	iii
Acknowledgements.....	iv
Table of Contents.....	v
List of Figures.....	vii
Chapter 1. Introduction.....	1
1.1. Background and Significance.....	1
1.2. Project Overview.....	1
1.3. Project Vision.....	2
Chapter 2. Project Objectives.....	3
2.1. Reconnecting with Roots and Crafting Personal Realities.....	3
2.2. Cultural Preservation and Reimagination.....	3
2.3. Contribution to Afrofuturism.....	4
2.4. Accessibility and Inclusivity.....	4
2.5. Technological Advancement.....	5
2.6. Global Cultural Dialogue.....	5
Chapter 3. Related Previous Works.....	6
3.1. Digital Humanities and Cultural Preservation.....	6
3.2. Afrofuturism and Cultural Representation.....	6
3.3. Spatial Computing and Place-Based Experiences.....	6
3.4. Accessibility and Audience Inclusion.....	7
Chapter 4. Methodology and Project Iterations.....	8
4.1. Autoethnographic Framework.....	8
4.1.1. Reflective Practices and Cultural Documentation.....	9
4.1.2. Analytical Connection to Cultural Contexts.....	10
4.1.3. Ethical and Cultural Considerations.....	11
4.2. Research Through Design with Iterative Platform Exploration.....	11
4.2.1. 3D Modeling and Asset Creation.....	11
4.2.2. Exploration of Virtual World Platforms.....	12
4.2.3. Platform Selection and Design Iteration.....	13
Chapter 5. Artifact Description.....	14
5.1. Historical Landmarks.....	14
5.2. Musical Instruments.....	18
5.3. Everyday & Ceremonial Objects.....	20
Chapter 6. Project Reflection.....	22

6.1. Insights and Reflections.....	22
6.2. Challenges Encountered	22
6.3. Broader Implications.....	23
6.4. Conclusion	23
References	24

List of Figures

Figure 1. 3D model of the Emperor Yohannes IV Palace	15
Figure 2. 3D model of the Axum Obelisks	15
Figure 3. 3D models of the Axum Church of Our Lady Mary of Zion (Left Side) and the Chapel of the Tablet (Right Side)	16
Figure 4. 3D model of the Al Najashi Mosque.....	16
Figure 5. 3D Model of the Yeha Temple.....	17
Figure 6. 3D Model of the Tigray Martyr's Memorial Monument	17
Figure 7. 3D model of the Kirar.....	18
Figure 8. 3D model of the Kebero	18
Figure 9. 3D model of the Begena	19
Figure 10. 3D model of the Chira-Wata	19
Figure 11. 3D model of the Jebena	20
Figure 12. 3D model of the Mesob	20
Figure 13. 3D model of the Mogogo	21

Chapter 1. Introduction

1.1. Background and Significance

Qirsi is a deeply personal project born from the author's profound connection to the Tigray region of Ethiopia. As a native of Tigray and a member of the Tigrayan people, this initiative holds immense significance for the author. Tigray is a land steeped in history, home to the remarkable D'mt and Aksum civilizations that have left an extraordinary legacy of ancient sites (Phillipson, 2012). Tragically, the Tigray war (2020-2022) inflicted significant damage upon the precious Tigrayan cultural heritage (Gettleman, 2021).

The unfortunate circumstance of the author being severed from his family, friends, and homeland for over 800 days during the war fuelled the creation of Qirsi. This project represents both a commitment to cultural preservation and a means to reconnect with his roots. The Author firmly believes that countless individuals displaced by conflict share this profound sense of longing for home (UNHCR, 2022). Qirsi aims to inspire others by demonstrating how spatial computing can bridge divides and bring a sense of home to those who have been forced to leave. The project also aims to make spatial computing serve as a medium for people to introduce their culture and heritage to the rest of the world in an interactive and engaging way.

1.2. Project Overview

In the ever-evolving domains of digital humanities and cultural preservation, Qirsi transcends traditional methods of digital archiving. It envisions a dynamic reimagining of Tigrayan cultural artifacts and landmarks, breathing new life into them within an interactive virtual environment. Through this experience, users will embark on a journey where history and culture unfold in vivid and engaging ways.

Deeply rooted in Tigrayan culture, Qirsi is both visually captivating and steeped in cultural significance and educational value. It represents a concerted effort to reshape

the discourse on cultural heritage, emphasizing traditional African values through the lens of innovative technologies.

The development of Qirsi involves a meticulous conversion of Tigrayan cultural assets into intricate 3D models, prioritizing historical authenticity and a future-forward perspective. Each virtual representation embodies the spirit, narratives, and symbolism embedded within the Tigrayan heritage, creating a profound and emotionally resonant user experience.

