

# Saving the Vanishing Intangible and Tangible Cultural Heritage through the Development of an Online Panorama

Fungai Jacqueline Kiwa<sup>1</sup>, Herbert Chimhundu<sup>2</sup>, Maria Tsvere<sup>3</sup>, Sindiso Nleya<sup>4</sup>

<sup>1</sup>(Department of ICT and Electronics, Chinhoyi University Of Technology, Zimbabwe)

<sup>2</sup>(Institute of Lifelong Learning and Development Studies, Chinhoyi University of Technology, Zimbabwe)

<sup>3</sup>(Institute of Lifelong Learning and Development studies, Chinhoyi University of Technology, Zimbabwe)

<sup>4</sup>(Computer Science Department, National University of Science and Technology, Zimbabwe)

---

**Abstract:** The worldwide community has as of late become cognizant that ICH needs and merits universal guarding, setting off a legal interaction which concluded with the assembly in 2003 of the UNESCO Convention on the shielding of the Intangible Cultural Heritage. The utilization of heritage happens in different areas and takes on significance as a vehicle for political, social, and imaginative purposes, fair as teacher and emancipator, to provide a few cases. Step by step enlightening to decode heritage to comprehend its centrality to different social occasions is subsequently an imperative errand. Intangible and tangible cultural heritage has all major forms of culture tending as the best vehicle of social differences. However, little endeavours have been done to advance picture imaging in the form of panoramas. The worldwide community has as of late become cognizant that culture requires universal defending focussing on the 2003 UNESCO Convention. This chapter highlights technologies which provide access to culture through the recording of places and objects in pictures and videos which enables the spread of information over the globe. The online display will reach its fundamental overseers with the information of their legacy.

**Keywords:** Intangible cultural heritage, ICT, Hurungwe Online Panorama, Local communities, Safeguarding, Transmission

---

Date of Submission: 20-11-2021

Date of Acceptance: 04-12-2021

---

## I. Introduction

The need to secure and oversee social legacy assets has progressed internationally. The internet is enveloped with different sites of western cities and countries. Some websites and applications show a complete view of a country, its heritage and people to the extent that when you view that application it is as if you are already there. This shows that they are proud of who they are and mostly attract many tourists' therefore more foreign currency. There are a lot of places in Zimbabwe that are beautiful and unknown to the world. Even those living in Zimbabwe have no idea these places exist. Most of our heritage has disappeared and the current generation does not care and is simply unaware of the value they have. It is vital to save our vanishing intangible and tangible heritage through the development of an online panorama. Panoramic images are being made accessible on an expanding number of online media stages, such as Google Maps. Virtual reality (VR) innovation is additionally getting to be more common in cutting edge life (e.g., video diversions and road see maps), giving immersive and intelligently encounters for clients. The online display will give data and data which is evident, reliable, open, and significant approximately a Zimbabwean range, deliver a web location seeing platform, and spread vital data around ICH and TCH of Zimbabwean zones to all the eras. The camera has become a very important tool in recoding the heritage in all forms of multimedia.

### Study area and research background

The Hurungwe District forms part of the Mashonaland West Province in Zimbabwe including the Karoi town and Magunje growth point (Earth, 2021). Mashonaland West Province is apportioned into 13 Census Districts, and these are Chegutu, Hurungwe, MhondoroNgezi, Kariba Country, Makonde, Zvimba, Sanyati, Chinhoyi, Kadoma, Chegutu Urban, Kariba Urban and Karoi (ZimStat, 2012). There is little information about the Hurungwe District over the internet. The Hurungwe District is rich in its heritage, with nice flowing rivers, traditionally made huts, emerald pebbles and stones, interlocking spurs, evergreen vegetation and many other breathtaking views, the list is endless. There are several lists of most beautiful places in the world which attract many tourists because of the scenic popular views they provide. These views have

been made popular by tourists point, with more views of the Hurungwe on the internet, it will have a chance to be recognised as one of the best tourists attraction places in Africa.

