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The Use of Artificial Intelligence in Visualizing Historical and Cultural Objects on Social Media: A Sentiment Analysis of Public Reactions to AI Generated Images of Indonesian Heritage

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Abstract

Visual reconstructions generated by Artificial Intelligence (AI) are swiftly gaining popularity in both academic circles and entertainment industries. Without credible sources, disseminating AI-generated visual depictions of historical figures and ancient sites on social media may perpetuate misinformation and cognitive bias. AI-generated reconstructions have been developed within the scientific practice of History, Anthropology, and Archaeology. However, there are limited studies regarding the utilisation of AI to visualise historical objects, in terms of public reaction to the AI-generated visual. By conducting sentiment analysis of comments on AI Nusantara's TikTok platform, the study intends to provide an overview of public response to the visual design of historical figures and sites generated by AI technology. The public response to AI is important because many researchers are using social media as a source of data to forecast and explain human behaviour in real life. Related to the use of AI technology that penetrates various fields of life, this research in general can be useful for reading public responses and tastes so that they can project the use of AI in the future. Sentiment analysis methodology was employed to analyse comments posted under uploaded AI-generated images of historical figures and sites. The sentiment classification process uses the Naïve Bayes classifier algorithm in the RapidMiner software. This study finds that public sentiment regarding the utilisation of AI is categorised into three domains: accuracy, technology, and common knowledge. The categorisation is based on scientific opinion and local knowledge opinion. Accuracy relates to the similarity of AI-generated visuals to public expectations. Technology refers to the public's curiosity about the tools that are used to create the visualisation. Common knowledge refers to public perception and custom. This study also illustrates how AI can facilitate the creation of creative characters which are accurate by integrating academic references.

Keywords: Public opinion, AI Visualisation, Social media analysis, Visual reconstruction, AI-Generated.

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Introduction

The rapid growth of Artificial Intelligence (AI) technology has impacted the multidimensionality of human life (Saba and Pretorius 2024). During its continuous evolution, AI raises numerous debates within society. AI technology is increasingly prevalent in economics (Besiroglu et al. 2024), education (Ballantine et al. 2024; He et al. 2024), and healthcare systems (Onno et al. 2023; Schaekermann et al. 2024). AI has made significant contributions to the advancement of research in archaeology, history, and visual culture (Cotella 2023; Murphy et al. 2024). AI helps to categorise archaeological discoveries through visual recognition technology, predicting missing text in ancient manuscripts (Assael et al. 2022a; Zhao and Zhou 2025), presenting illustrations of ancient artifacts and scenes (Magnani and Clindaniel 2023), and correcting the colours and visuals of ancient artifacts (Santos et al. 2024). Nonetheless, the utilisation of AI introduces bias when the data is disproportionately sourced from a single individual, organisation, or region. This discrepancy in data enables specific patterns to emerge, driven by the data inputted into the AI platform. Thus, this phenomenon produces outputs with limited accuracy. Research concerning the utilisation of AI in reconstructing specific scripts or visuals remains primarily within the academic domain. Meanwhile, the public has exploited AI platforms such as Midjourney, OpenAI, DALL-E, and Stable Diffusion to reconstruct scripts or visuals for entertainment purposes with lack of accuracy.

One of the initial applications of computerisation in archaeology involved forecasting site locations and automating the classification of unearthed archaeological discoveries, as demonstrated by Fusco et al. (2022), Barceló (2009), and Gualandi et al. (2021). Lyons et al. (2022) argue that fostering interdisciplinary collaboration between archaeologists and computer scientists serves as a vital strategy for enhancing and broadening digital methodologies within the field of archaeology (Lyons et al. 2022). The use of computerisation for predicting historical artifacts is steadily advancing, with Roueché (2022) utilising an AI platform named Ithaca to demonstrate the capability of deep neural networks in restoring missing letters in an ancient manuscript (Assael et al. 2022a). The Ithaca platform was trained using a dataset consisting of 178,551 manuscripts that were subjected to scientific research assessment. Ithaca's precision holds potential to enrich and improve the endeavours of researchers. Specifically, the utilisation of AI for predictive purposes as demonstrated by Roueché mirrors the work of Assael in predicting the contents of damaged manuscripts (Assael et al. 2022b; Barcelo 2009; Fusco et al. 2022; Gualandi et al. 2021; Lyons et al. 2022; Roueché 2022).

