School of Architecture, Planning, and Policy Development
Institut Teknologi Bandung

Ministry of Tourism
Republic of Indonesia

arte polis 6

creative tourism and the making of place

proceedings volume2

2016

arte-polis 6
creative tourism and the making of place

Proceedings

Arte-Polis 6 International Conference
Imagining Experiences: Creative Tourism and the Making of Place

Bandung, 4-5 August 2016

Volume 2

School of Architecture, Planning and Policy Development
Institut Teknologi Bandung
INDONESIA

Proceedings
Arte-Polis 6 International Conference and Round Table Discussion
Imagining Experiences:
Creative Tourism and the Making of Place
Bandung, 4-5 August 2016

Editors
Indah WIDIASTUTI
Nova ASRIANA
Hafshah SALAMAH

School of Architecture, Planning and Policy Development
Institut Teknologi Bandung

ISBN 978-602-74872-0-8 (jil.2)

School of Architecture, Planning and Policy Development
Institut Teknologi Bandung
Jalan Ganesha 10, Bandung, INDONESIA
Tel. +62-22-2504962, Fax. +62-22-2530705
Email: artepolis@ar.itb.ac.id

PREFACE

The sixth biennial Arte-Polis International Conference between the 4-5 August 2016 brings together to Bandung, Indonesia, creative champions from different places around the world, to share and learn from each others creative experiences in the making of places.

Under the theme of Imaginig Experiences : Creative Tourism and the Making of Place Arte-Polis 6 underlines the importance of local art & craft, built envirnonment and landscape as reflections of creative energy, cultural richness, environmental diversities, quality of living, traditions of its people, and potential for tourism. Creative Tourism reffer to tourism within the frame of creative community and place-making and their reflections in spatial structure, planning, ethic, policy-development, business, environmental discourse and ICT.

The aim of Arte-Polis 6 is to connect together practitioners, academics, community leaders, government officials, policy-makers, artists and other creative professionals from diverse disciplines and regions around the world to shares concerns about the growing trend of tourism and environment sustainability in its relation to the nature of creative culture and creative communities in urban, rural and pastoral places, particularly in response to contemporary situations of globalization, neo-liberal economy, the advent of digital technology, environmental issues and the positions and role of society and public realm in the discourse of creative culture.

Keynote and Featured Speakers provide a platform for discussion of Conference theme to be elaborated in parallel sessions of the Conference Tracks:

Arief YAHYA, Dr. – Minister of Tourism, Republic of Indonesia, INDONESIA
Feng HAN, Prof. – College of Architecture and Urban Planning, Tongji University Shanghai, CHINA
Greg RICHARDS, Prof. – Breda University of Applied Sciences, NETHERLANDS
Lenia MARQUES, **Dr**. – Bournemouth University, UNITED KINGDOM
Frans TEGUH, Dr. – Ministry of Tourism, Republic of Indonesia, INDONESIA
Budi FAISAL, PhD. – Center of Tourism Planning and Development, Institut Teknologi Bandung, INDONESIA

In this publication, Parallel Session papers are compiled to provide an insight for reflection and sharing of the best practice experiences from over 15 countries. We trust that you will find Arte-Polis 6 International Conference on Arte-Polis 6 Imaginig Experiences : Creative Tourism and the Making of Place a rewarding and enriching learning experience worth sharing.

The Editors
Arte-Polis 6 International Conference

CONTENTS

TRACK B

Digital Technology Enabling Creative Tourism and Experience

TRACK C
Creative Strategy, Innovation and Policy Making for Heritage and Cultural Landscape

Augmented Reality for Enriching Experience for Creative Interaction Display in Mount Merapi Museum, Yogyakarta

Bertha BINTARI
Departement Mechatronic Product Design
Polytechnic of Mechatronics Sanata Dharma
INDONESIA
bertha@pmsd.ac.id

ABSTRACT

One of the trigger for the nation's generation who appreciate the history, culture and knowledge is by visiting Museums. Unfortunately, the museum's collection displayed in a conventional concept of the museum as a "warehouse" goods, it made museum has less desirable to visit.
Augmented reality has begun to be used in applications for various fields. In this paper Augmented Reality will be used as the design of the supporting media museum experience at Mount Merapi Museum applications to enrich the creative experience interactively.