Recognizing potential barriers to accessing VR technology, Qirsi is strategically designed within Mozilla Hubs and Meta Horizon Worlds. This ensures cross-platform accessibility across desktop, mobile, and VR headsets, aiming for the widest possible reach and engagement.

1.3. Project Vision

At its core, the vision of Qirsi is to empower oneself to reclaim and reconnect with one's own heritage and reshape one's own narratives using spatial computing, transforming personal and collective stories. It aims to demonstrate how virtual environments can profoundly engage individuals with their roots, creating a space where history is not merely recalled but actively experienced. This project leverages spatial computing technology to craft new realities that honour tradition while embracing the future, thereby serving as a powerful tool for cultural preservation and personal discovery.

Chapter 2. Project Objectives

The objectives of Qirsi are deeply rooted in cultural preservation, technological innovation, and the digital reinterpretation of Tigrayan heritage, infused with a personal mission to reconnect with and safeguard this culture amid recent conflicts. This project is born from a personal journey of displacement and loss, driving a heartfelt commitment to using spatial computing not only to bridge physical and cultural divides but also to highlight and celebrate Tigrayan heritage on a global stage. Qirsi aims to provide a dynamic, immersive platform for individuals around the world to explore, learn, and engage in meaningful dialogue, making it a deeply personal yet universally accessible venture. Through this initiative, users can experience the rich tapestry of Tigray's history and traditions, fostering a broad appreciation and understanding tailored to the diverse needs and interests of a global audience. The objectives of Qirsi are:

2.1. Reconnecting with Roots and Crafting Personal Realities

The Qirsi project embodies a profound commitment to reconnecting the author with the Tigrayan culture and heritage disrupted by conflict and displacement. It serves as a digital bridge that allows those far from their homeland to virtually return and engage with the cultural landmarks and practices that define Tigray. By offering an immersive experience through detailed 3D models of historical sites like the ancient obelisks of Axum and interactive rituals such as the traditional coffee ceremonies, Qirsi helps restore a sense of belonging and identity. This virtual engagement not only revitalizes memories of home for the diaspora but also deepens understanding and connection for those new to Tigrayan culture.

2.2. Cultural Preservation and Reimagination

Preserve Tigrayan Heritage: Digitize and preserve Tigrayan cultural artifacts, traditions, and historical sites, ensuring their survival against the ravages of time and destruction. This initiative reflects a profound commitment to safeguarding the region's

rich history, such as the Al Najashi Mosque and the Emperor Yohannes IV Museum, which have been significantly impacted by recent conflicts in the region (Phillipson, 2012).

Reimagine Cultural Elements: Employ spatial computing to offer immersive, interactive reinterpretations of traditional Tigrayan cultural elements, effectively bridging the historical past with future possibilities. This innovative approach aims to provide novel insights into Tigrayan heritage, making it accessible and engaging for a modern audience.

2.3. Contribution to Afrofuturism

Enhance Afrofuturist Aesthetics: Contribute to Afrofuturism by integrating Tigrayan cultural motifs and historical narratives, adding a unique dimension to the Afrofuturist aesthetic. This enriches the genre with the distinct cultural narratives of Tigray, offering a fresh perspective within this artistic and cultural movement (Anderson and Jones, 2015).

Foster Creative Exploration: Qirsi provides a platform for the exploration of Afrofuturist themes from a Tigrayan perspective, encouraging creative expression and the envisioning of futures that incorporate African cultural legacies with technological advancements. This facet of the project promotes a broader engagement with Afrofuturism, inviting users to imagine and create futures that are deeply rooted in African cultural and historical contexts (Eshun, 2003).

2.4. Accessibility and Inclusivity

Ensure Broad Accessibility: Make Qirsi accessible on various platforms, including VR, desktop, and mobile, to reach the broadest potential audience. This objective addresses potential technological barriers, aiming to make Tigrayan culture accessible to all interested users.

Promote Cultural Inclusivity: Engage a global audience in a celebration of Tigrayan culture, fostering a sense of inclusivity and respect for cultural diversity. Qirsi

emphasizes the universal appeal and importance of Tigrayan heritage, encouraging a global dialogue on cultural differences and similarities.

2.5. Technological Advancement

Employ Advanced Technology: Use the latest VR, 3D modelling, and interactive design technologies to create an immersive and engaging user experience. Through its innovative approach, Qirsi seeks to push the boundaries of digital cultural preservation and interactive heritage experiences.