Recently, AI technology has been used to visualise historical figures and sites. A multitude of these reconstructions have been shared on various social media platforms. Nathan Shipley (@nathan_shipley_vfx), a notable motion graphic artist,

recreates paintings of renowned global historical figures into their present-day human likeness with the assistance of AI technology. The designers from @ ainusantara also reconstruct figures and sites related to Indonesian historical events using AI technology. In contrast to Nathan, who bases his visual reconstructions on well-known paintings as the primary source (Figure 1), AI Nusantara (@ ainusantara) does not necessarily use paintings but also relies on literature and statues to visualise characters and historical sites in Indonesia, such as using the Prajna Paramita statue to predict Ken Dedes's face (Figure 2).

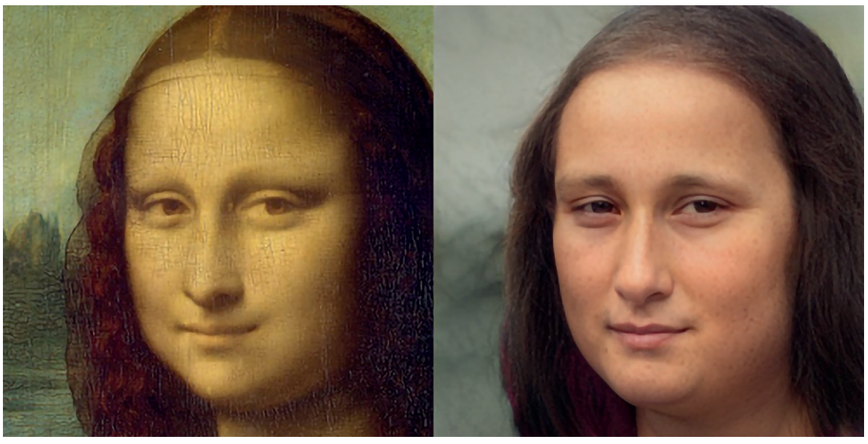


Figure 1. AI visual design based on the Mona Lisa painting (Shipley 2021) used with the creator's explicit permission (granted via email on 12 November 2024).

Figure 2. AI visual design based on the Prajna Paramita statue (@ainusantara 2022) used with the creator's explicit permission (granted via email on 12 November 2024).

At the same time, creators are sharing their work across social media platforms, including Instagram, YouTube, and TikTok. This practice has generated diverse responses from internet users. The public's interest in visual designs based on cultural and historical heritage shapes the responses of internet users, which in turn present several possible outcomes. For instance, the perception of AI-generated visualisations as an unquestionable truth may lead to controversy and more intricate consequences. This scenario is highly probable when a visual representation becomes widely circulated or goes viral on social media, influencing the public's perception of historical or cultural visualisation without validation from relevant scientific experts. Murata (2022) suggests that the utilisation of AI technology without adequate oversight of its accountability could contribute to the emergence of a society where individuals are treated as black boxes whose minds are manipulated and exploited through AI, known as post-truth society (Murata 2022).

In another perspective, the utilisation of AI and machine learning remains a subject worthy of critique. According to Crawford (2021), the classification system implemented by AI is inherently entwined with social and political dimensions, as it fundamentally relies on human subjectivity to assign words (labelling) to the trained data (Crawford and Paglen 2021). From a geographical standpoint, Davis (2020) also observes a disparity in the data accessible for utilisation of AI. Davis notes that the advancement of automated computational methods is hindered by the geographical discrepancy in the development and application of these techniques (Davis 2020). From an artistic standpoint, the utilisation of AI also presents challenges. Artists raise objections to at least two aspects when AI generates an image, namely ethical concerns and issues related to artistic expression. Ethical concerns arise from the alleged unauthorised sourcing of the images, potentially infringing on the artist's portfolio of works. A study also finds that people tend to like artwork less if they know it was made by AI, but they like it more if they know a human was involved; they value the human touch in art (Bellaiche et al. 2023). In relation to visual reconstructions of historical figures and events, it is evident that AI-generated images still rely on datasets sourced from artists' portfolios from around the globe. Thus, there is a need to scrutinise the bias and accuracy of these visualisations (Crawford and Paglen 2021; Davis 2020; Liu 2020; Murphy et al. 2024).

Therefore, this study aims to examine social media users' sentiments towards the visualisation of historical and cultural objects generated by AI through their comments. This study applies mixed methods in analysing social media comments—quantitative and qualitative—by scrutinising the accuracy of AI and cultural authenticity based on local beliefs and scientific evidence. By conducting sentiment analysis on data collected from social media, the study provides an

overview of the public response to the visual design of historical figures and sites generated by AI. Related to the use of AI technology that penetrates various fields of life, this research in general can be useful for reading public responses and tastes so that they can project the use of AI in the future (Abbasi et al. 2012). This study also contributes to the discourse on AI utilisation in the preservation of history and culture, as well as the role of social media in shaping collective memory.