Keywords: *Augmented reality, museum, creative experience*

BACKGROUND

The use of Augmented Reality (AR) creatively enriching experience of space, events, and knowledge. AR applications by using a 3D virtual e-drawing that will be simulated in virtual realistic. The experience will be raised by the application of holograms or movie to add real impression. Furthermore, It is expected from the design plan will be developed to be applied in the museum of Mount Merapi in Yogyakarta.

As an educational place that is also recreational, the museum should be able to attract curiosity, amazed, excitement, which made visitors get engage with the experience in the process of gaining insight in the museum. But when the media does not accommodate interaction with visitors, which is intention to engage, get new experience so there will not rises motivation to give others a recommendation to visit it again. The process of experiencing a visit in the museum is very important to give the memory trace and expected visitors will still continue exploration outside the museum through the media or on the museum's website. So the museum today should have the management of the information displayed as an interactive museum exhibition material and information contained on the website which has a virtual iteration to the visitor.

With technology evolving at this time, especially the technology of Augmented Reality (AR) is superior to the virtual animation is to combined between real-world objects with virtual objects, can be used as a means to cover the real time inherent in the media presentation of the material and information museum today. The development of AR technology has grown every related form that can be applied either in the web application form, desktop and mobile.

In this paper will only discuss about how Augmented Reality with various options can now be applied to the way the museum display in the Museum of Mount Merapi, Yogyakarta. By trying to identify their needs and sketched the design concept to the presentation of the concept of Augmented Reality which is suitable for the characteristic of the museum.

METHODOLOGY

Methodology of this paper is beginning with identifying the material types and information from the museum that has the potential to added Augmented Reality in the presentation. Identifying information needs of visitors and visitor interaction possibilities using this application. To analyze the potentials of the museum's materials determine the type of applications that will be added to the needs of the information .In the other side to analysis the need is to adjust the interaction of the information and knowledge would be delivered. Then from the design concept Augmented reality sketch, it could be used for recommendation as management advice museum presentation of information material.

Definition and Benefits of Museum

The definition of the museum is:
"A non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, Researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment".

In a sense it is mentioned that the museum not only as a place to collect, preserve, and examine objects tangible and intangible, but also as a place to communicate and exhibit to the public for the purposes of study, education and enjoyment.

Mount Merapi Museum

Mount Merapi Museum is located at Jln. Boyong, Harjobinangun village, Pakem, Sleman, Yogyakarta, about five kilometers from the park Kaliurang. Mount Merapi Museum was open on October 1, 2009 by the Minister of Energy and Mineral Resources (ESDM), Purnomo Yusgiantoro.

With a building area of about 4.470 that stood on the land area of 3.5 hectares, the future museum will also be equipped with a garden, parking area, and this plaza wish known to the public as a museum with the motto of Museum as Merapi the window of Earth Volcano Museum is intended as a means of education, information dissemination of volcanoes aspects in particular and other geological disaster that are re-educative for the people

Museum as Educational Place

MGM is designed for educational tours, as a place to knowledge conservation, disaster science of volcanoes, earthquakes, and natural disasters. Such information, as list below

1. Volcano, seismicity and ground motion (dynamics of geological processes)
2. The phenomenon of the formation of volcanoes
3. Mitigation of volcanic disasters, earthquakes, tsunamis, ground movement
4. Resource volcanoes
5. Socio-cultural aspect (life, culture / traditions, myths and others related to the environment and the existence of volcanoes).

Media display materials which presented in museum are photographs, objects, posters, dioramas and film media. The information materials such as posters have information in text form, whereas some objects are presented with such minimal information such as only the name of the object.
Spatial exhibition are to display the posters, diorama, and visual media distributed as:

1. First Floor Museum Merapi Volcano
Merapi Volcano Museum The first floor consists of four rooms that can be enjoyed by visitors, are (1). Lobby (2). Exhibition space which is display the impact of Merapi eruption in 2010 (3). Space to display the world of volcanoes (4). Space to display surrounding of the Merapi, volcanology, and (5). Thematic plaza, the exhibition on the first floor has two themes, the Merapi Volcano theme and the Around the World Volcano theme.