This is a state of the art two in one system that will show unbroken views of the entire surrounding selected area. Pictures or a series of pictures representing a continuous scene with also be included. This can be done for a city, town and rural setup to have an online presence. This is important for the people of Zimbabwe to know their own country inside and out, and to know what each part of the country is all about. Many sacred areas have ancient stories about them, these are spiritual historical stories with information that should be taken seriously and never breached by the people of that particular community or any visitor. By providing such information, the panorama becomes a form of a guide. The system has one part which is a website and it is excellent in both form and function. Its main purpose is to market the scenic views of Hurungwe which come in very attractive images, pleasing to watch, and easy to navigate. It performs well for a wide range of visitors and is technically stable and secure. The moment one opens the website they are taken by the breath-taking the images.

The website title is called Hurungwe Online Panorama (HOP) and it comes with a mobile application. Every function on the website is mapped on to will appear on the mobile application. The system will show different parts of the Hurungwe district from different angles. It will also include culinary information, Hurungwe traditional songs and lyrics, traditional games, folktales, riddles, traditional dance videos, artefacts, and traditional objects. The best part of the system is an algorithm that will pick any multimedia related to Hurungwe and place it on the website. The multimedia will automatically be updated on the mobile application. The multimedia can come in audio, text, video, and different formats of images.

### **Panoramic digital platforms**

ICH can be recorded using different platforms namely google maps, virtual reality imaging, websites, mobile applications and many other technologies. Through these technologies an individual who is far away from home can be able to view their rural space and still be able to feel at home. ICH is rich in its existence as it presence a unique identity which lives forever which makes it a very good idea for people to view their roots through an aerial space. This can be done through different platforms.

### **Google Maps**

Google Maps may be a web mapping stage and customer application advertised by Google. It offers obsequious imagery, airborne photography, street maps, 360° intuitively all-encompassing sees and enveloping points of view on streets (Road See), real-time activity conditions, and course arranging for voyaging by foot, vehicle, discuss (in beta) and open transportation. In 2020, Google Maps was being utilized by more than 1 billion people reliably all through the planet (Metrics).Google Maps' adherent see could be a "progressive" or bird's-eye view, most of the high-resolution symbolism of urban communities is aeronautical photography taken from plane flying at 800 to 1,500 feet (240 to 460 m), whereas most other symbolism is from satellites (Blurry ot Outdated Imagery, 2014). Much of the available satellite symbolism is near to three a long time of age and is revived on a normal premise(How often is Google Maps and Google earth updated, 2013). Google Maps as of late utilized a variety of the Mercator projection, and thusly couldn't absolutely appear regions around the posts (Designers, 2013). In August 2018, the work zone interpretation of Google Maps was revived to appear as a 3D globe. It is as however conceivable to switch back to the 2D outline within the settings. Towards the conclusion of 2015, Google Maps pronounced its unused offline usefulness (Google Maps Now Available Offline, 2016), be that as it may with diverse limitations, the downloaded locale can't outperform 120,000 square kilometers (Independent, 2018) and require a parcel of capacity space (AndroidPIT, 2016) In January 2017, Google included a component as it were to Android that will, in a few U.S. urban communities, illustrate the degree of inconvenience in finding available ceasing spots (Welch, 2017), and on both Android and iOS, the application can beginning at an April 2017 overhaul, recall where clients stopped (The Verge, 2017).In August 2017, Google Maps for Android was revived with unused value to viably offer assistance to the client in finding stopping regions and carpports close a goal (The Verge, 2017). In December 2017, Google included another bicycle mode to its Android application, aiming for clients in India, taking into consideration more prominent openness in surge hour gridlock conditions (Harish, 2017). In 2019 the android variation displayed the modern component considered life see that grants to see headings direct out and around since of expanded reality (CNBC, 2020). Google Maps won the 2020 Webby Award for Best Client Interface within the classification Apps, Portable and Voice. In Walk 2021, Google included a component in which clients can draw lost streets (Surveys, 2021). Google Maps can give pictures for the online display.