Material and Method

Method

This study uses sentiment analysis of comments on TikTok social media posts about images created by AI based on Indonesian history Sentiment analysis is used to capture responses or opinions in social media comments by assessing the subjectivity of social media users' expressions and then classifying their sentiment as positive, negative, or neutral. Pozzi et al. (2017) explain that sentiment analysis is the process of evaluating the opinions, behaviours, and emotions of certain individuals towards an entity such as products, organisations, events, topics, figures, and others (Pozzi et al. 2017).

The first stage is data collection from comments uploaded on TikTok social media about Gajah Mada, Prabu Siliwangi, Singhasari Kingdom, and the Pyramids in Tanah Sunda from the AI Nusantara account. The four selected visuals were chosen due to their strong cultural significance within Indonesian society and the authenticity of the factual data, which has been interpreted in multiple ways. Comments for analysis were selected by identifying those that discuss the accuracy of AI-generated visuals and their cultural authenticity, considering both local beliefs and scientific evidence. This study focuses specifically on comments written in Indonesian. Although there were no geographical restrictions during data collection, the extracted data revealed that nearly all discourse occurred in Indonesian. This indicates that the primary audience for the AI Nusantara account consists of Indonesians who are engaging with local historical and cultural contexts through AI-generated images.

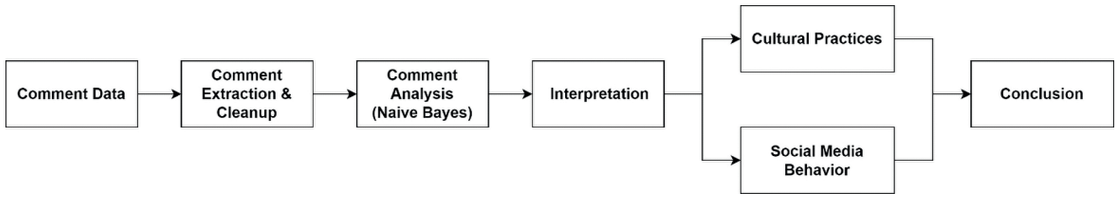


Figure 3. Research workflow. Source: author

These comments represent important public opinion and are used as primary data in sentiment analysis research (Henderi 2024). The data collected totals 2741 comments. Next, data cleaning was carried out to remove duplication, remove emoticons, symbols, hashtags, and irrelevant URL links. This can be seen in Figure 4. This is to guarantee more consistent data. This was followed by filling in 60% of the sentiment that arises from the comment manually to be used as training data for the Rapidminer Studio software to automatically recognise the next comments. At this stage, 60% of the samples are used as training data for algorithm, making the labelling process easier with classification into two categories of negative or positive sentiment. Accuracy in labelling is essential for training effective predictive models (Henderi 2024). Calculation is followed by recognition of patterns and opinion topics that arise to then interpret the results and write conclusions.

Technically our sentiment classification process used the tool in the Rapidminer software as seen in Figure 5. The advantage of using the Naïve Bayes classifier algorithm is that it is enough to use small training data to be used as a reference in the classification process and can function properly. The Naïve Bayes classifier is a simple probability-based technique based on the application of Bayes' theorem with strong independent assumptions. The Bayes prediction is based on Bayes' theorem with the following formula: *Algoritma Naïve Bayes Classifier* (Romli et al. 2021; Yuliarina and Hendry 2022).

$$P(H|X) = \frac{P(H|X)P(H)}{P(X)} = \frac{P(X|H)(H)}{P(X)}$$

X : Sample data that has an unknown class (label)
H : Hypothesis that X is class data (label)
P(H|X) : Hypothesis probability H based on condition
X P(H) : Probability of Hypothesis H
P(X|H) : Probability of sample X data based on the conditions of Hypothesis H
P(X) : Probability of X

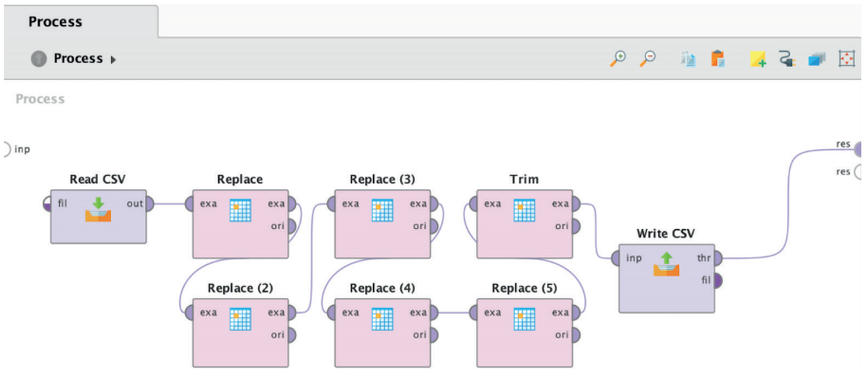


Figure 4. The process of cleaning the dataset from unnecessary elements. Source: author