Lobby
This space is a transitional space visitor. The Lobby has circular shape and a void. There is a mock model, a replica of Mount Merapi which has diameter around+ 6 m. The replica is design for interaction activities. It is simulate the eruption of Mount Merapi in 2002, 2006 and 2010. There are four buttons on the replica. The first button is a narrative button that explains about Mount Merapi in Indonesian and English. The second button is a button to simulate the glowing hot clouds when the eruption happened in 2002. The third button is a button that simulates glowing hot clouds when the eruption happened in 2006. The fourth button is a button that simulates glowing hot clouds when the eruption happened in 2010. In the lobby there is also a scale model of Merapi Volcano Museum and mockup of Ketep Pass were made in scale 1: 200m. Merapi Volcano Museum model, describes the current state of the museum, including the concepts and overview of the museum in the future.

Impact Exhibition space of Merapi Eruption 2010
This room is located on the right of the entrance as visitors pass through .The lobby room showcased Merapi eruption activity documentation in photographs, the impact of hot clouds of the houses around the slopes of Merapi, and bridges were destroyed by hot clouds. In addition, there is a motorcycle carcass affected by the eruption of Merapi, the owner donated to the museum. In the room there a showcase containing everyday equipment such as spoons, forks and pans and glassware belonging to residents affected Merapi hot clouds of Merapi eruption.

World Space Volcano (Volcano World)
Volcano World space is a space after the lobby. In this room showcased the evolution of the earth's crust magmatic volcanic environment, the active volcano of the world and Indonesia, Indonesian volcanoes face, the types of volcanic eruptions, eruptions index he shape of volcanoes, fire explotion, volcanic eruption Indonesia and the world, and resources volcanoes.

The exhibition in this room is presented in a poster affixed to the panels, mock-ups, props, and a collection of objects in s. Poster showcase presented consists of illustrations and photos are annotated in Indonesian and English. Museum collections in the form of material objects eruption
Merapi is a stone that is labeled in Indonesian and English.
The distribution of active volcanoes of the world and Indonesia in the form of props were briefed in Indonesian and English.

After World Volcano room, the visitor enters another room named Regarding Merapi Volcano. This space contains information and sundries near Merapi. Information is

delivered in the form of posters, mockups, paintings and a collection of museum objects. Poster presented consists of various kinds; (1) picture illustration of mitigation measures Merapi eruption, the myth of Merapi Volcano and Volcano Bromo, and early warning when the eruption occurred. (2) Photo documentation of Merapi via satellite and digital cameras. (3) Map neighborhood Merapi eruption.

Room Plaza Thematic
Thematic plaza space is located in the center of the museum .The rooms are earthquake simulation room, contains a replica of the trees and mountains. Until now this room cannot be used because of damage to the machine due to the rain of ash during an eruption of Mount Merapi in 2010

2. Second Floor Exhibition at Museum of Merapi Volcano
Photos Space at east
The collections in this room, consist of poster photographs of landscapes seen from the slopes of Mount Merapi village and panoramic views of Mount Merapi in 1954.

Round Space
The poster depicts the landscape of Mount Merapi began in 1900 until 1961, and posters Mount Merapi in 2006 and 2008

Memorabilia space
This room contains a poster during eruption of Merapi in 2010, miniature Merapi and scenes around Merapi, and there is room memorabilia that contains the photo documentation of the Indonesian president Soekarno to Susilo Bambang Yudhoyono when a visit to Mount Merapi.

Tsunami space
This space contains information about the process of a tsunami, a tsunami hazard simulation tools tsunami placed in glass showcase , a globe in diameter + 1 m rotatable, posters various processes of emergence of life on earth, and mockups types dome and types tectonic plates and fault simulation tool that can use by visitors to simulate earthquake. This simulation gives knowledge to visitors about how the feel of earthquake levels as measured by the Richter scale, from a low to a high.

Eruption space
This space contains information about the eruption of Mount Merapi from 1930 to 2010.The addition information is presented in poster also in diorama, visual display and display cube stacking in three. Diorama presented describing the distribution of hot clouds. Visual display in this room uses the television screen.

Monitoring space
In the middle of this room there is a scale model of Mount Merapi, posters various methods of monitoring Merapi from 1930hingga year 2010. Visually displayed video monitoring Merapi ecara both visual and seismic mountain.