Innovate in VR Content Creation: Pave alternative paths in VR development through the creation of culturally rich, interactive virtual environments. This effort underlines Qirsi's contribution to the advancement of VR technology and content creation, particularly in the realm of cultural heritage.

2.6. Global Cultural Dialogue

Facilitate Cultural Exchange: Act as a digital meeting place for cultural exchange, allowing users from diverse backgrounds to explore, interact with, and appreciate Tigrayan culture. Through Qirsi, the project envisions fostering understanding and respect among different cultures, enhancing global cultural literacy.

Enhance Global Cultural Literacy: By presenting Tigrayan culture in an accessible and engaging format to a worldwide audience, Qirsi contributes to a richer global cultural mosaic. The project aims to encourage cross-cultural dialogue and appreciation, promoting a deeper understanding of the world's diverse cultural heritage.

Ultimately, Qirsi aspires to not only preserve and celebrate Tigrayan heritage but also to inspire new perspectives on how culture and technology can coalesce to create meaningful, educational, and transformative experiences. The project seeks to set a new standard in the digital preservation and reinterpretation of cultural heritage, demonstrating the potential of VR as a medium for cultural storytelling and engagement.

Chapter 3. Related Previous Works

3.1. Digital Humanities and Cultural Preservation

At the heart of the digital humanities is the mission to use technology as a tool for the preservation, analysis, and broad dissemination of cultural heritage. Innovative projects like the Virtual Museum of Iraq (Losier, 2007) and the Digital Benin initiative (Bascom et al., 2023) have set precedents in how digital reconstructions and immersive technologies can act as bulwarks against the loss or degradation of cultural artifacts and traditions. Building on these pioneering efforts, Qirsi places a strong emphasis on user-centred design and the digital revival of Tigrayan heritage, enhancing the accessibility of these cultural narratives and engaging a global audience in their preservation.

3.2. Afrofuturism and Cultural Representation

Afrofuturism stands as a visionary framework that intertwines African diaspora culture with speculative visions of the future, often leveraging technology to reimagine histories and narratives (Nelson, 2002; Womack, 2013). Qirsi enriches this discourse by incorporating Tigrayan cultural motifs and the storied past of its ancient civilizations within a futuristic context, showcasing the profound potential of technology in cultural representation and narrative sovereignty. This integration not only contributes to the Afrofuturist movement but also provides a unique lens through which East African historical and cultural narratives can be viewed and understood.

3.3. Spatial Computing and Place-Based Experiences

Spatial computing, including technologies such as VR, augmented reality (AR), and 3D mapping, offers novel ways to reinterpret physical spaces and their associated cultural significances. Projects like "Re-Coding the City: Place-Based Storytelling with AR" (Gordon & Schirra, 2019) exemplify how these technologies can facilitate rich, multi-layered narratives about specific locations. Qirsi employs a similar approach, aiming to

recreate and re-contextualize Tigrayan sites within a virtual space, thus providing a means for those distanced from their homeland to connect with it meaningfully.

3.4. Accessibility and Audience Inclusion

Ensuring broad accessibility and inclusivity is paramount in the realm of digital heritage, as these principles are key to enabling wide-reaching participation and engagement. A prominent example of cross-platform accessibility is the Google Arts & Culture project, which collaborates with over 2000 institutions to make their collections available online (Google, 2021). This initiative allows users to explore virtual art exhibits, historical artifacts, and cultural stories through an interactive digital format accessible via VR, desktop, and mobile platforms (Smith, 2022). Similarly, the Qirsi platform's deployment across these platforms underscores a steadfast commitment to making Tigrayan culture accessible to all, thereby facilitating an extensive cultural exchange that transcends geographical and digital boundaries.

Qirsi sets itself apart by intricately weaving together Tigrayan cultural preservation with the forefront of digital and immersive technologies. Inspired by an array of scholarly work and creative initiatives, Qirsi not only draws upon these resources but also offers a distinctive contribution by focusing on the convergence of Tigrayan heritage, educational technology, Afrofuturism, and spatial computing. By representing a visionary approach to cultural preservation, Qirsi is poised to engender a global appreciation for Tigrayan heritage and foster a nuanced understanding of the dynamic interplay between culture, technology, and identity.