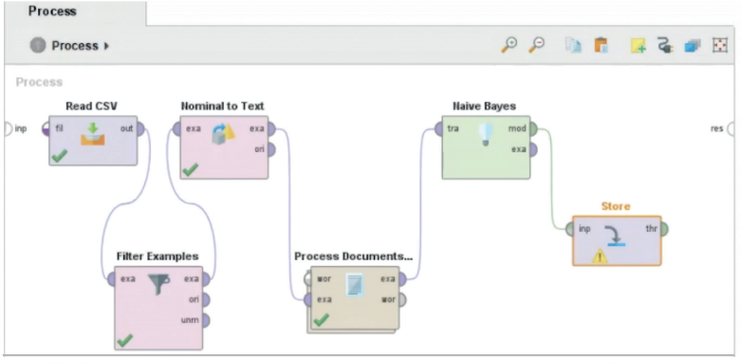


Figure 5. The sentiment classification process uses the Naïve Bayes algorithm. Source: author

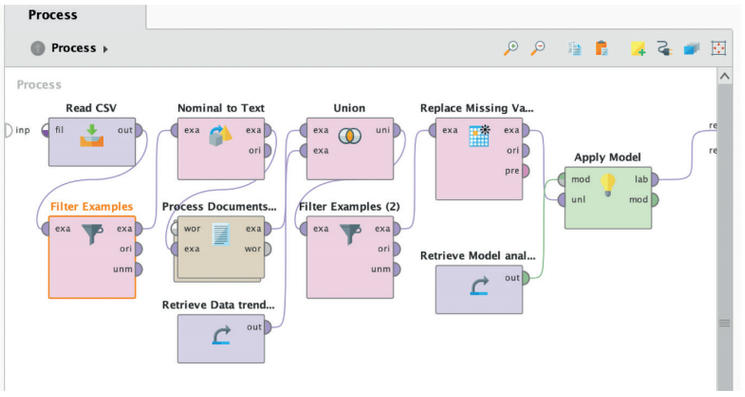


Figure 6. The dataset analysis process (Retrieve data trend, Union, and Replace Missing Variable) uses the Naïve Bayes algorithm. Source: author

This study follows the Internet Research Ethical Guidelines 3.0 from the Association of Internet Researchers (AoIR) by adopting a process-oriented approach (Frankze et al. 2020). Acknowledging the complex privacy expectations within public online venues, specific mitigation strategies were implemented. The data was collected in .csv format, with all user identities permanently removed. Since the comments on this platform are publicly accessible, regarding the AoIR guidelines (2019), obtaining individual consent was not required. Since it is not feasible to obtain consent from every user, strict measures were taken to protect privacy and minimise potential harm. To further safeguard user anonymity, comments were paraphrased rather than directly quoted, ensuring that individual commenters cannot be identified. As for the certain TikTok account ID that we display in this article, AI Nusantara, we have previously asked for consent from the owner. We made sure they were thoroughly informed about this research and allowed us to display the account ID even though it may reveal the account owner's personal information. These procedures ensure that the academic inquiry is balanced with a fundamental ethical responsibility to the online communities being studied.