Structure space
This room provides general information about the structure of Mount Merapi and Merapi. There is also a poster and mockups that describe the atmosphere of the Merapi eruption in 1930-1934, 1961-1969, 1994-2006 and 2010.Selain mockups that illustrate the Merapi eruption; there is also a scale model of Mount Merapi structure

INTERACTION POTENTIALS

Some media have been applying the interaction of visitors with the media on a display of information for example:
1. Media sound effects, lights, smoke, and narrative in a physical model of the volcano in the hall when displaying models of Merapi eruption in some years when visitors press a button on the edge of the media.
2. Media LED lights are illuminated on the map volcanoes when the name of the mountain pressed the button and the lights will flash to indicate the location of the mountain on the map. Light color indicates the level of activity of the mountain.
3. The media picture boxes are arranged as a medium that can be rotated to view photos on the other side of the crib. Boxes are containing photos of a topic.
4. The media simulated earthquake that will shake and sound when you pressed the button. This media is an example of display space, but visitors are not allowed to climb the media.
5. Media simulation of the tsunami, the media is in the form of a kind of aquariums with a diorama of the beach and water. When the button is pressed, the aquarium will move as if water becomes a tsunami.

Of the many interesting material to be told at MGM is unfortunately not allow for a museum guide guider many people. Visitors who come in groups do not all have the same intention of information. Independent museum visitors get information only if they reading the information on the poster. While the article is presented with a letter that can only be read in a way closer to the poster panel. Most of the visitors just skip poster without reading it carefully.

Of the entire collection of the Museum of Mount Merapi, there are 55 posters, two paintings mythology, 6 mockups, 10 collectibles 6 poster collections of photographs, 1 pcs memorabilia, and 7 props and interactive potential simulation. Poster has a chance to be facilitated with Augmented Reality in the Visual form of information and 3-D modeling and animation that can be accessed through mobile gadgets. At the props as a tool that can be used interactively, Augmented Reality applications added to enrich the information with animation or video. In other way on mockups and collectibles can include Augmented Reality on some kind to facilitate observation and add information. The addition of Augmented Reality with interactive video can be added as a new interactive activity, the new museum atmosphere which contains certain psychological elements thus giving a new experience to visitors.

Visitor Profile

The number of visitors in the museum Mount Merapi continues to increase, rating both domestically and abroad. The number of visitors in 2010, which is 41 471 visitors, while in 2011 increased to 64,700 visitors (up 65%) and in 2012 until the end of August 2012 is 63 129 visitors from the target of 100,000 visitors. Profile of most visitors are students, due to the program must visit the museum in collaboration between the Dinas Kebudayaan and the school. From the questionnaire about the arrangement and presentation of material existing museum today, taken by 55 respondents, it was concluded as, that the visitors were mostly aged more teens just take pictures - a photo on a particular object (a unique building, the hall space is unique). Information not be interesting for them, read the text by themselves on poster. Visitors are more interested in pressing a button, try the simulation tools and props, instead of paying attention to the movie visualization. From this questionnaire showed that 69% of visitors, visit museum for recreation, while 27% to gain knowledge.

From this conclusion it is necessary to plan and develop activities that are educational but also recreative place, so that information and knowledge are delivered to the

museum can attract more visitors. Presentation and additional activities provide experiences and interaction with the material of the museum into a strategy is important to manage

AUGMENTED REALITY

Augmented reality is a technique of merging real objects and virtual in a real environment, run interactively in real time, and there is integration between objects in three dimensions, as integrated virtual objects in the real world. The main goal of augmented reality is to create the sensation of virtual objects are present in the real world. To achieve this effect it is necessary merger between virtual reality (VR) to the real world.

Augmented reality will be very effective if added in realtime virtual element. Because of this, commonly added augmented reality objects on a 2D or 3D digital video in real-time. Virtual objects are added to the visual scene known as AR.
Augmented reality using methods Marker Matching to match the marker captured by the camera with a matrix that has been determined. Matching Marker stages used by the authors is the rectangle extraction and pose and position estimation will be explained further in the next section. Once the data is matched marker and marker ID is obtained, then the visual AR suitable to be displayed to add the needed information.

Functions and advantages of Augmented Reality
Function and Advantages of AR and VR technology in animation are:

1. Media virtual display produces interactive cornerstone of virtual 3-D.
2. Equipment merging images, color coding and transparency, manual and automatic segmentation structure.
3. The use of advanced equipment is based on the actual conditions and the code scan images provide important information about relevant information, which can be explored and stimulated with different approaches to meet the needs of personal information.