### **Virtual reality imaging (VRI)**

Virtual Reality (VR) may be a computer-generated environment with scenes and things that have all the earmarks of being veritable, causing the client to feel they are submerged in their natural components. This

environment is seen through a contraption known as a Virtual Reality headset or protective cap (Rehan& Ameer, 2015). VR licenses us to submerge ourselves in computer diversions as in spite of the fact that we were one of the characters, figure out how to perform heart restorative method or progress the nature of sports planning to boost execution. In spite of the fact that this may show up to be incredibly progressed, its beginnings are not as afterward as we might suspect. Truth be told, various people consider that one of the essential Virtual Reality contraptions was called Sensorama, a machine with an verifiable situate that played 3D movies, gave off odours, and created vibrations to form the experience as striking as can be anticipated. The creation goes back comparable to the mid-1950s. Coming about mechanical and programming progressions all through the time carried with them a reformist improvement both in contraptions and in interface arrange (Yongju&Jihun, 2015).

The wide field of see all-encompassing recordings have as of late ended up celebrated since the availability of tall objective appears. These all-encompassing recordings are created by sewing video outlines captured from an all-encompassing video securing system, routinely counting distinctive camcorders engineered on an inactive or versatile stage (Rehan& Ameer, 2015). A portable all-encompassing video securing system may encounter the sick impacts of around the world mechanical vibrations fair as free between camera vibrations bringing around an anxious all-encompassing video. While existing adjustment plots for the most part tackle single-camera vibrations, they don't represent these between camera vibrations (Yongju & Jihun, 2015). Virtual reality can provide images for the panorama.

### **Websites**

Some other people's websites had fair content, and some time recently long, pictures. Web browser modules were at that point utilized to include sound, video, and instinct, (for illustration, for a wealthy web application that reflects the multifaceted nature of a work zone application like a word processor). Occurrences of such modules are Microsoft Silverlight, Adobe Flash, Adobe Shockwave, and applets composed in Java. HTML 5 consolidates courses of action for sound and video without modules. JavaScript to boot consolidated into most present-day web browsers and considers location architects to send code to the web browser that teaches it on how to intellectuals modify the page substance and talk with the internet server on the off chance that fundamental. The program's internal depiction of the substance is known as the Archive Protest Show (DOM) (LePage, 2017). WebGL (Web Design Library) is an progressed JavaScript API for conveying natural 3D plans without the utilization of modules. It licenses brilliantly substances like 3D energy, discernments, and video explainers to presented clients within the most intuitively way (Khronos.org, 2019). A 2010-time design in locales called "responsive plan" has given the most excellent audit understanding because it gives a gadget-based arrange to clients. These locales alter their plan as per the contraption or flexible arrangement in this way giving a wealthy client encounter (Khronos.org, 2019).

### **Mobile applications**

A versatile application moreover insinuated to as a flexible application or basically, an application could be a computer program or programming application aiming to run on a cell phone like a phone, tablet, or observe. Applications were at first arranged for effectiveness offer assistance like e-mail, plan, and contact information sets, however the open intrigued for applications caused quick wander into diverse districts like flexible diversions, preparing plant computerization, GPS and range based organizations, ask taking after, and ticket buys, so that there are right now a tremendous number of applications open (Yetisen, Martinez-Hurtado, Da Cruz Vasconcellos, Simsekler, Akram, & Lowe, 2014). Applications are by and to a great extent downloaded from application circulation stages which are worked by the proprietor of the versatile working system, for illustration, the App Store (iOS) or Google Play Store. A few applications are free, and others have a fetched, with the advantage being separated between the application's creator and the movement organize (Marcano-Belisario, Gupta, O'Donoghue, Morrison, & Car, 2016). Flexible applications habitually stay as restricted to work region applications which are planning to run on individual computers and web applications that run inconvenient web browsers rather than directly on the mobile phone. The mobile applications can use goggle maps, virtual reality, play video games and run websites from the internet. They are a good platform for the online panorama because the applications run on smart phones that support all multimedia (Cho, 2017).

Gaming applications – these applications are typically the foremost standard course of flexible applications. You'd be astounded to figure out the number of clients who present diversions on their phones. Organizations contribute an growing degree of time and resources into making diversions and versatile variations of striking settled recreations since it's an especially useful market.Commerce or efficiency applications – these applications hold a colossal piece of the showcase nowadays since people are continuously slanted to utilizing their smartphones and tablets to perform various mind-boggling errands in a rush (Brownlee, 2016). For occasion, applications can help them with booking tickets, send messages, or track their work in advance.