Chapter 4. Methodology and Project Iterations

4.1. Autoethnographic Framework

Qirsi employs an autoethnographic framework, which blends autobiographical narrative with cultural analysis. This methodology is particularly suited for the project, as the project aims to reimagine and preserve Tigrayan cultural heritage through the lens of someone who is a member of the Tigrayan community. Autoethnography facilitates a deep exploration of personal experiences, connecting these individual stories to broader cultural, social, and historical contexts (Adams, Holman Jones, & Ellis, 2015). This approach ensures the project's cultural representations are both authentic and meaningful. The author's connection to Tigrayan culture, shaped by personal upbringing and experiences, provides a unique lens for interpreting and reimagining this heritage.

"Qirsi" represents a deeply personal take on Tigrayan culture and history, coloured by the author's own biases and perspectives as a member of this community. Personal experiences and interpretations informed the author's depiction of his cultural and historical heritage. This subjectivity is key to the project's goals, as it aims to present a living, dynamic expression of Tigrayan identity through the lens of a Tigrayan, beyond merely cataloging information.

In creating "Qirsi," The Author intentionally scaled certain cultural artifacts to appear larger than their actual size within the less interactive Mozilla Hubs component. This deliberate choice of magnification applies to everyday items such as kitchenware, agricultural tools, construction materials, jewelry, furniture, and musical instruments. The purpose behind this is to highlight the significance of these often-overlooked items, elevating their importance in daily Tigrayan life and prompting users to reconsider the value assigned to cultural artifacts beyond their physical dimensions. By enhancing artifacts' presence in the virtual environment, Qirsi aims to challenge perceptions and foster a deeper appreciation of their intrinsic value to Tigrayan heritage. In contrast, historical landmarks and buildings are represented at their true scale to maintain their authenticity and provide a realistic sense of place. Meanwhile, in the Meta Horizon

Worlds, artifacts are presented at true-to-life scale to preserve the authenticity of the experience, ensuring that users can engage with the culture as realistically as possible in virtual reality setting.

This methodology also highlights the project's personal nature. A single viewpoint cannot fully capture Tigray's rich diversity and history. The experiences and interpretations within Qirsi reflect the author's personal journey and connection to Tigray, rather than purporting to represent the entirety of Tigrayan culture or the experiences of all community members. The region's vastness and complexity mean that individuals from Tigray may have diverse perspectives and emotional connections to the cultural landmarks and artifacts featured in "Qirsi." Hence, users should approach Qirsi as a personalized portrayal, an effort to convey the profound impact of Tigrayan culture and heritage through a Tigrayan's personal perspective. Qirsi invites users into a dialogue to explore cultural identity and historical significance from a distinctive viewpoint. The project emphasizes that cultural preservation involves not just safeguarding physical objects but also maintaining the narratives, emotions, and meanings they carry for different people. Through "Qirsi," The author aims to contribute to a broader discourse on cultural diversity and the ways one can understand and appreciate collective heritage.

4.1.1. Reflective Practices and Cultural Documentation

At the heart of the autoethnographic methodology employed in Qirsi are reflective practices, namely journaling and storytelling, which have helped to document and interpret Tigrayan culture. Through journaling, the author engaged in an ongoing dialogue with himself, capturing not only personal anecdotes and reflections but also detailed observations of Tigrayan traditional artifacts. This process was enriched by contributions from friends and family, as well as by the invaluable insights drawn from old photographs and videos the author has preserved over the years. These photographs and videos, capturing moments of cultural significance, served as visual prompts for deeper reflection and analysis, enabling the author to weave a rich tapestry of cultural narratives.

Journaling provided a structured means to dissect and ponder the intricate details of each artifact, contemplating their historical context, usage, and symbolic meaning within the Tigrayan society. This introspective practice facilitated a nuanced understanding of how these artifacts embody the collective identity and heritage of the Tigrayan people, linking personal experiences to the broader cultural mosaic.

Complementing this introspective journey, storytelling emerged as a powerful medium to share these insights beyond the confines of personal reflection. By concisely narrating the stories behind Tigrayan artifacts and cultural practices, informed by both personal experiences and collaborative inputs from his community, the author transformed private reflections into shared cultural insights. This narrative process not only deepened his connection to his heritage but also invited others to engage with Tigrayan culture meaningfully, fostering a sense of collective memory and identity.

Together, journaling and storytelling acted as conduits for bridging the gap between individual experiences and the collective cultural narrative of Tigray. This reflective tandem not only underscored the personal significance of each artifact but also highlighted the communal values they represent, contributing to the preservation and celebration of the Tigrayan heritage within the Qirsi project. Through this layered exploration, informed by autoethnographic principles (Ibid; Bochner & Ellis, 2016), the project transcends conventional documentation, offering a deeply personal yet universally accessible window into the rich cultural landscape of Tigray.