DISPLAY POSITIONING

AR displays may be classified into three categories based on their position between the viewer and the real environment: a head-worn, hand-held, and spatial.

Head-worn

Visual displays attached to the head include the video / optical see-through head-mounted display (HMD), the virtual retinal display (VRD), and head-mounted projective display (HMPD). A current drawback of head-worn displays is the fact that they have to connect to the graphics computers like laptops that restrict mobility due to limited battery life.

Hand-held

This category includes hand-held video / optical see-through displays as well as hand-held projectors. Although this category of displays is bulkier than head-worn displays, it is currently the best work-around to introduce AR to a mass market due to the low production costs and ease of use.
For instance, hand-held video see-through AR acting as magnifying glasses may be based on existing consumer products like mobile phones.

Spatial

The last categories of displays are statically placed within the environment and include a screen-based video see-through displays, spatial optical see-through displays, and

projective displays reviews .These techniques lend themselves well for large presentations and exhibitions with limited interaction. Early ways of creating AR are based on conventional screens (computer or television) that show a camera feed with an AR overlay. This technique is now being applied in the world of sports television where environments such as swimming pools and race tracks are well defined and easy to augment.

The concept of the design of the material by applying Augmented Reality museum will be distinguished from the possible need for appropriate information accessible to the desire of visitors, but it has a genuine interaction between the virtual object. In addition to the needs of the information provided and accessible to visitors, Augmented Reality will be applied as interactive objects that can be experienced directly by visitors, so involved in the display object.

Considerations for choosing a method other AR applications is the limited ability to provide a tool if the tool must be worn by every visitor of the manager. With these considerations, the concept of AR-elect is the first display method using a mobile phone or gadget visitors' own. The second is to use screen media that include video motion capture and recognize signs at specific locations.

The concept of systematic application

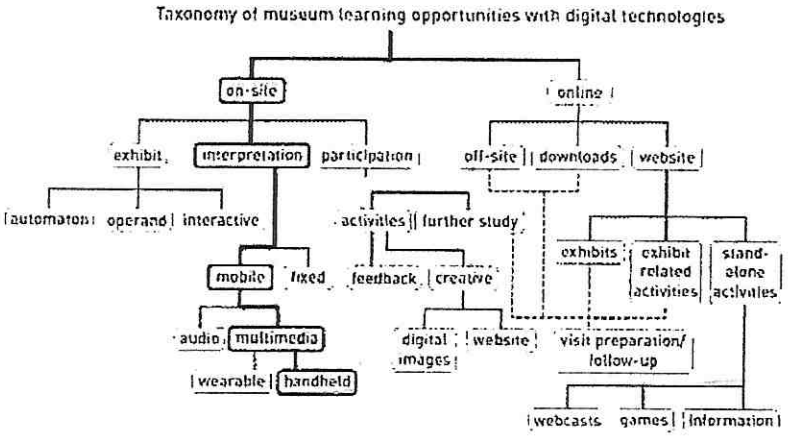

Figure 1. Museum learning opportunity with digital technologies

Mobile phone

The system will be built is a mobile application on the Android platform with the technology of Augmented Reality. Technology with application mobile will be easily accessed anywhere and is growing at the present time making it easier for the user to access this application. The advantage of augmented reality technology is also very advantage in terms of displaying the information in real time so it can be incorporated into applications, to be able to provide solutions to existing problems. The aim of the design of this app is able to display information from real time books.

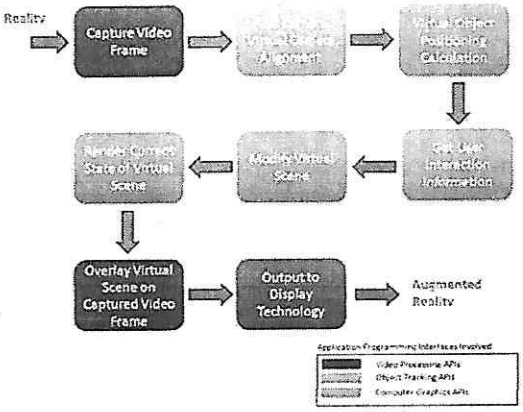

Figure 2.scheme of AR Process

In other AR application will be apply in big screen to capture the mark on the floor. The interaction between visitor and object from AR will pursue a new adventure of experience. The AR aplication video will be choosed from a particulary scene of Merapi eruption.