Instructive applications – this course joins flexible applications that offer assistance to clients in secure unused capacities and data. For occasion, dialect learning applications like Duolingo have ended up incredibly well known on the grounds that they allow clients the versatility they seek for in learning. Teacher diversion applications are a wonderful gadget for youths (Lyer, 2016). M-commerce applications – the foremost celebrated shopping applications like Amazon or eBay offer the encounter of their work range interpretations to flexible clients. Flexible exchange applications allow clients to accommodating permission to things and steady instalment methodologies for an perfect shopping involvement, ended up common place with flexible exchange definitions and sorts of convenient commerce (Lyer, 2016).

Amusement applications – these applications allow clients to exchange video substance, seek for occasions, visit, or observe substance on the internet. Web-based media applications like Facebook or Instagram are mind-blowing models. Other than, video real-time applications, for illustration, Netflix or Amazon Prime Video have gotten incredibly well known with clients all over the world (Brownlee, 2016). Travel applications – the essential thought behind this classification is helping clients with voyaging without any issue. Travel applications alter a cell phone or tablet into a development diary and direct that helps clients with finding all they require to think approximately the location they're going to. The larger part of the tourists is carefully able voyagers who realize how to utilize applications for their potential advantage.

### **Video platform on social media**

YouTube is not truly a secret. Forty-six thousand a long time of the video is watched each day on the website, and it's made stars exceptionally well known. The same way it made stars well known is the same way it can showcase the environment of Hurungwe. Since YouTube is so popular, we about fall flat to keep in mind that it's a casual organization. Be that as it may, clients relate with each other, share considerations, and find energizing unused substances, really like a few other organizations (4 Stages to Plunge Into Social Media Video Promoting, 2020).Snapchat is creating at an astounding rate. In May 2015, clients were observing 2 billion recordings per day. Sometime recently the wrap-up of February 2016, was up to 8 billion. Gary Vaynerchuk (moreover known as Gary Vee) says Snapchat is the taking after tremendous casual organization for publicizing. It's quick to pay consideration to Gary.

Claimed by Twitter, Vine is an casual organization for making and sharing brief recordings. Uncommonly brief. In fact, Vines are fair six seconds. This makes a test for sponsors. In any case, essentially as falling to pieces Snapchat substance could appear like annihilation for brands, Vine's length can incite creative ability (4 Stages to Jump Into Social Media Video Showcasing, 2020).Periscope makes live gushing straightforward and compact. It permits you to communicate on an open arrange for anyone to observe, or welcome chosen clients for private transmissions. Recordings can be observed on the application for 24 hours after the basic transmission. You'll be able moreover to spare the transmission and offer it, comparative to some other substance. It isn't the primary application for live spilling.Meerkat could be a standard contender, Youtube offers it, and Facebook has made a component. We're focusing on Periscope in light of its conspicuousness and association with Twitter (4 Stages to Plunge Into Social Media Video Promoting, 2020).

### **Panoramic Cultural Platform**

The getting of symbolism for the documentation of legacy websites is broadly gotten within the commerce. It is not extraordinary for legacy ventures to capture a colossal number of pictures of everything almost objects within the scene. As the undertaking develops, the amount of pictures quickly gets to be overwhelming, a critical figure within the number of pictures being made in the Field of Virtual (FoV). Ordinary cameras with 18mm to 55mm focal points create a large number of pictures differentiated with fish eye central focuses or unidirectional cameras. In expansion to the reality that this comes about in expanded file sizes, it also brings confuse up within the errand as there's significantly more data being delivered. A number of researchers have proposed strategies to manage the issues of photographic documentation. A prevalent approach is the utilization of all-encompassing imagery. For illustration, Jusof et al. (M. J. Jusof, 2014) get Tall Energetic Extending (HDR) all-encompassing imagery in sinkholes and envision it in a web browser for documentation purposes. The accentuation of their work is on the arrangement of imagery near to nature of the common eye (Roussou, 2008). As the accentuation is on itemizing, their Gigapixel imagery approach is repetitive and needs display dealing with to suitably to make the all-encompassing imagery. We propose a comparative work-flow and easy-to-use work-flow that combines cheap sensors and lighting strategies to rapidly capture the scene.