4.1.2. Analytical Connection to Cultural Contexts

The analytical component of this framework entails a rigorous examination of personal narratives against the backdrop of the wider cultural, historical, and social tapestry of Tigray. This involves an immersive engagement with cultural texts, historical records, and social theories to unearth the embedded meanings within Tigrayan traditions and practices. By analyzing personal experiences through the dual lenses of cultural theory and historical context, the project seeks to create a spatial virtual experience that resonates with both personal authenticity and the collective heritage of Tigray.

4.1.3. Ethical and Cultural Considerations

Ethical considerations occupy a central place in autoethnographic research, particularly when it involves the representation of cultural heritage. This project upholds an ethical approach that respects the integrity and sensitivity of Tigrayan traditions. It guarantees that the reimagined cultural elements within the Qirsi spatial virtual experience are accurately and respectfully portrayed. This commitment involves continuous reflection on the ethical implications of cultural representation and maintaining an open dialogue with the Tigrayan community to ensure that the project's cultural interpretations are both validated and refined.

In weaving together personal narratives, cultural immersion, and reflective practices within an autoethnographic framework, this project aims to create a spatial virtual experience that not only serves as a technological innovation but also as a culturally authentic and meaningful exploration of Tigrayan heritage. By situating personal experiences within the broader cultural narratives of Tigray and engaging in ethical considerations, Qirsi aspires to contribute significantly to the discourse on cultural preservation and innovation in the digital era.

4.2. Research Through Design with Iterative Platform Exploration

This project employs a research-through-design methodology to explore the creation of a 3D spatial virtual experience showcasing Tigrayan cultural heritage. This approach leverages design practices as a research tool to investigate and develop an interactive virtual environment (Fayling, 1994) The methodology involved iterative cycles of design, prototyping, testing, and evaluation within the context of various online platforms.

4.2.1. 3D Modeling and Asset Creation

The initial phase focused on the creation of over 55 3D models using SketchUp, 3ds Max, and Blender. These models encompassed historical landmarks like Emperor Yohannes IV Palace and the Axum Obelisk, alongside cultural artifacts such as musical

instruments (Kirar, Kebero, Begena) and everyday items (Sa'eni, mah'zel, jebena).

4.2.2. Exploration of Virtual World Platforms

Following the creation of 3D assets, the research transitioned to exploring suitable platforms for hosting the virtual experience. This involved investigating various online platforms, including:

- **Unity:** Unity offers a powerful suite of tools for building highly interactive and visually rich spatial virtual experiences. However, several limitations affect its suitability for projects targeting a global audience:
 - **Distribution:** Distributing Unity-based experiences often requires users to download and install specific software, creating a barrier to entry. This can be problematic for users with limited access to the internet or technical knowledge (Smith, 2021).
 - **Web-Based Accessibility:** While Unity offers WebGL for web deployment, the performance of complex spatial experiences can be inconsistent across different devices and browsers. This can lead to degraded experiences for some users (Johnson & Brown, 2023).
 - **Hosting Requirements:** Hosting a Unity virtual experience with robust performance often requires a specialized website with significant server resources to handle the complex spatial graphics and potential user traffic. This adds complexity and cost to the project (Thompson, 2022).
- **VRChat:** This platform was deemed unsuitable because of its requirement for extended use of the platform before world creation capabilities become available (Williams, 2020).
- **Mozilla Hubs:** This platform was suitable for the project because it offered compatibility with externally created 3D assets, which was important since the 3D models of the project were created with different 3D modeling platforms. However, it lacked the ability to integrate interactive elements, limiting the potential for user engagement (Lee, 2022).

Meta Horizon Worlds: This platform offered a robust suite of interactive features,

including spatial sounds and special effects. However, it requires the creation of new 3D models within its own environment, limiting the utilization of the detailed models created in SketchUp and Blender.

Rec Room: While this platform offered similar interactive features, inadequacies observed in the platform's user interface made it a less favourable option.

4.2.3. Platform Selection and Design Iteration

The project faced a crucial decision: prioritizing accessibility with pre-existing assets or maximizing interactivity with platform-specific tools. After considering the extensive effort invested in the initial 3D models, the author had to make a compromise on balancing functionality and platform accessibility.