TikTok and Its Popularity

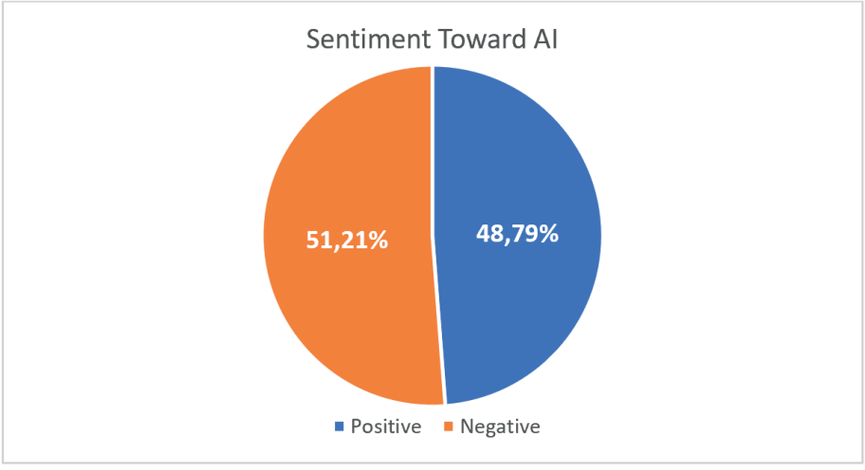
Since its release in 2017, TikTok's popularity has surged, particularly during the pandemic, making it the most popular social media application with over 1.5 billion active users by 2023 (Dixon 2024). Unlike other platforms, TikTok pioneered short video sharing, typically 15-60 seconds, across diverse genres (Southwick et al. 2021). By tailoring videos to user preferences, TikTok attracted a broad user base, especially teenagers (Y. Wang 2022). Indonesian TikTok users increased rapidly during the pandemic, reaching 157.6 million active users by July 2024, the largest user base globally (Ceci 2024).

In the creative realm, content creators foster engagement through the short videos that are the hallmark of this platform. Tutorials on creating works both conventionally and digitally are readily accessible, and products featured in these videos are easily purchasable. TikTok, serving both as a promotional medium and a social media platform, is frequently utilised to seek visual inspiration and keep up with current trends. The platform's user-friendly features for uploading content and integrated marketplaces are among its key advantages. Young people increasingly prefer audiovisual communication, favouring images and short videos over traditional text-based formats (van der Bend et al. 2023; Wang and Wang 2024), a shift facilitated by platforms like TikTok, enabling rapid and engaging visual storytelling (Vogels and Gelles-Watnick 2023).

TikTok's content personalisation ensures relevant content appears on a user's home page. If a user shows an interest in the creative industry and AI, the algorithm

intensifies the presentation of related content. AI-generated images of historical objects have become a trend on TikTok, with Indonesian creators participating by visualising historical figures, gods, and mystical creatures from folklore. The outstanding quality of AI-generated images enhances their realism, making TikTok accounts like AI Nusantara increasingly popular among users interested in historical content, especially Indonesian history.

Visual Works Subjected to Analysis



Graph 1. Sentiment towards using AI for visual design in the past

This study bases its analysis on AI Nusantara's TikTok uploads of four visual design objects, from which 2 741 comments were obtained (per January 2023). In data processing, only 1 654 comments, approximately 60%, were readable for analysis of public sentiment towards the use of AI. Overall, Graph 1 shows that the public sentiment towards AI-generated pictures of historical figures and sites demonstrated a slightly more positive tone with 51.21% against 48.79% of negative comments. This section presents the AI-generated images of the historical reconstruction followed by the description of the visuals. The chosen visuals are very popular among the public, and the public has already formed various interpretations towards the historical figures and sites.

This study also maps and analyses user comments on posts from the AI Nusantara TikTok account that feature visual designs inspired by historical cultures. Because the number of comments per post varies, these quantities are standardised as percentages to ensure appropriate analytical weighting. The comments analysed

in this study pertain to AI-generated visual content of two prominent figures of the Archipelago's monarchy and two historical sites, specifically: (1) Gajah Mada; (2) Prabu Siliwangi; (3) the Singhasari Kingdom; and (4) the Pyramids of Sundaland. These four posts were selected due to their high engagement rates, their representation of both historical figures and sites, and the diverse public discussions they generated, making them rich sources for sentiment analysis.

Gajah Mada was a general of the Majapahit Kingdom. Several studies suggest that Gajah Mada was believed to possess supernatural powers, contributing to his reputation as a mighty general. Additionally, several studies indicate that the Gajah Mada statue, designed by Mohammad Yamin (former minister), is frequently referenced by the public as a visual representation of Gajah Mada. In AI Nusantara's post with the caption "I asked AI to imagine 'Gajah Mada based on his statue'" and the hashtags #artificialintelligence and #gajahmada, several visual designs of Gajah Mada's character were presented. At the end of the video, the process of face rigging (integrating bones to animate characters for movement) is demonstrated on one of Gajah Mada's visuals. This post garnered 1 407 comments, from which 1 001 were analysed in this study.

The next case concerns Prabu Siliwangi, the prominent king of the Padjajaran kingdom who reigned around the 15th century. According to the prevailing myth, Prabu Siliwangi and his followers were transformed into white tigers. The visual design of Prabu Siliwangi was posted with the caption "I asked AI to reimagine 'Prabu Siliwangi based on his portrait painting'". This post, using the hashtags #artificialintelligence, #pajajaran, and #prabusiliwangi, garnered 302 comments, which were selected for analysis.