Fan et al. (J. Fan, 2009) furthermore utilize HDR all-encompassing imagery to set up a distinctive bequest climate and grant an offline database to picture the data. Whereas being speedier, they don't give a spatial portion to assist orientate the watcher. At display, most applications really require the semi-robotized sewing of the data which prevents the interaction significantly. Another charming utilize of picture documentation is the creation of 3D models and orthographic imagery (Hassani). This incorporates

photogrammetric measures that figure the general heading of the imagery with respect to each other depending on the cover. The way toward building a 3D show from pictures incorporates the thick planning of covering pixels which are computationally troublesome. When all is said in done, these strategies are utilized to record a parcel of the scene or a specific question. For instance, Chiabrando et al. (F. Chiabrand, 2015) use airborne and close-range photogrammetry to deliver ortho-photos of a venture. Pierrot-Deseilligny et al. utilize a comparable strategy and moreover utilize the pictures to create 3D models. Entertainments of entirety structures are also proposed however regularly these depend on Earthbound Laser Checking (TLS) (M. Murphy, 2013). Pictures from online vaults are moreover utilized for 3D diversion. Makantasis et al. propose a strategy to evacuate important imagery from straightforwardly open enlightening records and successfully duplicate substances in 3D (K. Makantasis, 2016).

### **Intangible Cultural Heritage, Tangible Cultural heritage and Cultural Landscape**

As of late, scene inquire about has appeared a creating intrigued in the request of social bequest, recognizing, for occurrence, its significance for biodiversity, donning potential, feel, and the social fulfillment of social scenes (Milcu, Sherren, Hanspacha, Absonic, & Fischer, 2014). Social scenes with tall legacy esteem are undermined nowadays by sped-up and extraordinary money-related and environmental changes at the adjacent and around the world scale (MA-Millennium Biological system Appraisal, 2005). The scenes are exceedingly acknowledged in beautiful and ethereal all-encompassing pictures. These will appear all overhead and none covered up highlights of a range. Understanding the human effect on social scene strength requires an understanding of how societies associated with their environment. Over the final decade, an efficient examination of the driving instruments and players of scene alter has been progressively prevalent (Burgi, Plieninger, Palang, & Bieling, 2016). Anthropogenic variables are recognized as an overwhelming figure in producing topographical spaces, and the network of conventions and values within the arrangement of person scenes and particular components that has been habitually highlighted. Nearby individuals grant a range or locale a particular character and identity through numerous eras (Fischelli, Schuurman, & Hoffman, 2016). Social scenes have advanced through a steady talk about almost standing up to and retaining outside and inside impacts, as well as the potential changes that these strengths can bring. By conceptually interfacing intangible legacy, social scene, and personality, we will pick up more noteworthy information of communities and their interrelationships with the social scene, as well as the strengths that cause scene to alter whereas at the same time empowering scene determination (Caballero, 2017).