- The author deemed historical sites and artifacts suitable for a non-interactive experience and created an open-air environment within Mozilla Hubs and uploaded the 3D models to a world named "Little Tigray". Mozilla Hubs is accessible across mobile, web, and VR platforms—which is fundamental to the project. This approach also served as an introduction to VR and spatial experiences for users.
- Meta Horizon Worlds was chosen for the core interactive virtual experience. The experiences include traditional coffee ceremony, interactive play with traditional musical instruments (Begena, Kirar, Chira-Wata, Kebero, Tsenasel), traditional bread making, and holiday rituals mainly, "Hoya-Hoye" and "Demera". The platform's strong interactive capabilities made it easy to incorporate spatial sounds, special effects, animations, games, and quests, resulting in a more immersive user experience.

The research-through-design methodology employed iterative exploration of various virtual world platforms with the creation of 3D assets. The final design solution involved dividing the experience between Mozilla Hubs for accessibility and Meta Horizon Worlds for interactivity, highlighting the challenges and opportunities in balancing user experience with platform limitations within the context of virtual heritage exploration.

Chapter 5. Artifact Description

The core artifacts of the Qirsi project encompass a meticulously curated collection of over 55 3D models, crafted using SketchUp, 3ds Max, and Blender. These models represent a blend of historical landmarks and objects integral to daily life in Tigray, providing a broad perspective on the region's rich cultural and historical tapestry. From this extensive collection, 13 artifacts have been specifically chosen for detailed exploration in this chapter. The selection process was challenging, as each of the 55 artifacts that were made in 3D carry unique significance within Tigrayan culture. The author's choices were guided by a deeply personal and autoethnographic approach, reflecting his own connections to and perceptions of these items. This subjective selection underscores the profound cultural importance the author believes these artifacts hold within their respective categories. Choosing which items to highlight and which to leave out was a difficult decision that underscores the intrinsic value of all the artifacts. However, the selected items are those the author believes most vividly represent the significant cultural and historical narratives and everyday practices of Tigray, illustrating their pivotal roles within the community.

5.1. Historical Landmarks

Emperor Yohannes IV Palace (Mekelle, Tigray): This 3D reconstruction showcases the grand residence of a powerful 19th-century Tigrayan Ethiopian emperor, emphasizing Tigray's role as a center of political power in Ethiopia (Marcus, 2002).



Figure 1. 3D model of the Emperor Yohannes IV Palace

Axum Obelisk: This intricately carved stele, a relic of the ancient Axumite Kingdom, stands as a testament to Axum's former wealth and influence and dominance in global trade and expeditions for over 8 centuries (Phillipson, 2012).



Figure 2. 3D model of the Axum Obelisks

Axum Church of Our Lady Mary of Zion & Chapel of the Tablet: A church that holds immense spiritual significance for Ethiopian Orthodox followers, with the Chapel believed in housing the biblical Ark of the Covenant (Kaplan, 1992).

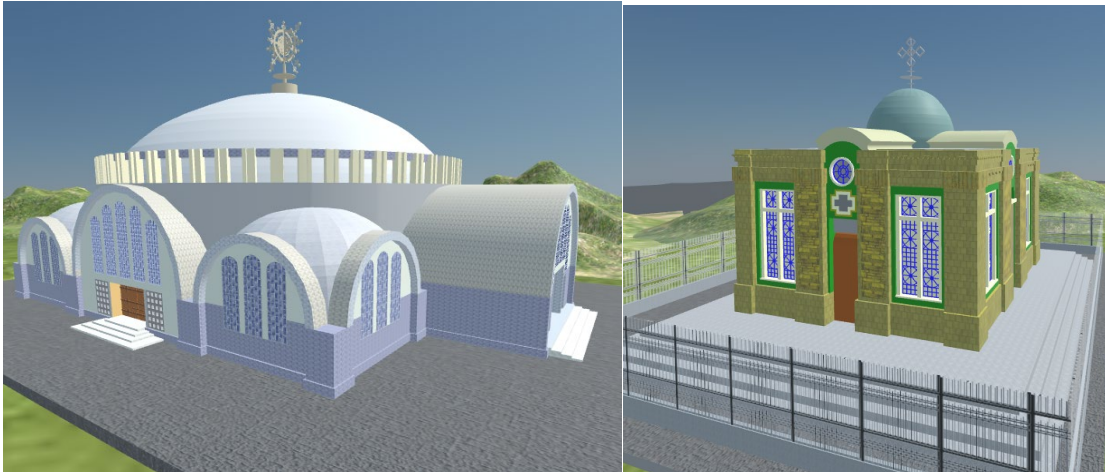


Figure 3. 3D models of the Axum Church of Our Lady Mary of Zion (Left Side) and the Chapel of the Tablet (Right Side)

Al Nejashi Mosque: One of the oldest mosques in Africa, it reflects Tigray's longstanding ties to Islam and tradition of religious tolerance (Trimingham, 1952).