Singhasari was established around the 1200s. The Singhasari Kingdom is estimated to have been in Malang Regency, East Java, modern-day Indonesia. The AI Nusantara TikTok account shared a visual reenactment of life in the Singhasari Kingdom's capital city, Singosari, using the caption "I asked AI to imagine 'Singhasari capital city'" accompanied by the hashtags that refer to the capital city of Singhasari, featuring images depicting the atmosphere of bathing pools, markets, and areas surrounding temples in a slideshow. In this post, a sample of 133 comments was extracted.

The arrangement of stone structures resembling pyramids in the Gunung Padang area constitutes a megalithic site thought to have been constructed before the Egyptian pyramids. The megalithic site was uncovered by N.J. Krom in 1914, with details of the discovery documented in a report titled *Rapporten Oudheidkundige Dienst*. In 2014, renewed public interest in this site prompted further scholarly investigation by multiple institutions. A post featuring the AI visualisation of the pyramid set in Sundaland, the AI Nusantara TikTok account employs the caption, "I asked AI to imagine 'the ancient pyramids in Sundaland'",

along with the hashtags #artificialintelligence, #nusantara, #sunda, #scifi, and #gunungpadang. Under this shared post, there are 899 comments. The following section presents the detailed findings of the sentiment analysis conducted on these four AI-generated historical and cultural visualisations.

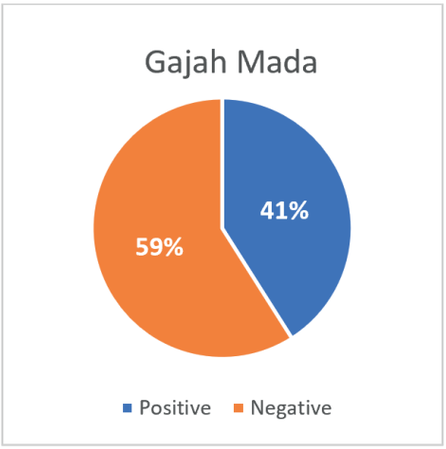
Research Findings

Gajah Mada

The AI-generated visual content of Gajah Mada is presented in a sequence of slideshow videos, beginning with an image of the statue of Gajah Mada located in Bojonegoro Regency, East Java. The initial image reference is the statue, which transitions to a black and white figure rendered in a realist visual style, occasionally displaying the wackiness typical of AI-generated visuals, with arms crossed like the statue. Various visuals show the AI's attempt to replicate the iconic pose and physical traits of Gajah Mada, such as a stocky build, thin moustache, and long hair, maintaining consistency across different images.

However, the AI's interpretation reveals notable inconsistencies, especially in facial features and accessories. While the statue depicts a mature face with a strong jawline, the AI-generated images present a younger, softer face with a different chin shape. Moreover, the AI adds elaborate crowns and luxurious necklaces that are absent in the original statue, indicating that the AI prioritised the general gesture of crossed arms but filled in other details based on broader training data about royal or warrior figures from the era. Further analysis by reviewers highlights differences in hand positioning: the statue shows both hands resting on the folded arms, whereas the AI images depict one hand tucked under the opposite arm. This discrepancy underscores the AI's focus on capturing the overall pose rather than exact details, resulting in a unique but not entirely faithful representation of Gajah Mada. These inconsistencies reflect the nature of AI-generated visuals, which often emphasise major gestures but may overlook finer specifics.

Figure 7. AI visual design based on the statue of Gajah Mada
(Source: TikTok @ainusantara) used with the creator's explicit permission
(granted via email on 12 November 2024).



Graph 2. Gajah Mada sentiment analysis (n=1001). Source: author

Sentiment analysis of comments regarding the AI visualisations of Gajah Mada indicates 409 positive responses and 592 negative responses, with the latter suggesting a general audience perception that the AI-generated visualisation does not align with the initial reference. Some negative comments on the AI results on Gajah Mada address the inaccuracy of the figure of Gajah Mada who is believed to have a lean body instead of fat and bulky. Meanwhile, positive comments show approval and discuss beliefs and historical significance.

The analysis highlights significant public scepticism concerning the historical accuracy of the visualisation, primarily stemming from uncertainty about Gajah Mada's actual appearance and the limited concrete evidence available, which prompted comparisons to other figures and underscores public awareness of these historical gaps. Nevertheless, discussions also encompassed diverse views on Gajah Mada's physical attributes and religious affiliation, demonstrating strong public interest in his history, mythology, and spiritual aspects. These interactions also revealed an appreciation for the AI's technological capabilities, despite underlying doubts regarding the visualisation's historical accuracy.