### **Importance of recording heritage on a panoramic view**

They say believing is seeing, so mostly the recorded heritage in scenic views makes it easy for the younger generation to understand. Heritage can be utilized in various ways. Leaving from Klas-Göran Karlsson's detail: existential, philosophical, business and instructive use appears particularly valuable and material. Joined with arrangements for safeguarding, improvement and the executives, legacy then, at that point offers a full scope of choices to legacy administrators, designers, organizers and to the general population also (Karlson, 2004). A developing assemblage of writing on arranging, creating cultural establishments is currently beginning to arise. Various models are introduced and assessed in these writings, frequently with points of view concerning the two entertainers inside the legacy area and general society. As of late, concentrates on culture and legacy set up advertising, has likewise been distributed (Aitchison, MacLeod & Shaw 2000). When arranging, creating and overseeing heritage sites, various elements need to be mulled over: the fundamental ones are admittance to assets important to safeguard, develop and keep a historical site or a historical object. Interest in the planning process is additionally a significant topic in heritage studies. The planning process includes the development of an online panorama which includes the website and a mobile application. The bottom-up approach involvement of local people in arranging and developing of heritage projects is positive. Yet, generally, the arranging cycle has been kept only in possession of entertainers inside the heritage area (Mason, 2002). On a local level, alleged Cultural Planning is a model that uses heritage as a driver for cultural and financial advancement, for the most part coordinated to the nearby occupants, yet can at the same be utilized to draw in guests and ventures. When different cultural festivals are done, records of these events should be recorded and uploaded on the website so that many people can witness the event and take cognisance of its importance. The younger generation will end up interested in their heritage because it comes in the technology that they are used to, all the heritage features come in the form of entertainment (de Bresser, 2015). Due to various understandings, legacy is either canonized or obliterated (iconoclasm). To quality worth to more periphery sorts of legacy is the thing that the third strand does. Social legacy contributes to social and financial necessities. Along these lines, it is basic to construct the comprehension of the complexities of social legacy and how it distinguishes with the important turn of occasions.

## II. Conclusion

In this paper, a visualization application is presented for legacy purposes. The complement of the work is on giving an intuitively and far-reaching approach to scattering information around unmistakable legacy to the different partners. Restricted to conventional photographic documentation work-flows which are inclined to disarray and distortion, we propose the utilization of geo-referenced 360° panoramic pictures. An unidirectional camera is utilized on a tripod nearby a lighting tile for homogeneous surrounding lighting to rapidly capture the location. The coming about symbolism is facilitated with an outline of the location and geo-located. In light of the Google API, we propose a web stage that permits the audit of the symbolism with an intelligent outline. An immersive panorama watcher is executed together with route instruments to instinctively navigate the scene. From the examinations is induced that the proposed work-flow is an imperative device in giving essential information to the stakeholders. Also, it can work as an accommodating gadget for decision-makers to choose upon the foremost fitting treatment of the asset. In common, the all-encompassing application gives a seriously immersive and comprehensive information encounter than the resource of photographs and content archives. In future work, we are going to proceed to explore the openings of utilizing the online watcher for recognition as well as for communication purposes. Functionalities such as geo-tagging, patching, and connecting the application to a GIS or Building Data Demonstrate may be invaluable for substance managing with.

## Future Works

More features should be added to the platform which accommodates more information about a place. The place should be able to sell itself fully. Most people have mobile phones which run on IOS, so a platform conversion is required for other operating systems.