Figure 4. 3D model of the Al Najashi Mosque

Yeha Temple: This pre-Axumite structure of the D'mt civilization offers a glimpse into the earlier kingdoms that shaped the Tigrayan identity (Fattovich, 2012).

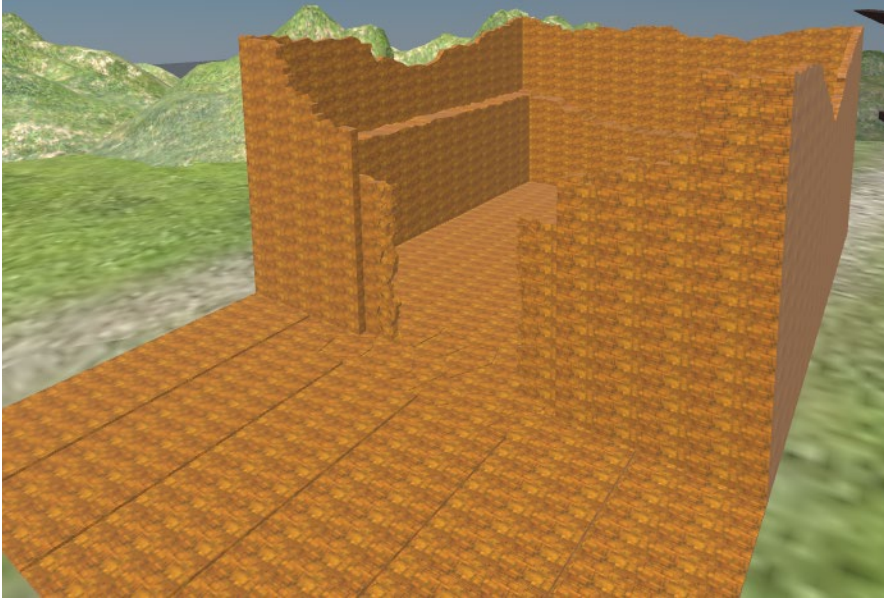


Figure 5. 3D Model of the Yeha Temple

Tigray Martyr's Memorial Monument: A monument built in remembrance of those who lost their lives during the Ethiopian Civil War (1974 - 1991). The monument is a solemn reminder of the 17 years of conflict, and it also highlights the ongoing struggle for peace and self-determination of tribes in Ethiopia. (Tronvoll, 2009).



Figure 6. 3D Model of the Tigray Martyr's Memorial Monument

5.2. Musical Instruments

- **Kirar (Lyre):** This five- or six-stringed lyre is central to Tigrayan musical traditions. Its resonant sound accompanies storytelling, historical epics, and social gatherings. Kirar playing is deeply intertwined with Tigrinya poetry and often features themes of love, war, and social commentary (Tsega et al., 2015).

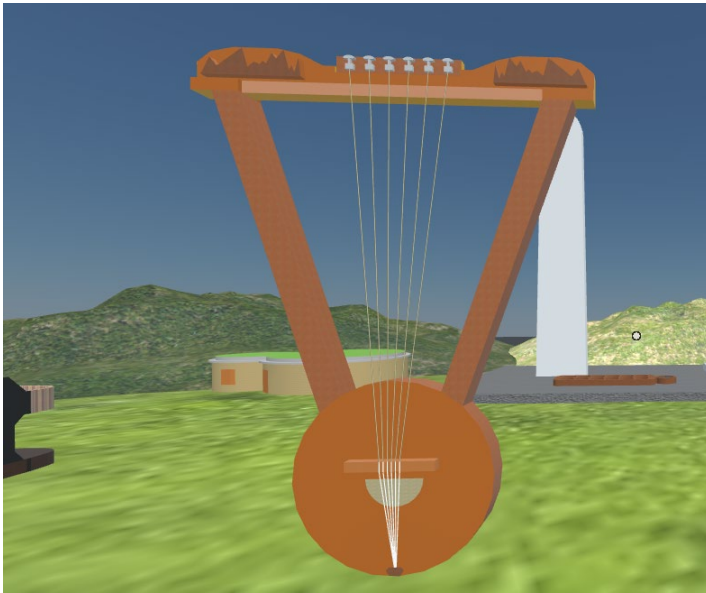


Figure 7. 3D model of the Kirar

- **Kebero (Drum):** A double-headed cylindrical drum that provides the rhythmic backbone for Tigrayan music and dance. It plays a vital role in religious ceremonies, weddings, and community celebrations (Tsega et al., 2015).