In the academic realm, there are several versions of Gajah Mada's depiction based on the statue by Muhammad Yamin, which shows Gajah Mada with a stocky, round face, devoid of a moustache and beard. Another notable depiction is presented by Prof. Agus Aris Munandar from the University of Indonesia. He characterises Gajah Mada based on the Brajanata statue, depicting him as a dashing man with a moustache and a mesomorphic physique. The Brajanata representation features curly hair, a large, well-built body, and closely mirrors the historical figure of Gajah Mada due to the similarities in characters and events associated with him. Additionally, a version discussed by Emha Ainun Najib (Cak Nun), an Indonesian

cultural and religious figure, during a Cultural and Environmental Sarasehan in 2013 and in his regular lectures uploaded on YouTube, describes Gajah Mada as a thin man with a moustache but possessing very strong power. This version aligns closely with the Brajanata statue's depiction (Munandar 2010).

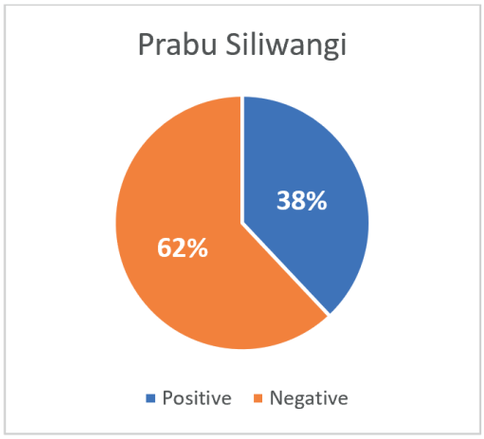
Within the analysed comments, Indonesian netizens predominantly adopt the Muhammad Yamin version of Gajah Mada, a prevalence attributed to its integration into the educational curriculum. Alternative interpretations are primarily debated among academics studying original sources, thus remaining largely unfamiliar to the general public. The creator's prompt, "I asked AI to imagine 'Gajah Mada based on his statue'", granted the AI significant latitude, introducing potential bias. This bias stems from the statue being an artistic interpretation rather than an objective historical depiction. Consequently, the AI may replicate or amplify symbolic elements, potentially incorporating features such as crowns or jewellery derived from training data or stereotypes, which may lack historical accuracy or be absent from the original statue. Ambiguous instructions further allow the AI to prioritise stereotypical over factual elements. Without awareness of these biases, users may misinterpret the speculative AI-generated images as historically accurate representations.

Prabu Siliwangi

The content relating to Prabu Siliwangi uploaded on the AI Nusantara account begins by displaying a painting in the Cirebon Palace. The creator's prompt, "I asked AI to reimagine 'Prabu Siliwangi based on his portrait painting'", directed the AI to reinterpret the leftmost image in Figure 8. This image portrays a male figure widely accepted as Prabu Siliwangi (King Sri Baduga Maharaja), depicted with royal adornments and specific facial features. Due to limited definitive historical sources on his appearance, various myths have developed, notably the Sundanese belief in his *moksa* and transformation into a white tiger. The subsequent AI visualisations, based on this painting, demonstrated significant alterations from the initial reference.

Figure 8. Prabu Siliwangi in AI visual design by AI Nusantara account (Source: TikTok @ainusantara) used with the creator's explicit permission (granted via email on 12 November 2024).

In-depth visual analysis of Figure 8 reveals distinct transformations across three AI-generated images compared to the original portrait painting. These transformations represent the AI's interpretation and 'reimagining' of the original image. The first visualisation primarily enhances realism and textural detail, creating a photorealistic effect. The second shifts to a monochrome palette with sepia tones and a blurred background, altering the mood. The third exhibits the most substantial deviations, with a notably younger and smoother face, altered features, and markedly exaggerated, opulent crown and jewellery details. This suggests an inclination towards an idealised or illustrative digital style, likely influenced by aesthetic biases in the AI's training data. These detailed changes in facial features, regalia, and background are crucial for understanding the AI's interpretive and reconstructive processes based on the initial visual input and prompt, underscoring the AI's emphasis on manipulating features and adornments for aesthetic impressions over purely historical depiction.