## References

- [1]. *4 Platforms to Dive Into Social Media Video Marketing*. (2020, 5 6). Retrieved 4 2, 2021, from <https://mention.com/en/blog/social-media-video-marketing/>
- [2]. AndroidPIT. (2016, 11 19). How to use Google Maps offline.
- [3]. Blurry of Outdated Imagery. (2014, 10 10).
- [4]. Brownlee, J. (2016, 07 04). Conservational Interfaces. *Co. Design* .
- [5]. Burgi, M., Plieninger, T., Palang, H., & Bieling, C. (2016). Sustainable features for europe's heritage in cultural landscapes. *Tools for understand, managing, and protecting landscape functions and values* .
- [6]. Caballero, G. V. (2017). Crossing boundaries: Linking intangible heritage, cultural landscape and identity. *Proceedings of the pagtib-ong: UP Visays International Conference on Intangible heritage*, (pp. 25-26 May). Iloilo City, Philippines.
- [7]. CNBC. (2020, 02 21). Google Maps AR directions reased.
- [8]. de Bresser, R. (2015). *Tourism Development Strategy for Mumbai*. Dutch: Bombay First.
- [9]. Developers, G. (2013, 01 15). *Map Types*. Retrieved from Google Maps JavaScript API v3.
- [10]. Earth, G. (2021). Hurungwe District. *Google Earth* .
- [11]. F. Chiabrando, E. D. (2015). SfM for orthophoto generation: Awinning approach for cultural heritage knowledge,. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*.
- [12]. Fischehelli, N. A., Schuurman, G. W., & Hoffman, C. H. (2016). Is "Resilience" maladaptive? *Towards an accurate lexicon for climate change population* , 753-758.
- [13]. *Google Maps Now Availbale Offline*. (2016, 10 19). Retrieved from [www.govtech.com](http://www.govtech.com)
- [14]. Harish, J. (2017, 12 5). Google maps get a dedicated teo wheeler in India. *Android Central: Mobile Nations* .
- [15]. Hassani, F. Documentation of cultural heritage techniques, potentials and constraints. *InternationalArchivesofthePhotogrammetry,RemoteSensingandSpatial Information Sciences* .
- [16]. *How often is Google Maps and Google earth updated*. (2013, 10 24). Retrieved from [www.technikamix.com](http://www.technikamix.com)
- [17]. Independent, T. (2018, 06 29). How to use google maps when you do not have a connection.
- [18]. J. Fan, Y. F. (2009). HDR spherical panoramic image technology and its applications in ancient building heritage protection. *IEEE 10th International Conference on Computer-Aided Industrial Design and Conceptual Design*. Proceeding 2009: E-Business, Creat.
- [19]. K. Makantasis, A. D. (2016). In the wild image retrieval and clustering for 3D cultural heritage landmarks reconstruction. 75. Western Michigan University.
- [20]. Khronos.org. (2019, 04 01). OpenGL ES for the web.
- [21]. LePage, P. (2017, 03 13). Responsive Web Design Basics.
- [22]. Lyer, S. (2016). *Things you never need to do for mobile security network world*.
- [23]. M. J. Jusof, H. R. (2014). Revealing visual details via high dynamic range gigapixels spherical panorama photography: The Tempurung Cave natural heritage site. *Proceedings of the 2014 International Conference on Virtual Systems and Multimedia*, (pp. 192-200).
- [24]. M. Murphy, E. M. (2013). Historic Building Information Modelling Adding intelligence to laser and image based surveys of European classical architecture. *ISPRS Journal of Photogrammetry and Remote Sensing* .
- [25]. (2005). *MA-Millennium Ecosystem Assessment*. Ecosystems and Human Well being. Washington: Island Press.
- [26]. Marcano-Belisario, J. S., Gupta, A. K., O'Donoghue, J., Morrison, C., & Car, J. (2016). Tablet computers for implementing NICE antenatal mental health guidelines: Protocol of a feasibility study.
- [27]. Metrics, G. M. (n.d.). *Google Maps Metrics and Infographics*. Retrieved April 01, 2021, from Google Maps for iPhone: [sites.google.com](https://sites.google.com)
- [28]. Milcu, L. A., Sherren, K., Hanspacha, J., Absonic, D., & Fischer, J. (2014). Navigating conflicting landscape aspirations. In *Land Use policy* (pp. 408-422).
- [29]. Rehan, H., & Ameer, H. (2015). Stabilization of panoramic videos from mobile multi-camera platforms. *Image and Vision Computing*, 37, 20-30.
- [30]. Reviews, T. (2021, 11 03). Google Maps updated will let you draw in missing roads.

- [31]. Roussou. (2008). New Media and Cultural Heritage. *NewHeritage* .
- [32]. The Verge, V. M. (2017, 08 29). Google maps will now help you find parking. Gartenberg.
- [33]. Welch, C. (2017, 01 26). Google maps now tell you how hard it is to park in some cities.
- [34]. Yetisen, A. K., Martinez-Hurtado, J. L., Da Cruz Vasconcellos, F., Simsekler, M. C., Akram, M. S., & Lowe, C. R. (2014). The regulation of mobile medical applications". *Lab on a Chip*.
- [35]. Yongju, C., & Jihun, C. (2015). Stabilization of panoramic videos from mobile multi-camera platforms. *Image and Vision Computing* , 20-30.
- [36]. ZimStat. (2012). *Mashonaland West Proviince Report*. Chinhoyi: ZimStat.

Fungai Jacqueline Kiwa, et. al. "Saving the Vanishing Intangible and Tangible Cultural Heritage through the Development of an Online Panorama." *IOSR Journal of Computer Engineering (IOSR-JCE)*, 23(6), 2021, pp. 53-59.