Figure 8. 3D model of the Kebero

- **Begena (Harp):** This large, ten-stringed harp is considered a sacred instrument, often associated with the Ethiopian Orthodox Church. Its meditative sound is used in liturgical music and for personal contemplation. Begena players earn high reverence for their skill and knowledge of traditional melodies (Shelemay, 1991).



Figure 9. 3D model of the Begena

- **Chira-Wata (Single-stringed Fiddle):** This bowed instrument has a distinctive, plaintive sound often used to accompany poetic recitations and songs of lament or praise. It has a distinctive, plaintive sound, and is often played by wandering minstrels (Tsega et al., 2015).



Figure 10. 3D model of the Chira-Wata

5.3. Everyday & Ceremonial Objects

Jebena (Coffee Pot): This beautifully shaped clay pot is essential to the Tigrayan coffee ceremony, a central social ritual in Tigrayan culture. The brewing and serving of coffee are a symbol of hospitality, conversation, and community (Mains, 2011).



Figure 11. 3D model of the Jebena

Mesob (Woven Basket): A colorful, handwoven basket, the Mesob serves as a table for meals in Tigray, where people often share food communally and use injera (flatbread) as a base for various stews and sauces. The Mesob symbolizes togetherness and the sharing of sustenance (Mains, 2011).



Figure 12. 3D model of the Mesob

Mogogo (Clay Baking Griddle): A large, circular griddle made of fired clay, is an essential artifact of Tigrayan cuisine. Its gently convex surface, often seasoned with subtle scorch marks, is central to Tigrayan meals (Woldemariam, 2010).



Figure 13. 3D model of the Mogogo

Chapter 6. Project Reflection

Reflecting on the journey and development of Qirsi underscores a commitment to leveraging digital humanities and spatial computing for the exploration, preservation, and vibrant reimagining of Tigrayan cultural heritage. This endeavor, rooted deeply in the history and legacy of the Tigray and Tigrayans, uses innovative technology not merely as a tool but as a bridge—connecting past, present, and future narratives of a rich cultural tapestry threatened by conflict and time.

6.1. Insights and Reflections

The project demonstrated the immense potential of virtual reality (VR) and spatial computing not just as tools for cultural education and preservation, but also as a means for personal reconnection with one's roots and a re-evaluation of everyday cultural artifacts and their relevance in one society. The meticulous digitization of Tigrayan artifacts and historical landmarks through an autoethnographic lens infused the initiative with personal depth and authenticity, enriching the cultural narrative presented within the virtual environments of Qirsi. Incorporating reflective practices such as journaling and storytelling enhanced this process, serving as pivotal mechanisms for interweaving individual experiences with the broader cultural heritage of Tigray. Engaging with community members and using personal and historical artifacts provided invaluable context and depth, ensuring a portrayal that was both respectful and accurate.

6.2. Challenges Encountered

One of the principal challenges encountered was navigating the technical constraints and limitations inherent in the development of virtual reality platforms. Balancing accessibility and interactivity emerged as a complex endeavour, especially when aiming to cater to the diverse technological capabilities and access levels of a global audience. The strategic decision to employ both Mozilla Hubs and Meta Horizon Worlds exemplified an effort to mitigate these challenges, albeit underscoring the ongoing struggle to balance broad reach with immersive engagement.

Moreover, the project grappled with the ethical complexities of digitally representing and reinterpreting cultural heritage. Ensuring respectful, accurate, and culturally sensitive portrayals needs continuous reflection and dialogue with the Tigrayan community, highlighting the importance of ethical considerations in every facet of the project.

6.3. Broader Implications

The Qirsi project stands as an encouraging contribution to the fields of cultural preservation and digital humanities, demonstrating the capacity of virtual reality and spatial computing to safeguard and reconnect with one's cultural heritage. This initiative also underscores the importance of interdisciplinary approaches in addressing complex challenges within these fields, drawing from technology, architecture, ethnography, and beyond to create a multifaceted exploration of culture.

6.4. Conclusion

The development of Qirsi is not just an act of preservation and personal reconnection with roots, but a forward-looking endeavour that opens dialogues between the past and potential futures of Tigrayan culture. It exemplifies the resilience of cultural identity in the face of adversity and the transformative potential of technology to bridge divides. As the project continues to evolve, it promises to inspire and serve as a model for how digital platforms can harness the celebration, preservation, and reimagining of cultural heritage in our increasingly digital world. This project, therefore, calls for ongoing reflection, collaboration, and innovation, aiming to empower the Tigrayan community and inspire a broader appreciation for the rich tapestry of global cultural heritage.

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