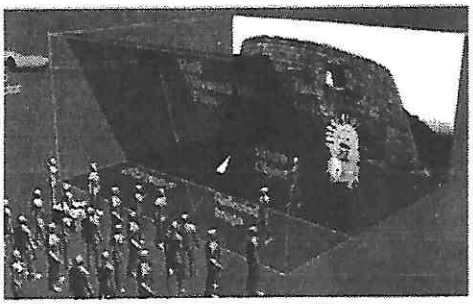

Figure 3.AR visualization

AUGMENTED DESIGN CONCEPT

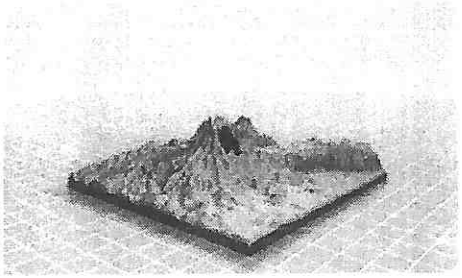

Figure 16. Model 3D

Concept of Aplication of Augmented Reality

Making this application begins with data collection, then followed by analysis of system requirements. Then proceed to the stage object design Volcanology use and application Blender 2.69 insertion of objects into ARToolkit. 3D animation created is

forming volcano, part of the volcano, based on the type of volcano eruptions and the type volcano based on its shape.

Designing objects "The volcanology learning" use application Blender 2.69 and low poly modeling .This application can be downloaded free so users can use the application without the need buy licenses application Blender . 3D object that was created in Blender, should be inserted into ARToolKit, thus forming 3D animation is used Augmented Reality technology.

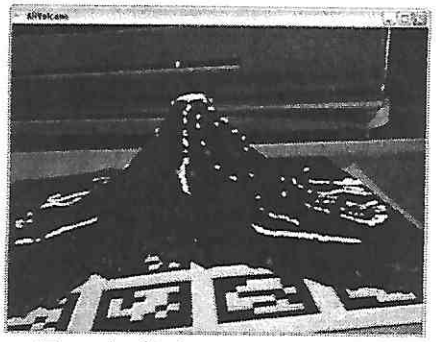

Figure 17 sample of Volcano eruption type (Emir M. Husni)

CONCLUSION

Design concept to develop the attractiveness of museum material using AR technology allows visitors to interact, gain more experience with the creative atmosphere, learn to direct and engaging as the subject is in control of the object on display.

From the entire object material exhibits almost all have the opportunity to be made as objects of interest using a combination of AR technology applications. The use of the type or types of AR technology makes visitors will be involved in different ways in each space.

BIBLIOGRAPHY

AGUSTINNA, Yosanny; Muhammad Ismail; Handoko Said. 2013. *Perancangan Augmented Reality Untuk Peta Topografi*, ComTech Vol.4 No. 2 Desember 2013.

CHRIS D. Kounavis, Anna E. Kasimati, and Efpraxia D. Zamani. 2012. *Enhancing the Tourism Experience through Mobile Augmented Reality: Challenges and Prospects*, International Journal of Engineering Business Management.

DEDI, Ary Prasetya, Muhammad Nurruzzaman. 2013. *Menerapkan Aplikasi Augmented Reality Pada Obyek-Obyek Museum Radya Pustaka*, Simposium Nasional Teknologi Terapan (SNTT) 2013.

D.W.F. van Krevelen and R. Poelman. 2010. *A Survey of Augmented Reality Technologies, Applications and Limitations*, The International Journal of Virtual Reality.

EMIR, M. Husni, Yusuf Rokhmat, *Perancangan Augmented Reality Volcano untuk Alat Peraga Museum*.

GALAN, Januanesbi. 2013. *Pembelajaran Vulkanologi Secara 3d Berbasis Augmented Reality*.

arte-polis 6

creative tourism and the making of place

Institut Teknologi Bandung
Labtek IXB 4th Floor
Jl. Ganesha 10
Bandung 40132
INDONESIA

+62 22 250 4962 P
+62 22 253 0705 F
artepolis@ar.itb.ac.id E
arte-polis.id W

978-602-74872-8-8