Graph 3. Prabu Siliwangi sentiment analysis (n=141). Source: author

Sentiment analysis of comments on the AI visualisation of Prabu Siliwangi revealed 54 positive and 87 negative responses; while quantitatively negative comments predominated, qualitative analysis indicated a complex public discourse engaging directly with the AI's 'reimagining.' Key sentiment categories included Aesthetic Admiration, Historical Scepticism, and Comparison. Comments expressing Aesthetic Admiration praised the visual quality, while Historical Scepticism questioned historical accuracy, highlighting public awareness of uncertainty surrounding Prabu Siliwangi's appearance and mythical narrative. A trend of Comparison emerged, with netizens likening the visualisation to contemporary

figures, demonstrating the audience's attempt to process the representation using existing visual schemas and often implicitly questioning the AI's interpretation. Positive feedback also included expressions of novelty and aesthetic appeal, serving as evidence of public engagement with AI-generated historical depictions presented as 'reimaginings'.

Integrated visual analysis and public reactions revealed correlations between specific AI-generated elements and comments. The AI's tendency to render the face younger and smoother correlated with praise for handsomeness. Comparisons to contemporary figures likely arose from specific facial features rendered by the AI, creating unexpected visual associations. The enhanced crown and jewellery details also prompted varied responses, from admiration to scepticism about historical accuracy. Beyond sentiment, the visualisation stimulated discussions on historical aspects and prompted requests for more AI visualisations of Indonesian figures, indicating public interest. This process tends towards producing idealised or fantastical images that prioritise aesthetic appeal over historical fidelity, a tendency particularly relevant given the scarcity of definitive historical visuals for Prabu Siliwangi.

Muhsin (2011) revealed that Prabu Siliwangi's name can be traced in ancient manuscripts, including the Carita Parahiyangan manuscript (1579), the Sang Hyang Siksa Kandang Karesian manuscript (1518), the Carita Purwaka Caruban Nagari manuscript (1720), and the Bujangga Manik manuscript. It is suggested that Prabu Siliwangi refers to only one King of Pajajaran in the era of 1482-1521, namely Prabu Jayadewata or Sri Baduga Maharaja. In other sources, it is mentioned that Prabu Siliwangi was a handsome figure, and a reliable and trustworthy leader (Muhsin Z. and Falah 2021). The reference uploaded to the AI platform used by the AI Nusantara account uses paintings found in the Cirebon Palace. So far, the painting is considered the most representative because it is in the palace collection. The AI visualisation of Prabu Siliwangi by AI Nusantara, prompted to 'reimagine' a portrait painting, serves as a case study at the intersection of historical representation, AI technology, and digital discourse. The AI's visual outputs, significantly altered from the source, dynamically engage public understanding, shaped by academic views and prevailing myths.

Netizen reactions demonstrate active negotiation of this new representation, blending historical knowledge, aesthetic preferences, and critical awareness of AI's capabilities and limits. This highlights challenges in using AI for myth-rich figures lacking definitive visual sources, particularly in 'reimagining.' Digital platforms become crucial for negotiating cultural meaning, where potentially biased AI images spark debates on authenticity and heritage. The creator's 'reimagine' prompt likely granted creative license, with the public's response reflecting their assessment of its balance between historical reference and artistic interpretation.

Singhasari Kingdom

The AI Nusantara account includes visualisations of the capital city of Singhasari Kingdom, Singosari, displaying areas of the kingdom that have water pools or lakes in front of them and have the form of roof models or house buildings in the form of *limasan*. These visualisations are presented across eight distinct panels, offering varied perspectives of the imagined city. In addition, there are ornaments on the buildings which are very complex, such as those seen on the grand, intricately carved gate depicted in one panel. Then there are also building forms such as parts of the temple complexes that are found in Indonesia or Southeast Asia, including large temple structures with impressive detail and smaller, stupa-like forms situated within garden settings. Some forms of traditional houses are visualised using a roof of thatched leaves or dried coconut leaves. The AI has also added to the visualisation with images of local community activities, such as a figure walking through a garden with statues or another figure carrying a lantern at dusk. Overall, the visualisation of the AI work is interesting, and the objects look beautiful, although for the accuracy of the visualisation a more in-depth study is needed. The panels collectively create an atmosphere that is tranquil, lush, and sometimes dramatic, featuring scenes at different times of day, including mystical night views illuminated by lanterns and majestic gates silhouetted against sunrises or sunsets.

The appearance of water pools (*pertirtaan)* and temple-like buildings in the AI visual design of the Singhasari Kingdom atmosphere refers to the Watugede petirtaan or better known to the community today as *Petirtaan Ken Dedes*. Although according to experts Watugede was built during the Majapahit kingdom, namely the thirteenth to fourteenth centuries AD, many people believe that the *petirtaan* was the place where Ken Dedes and Ken Arok met for the first time. In some of the AI visual designs, there appears to be a woman and a man, allegedly Ken Dedes and Ken Arok. Chutiwongs (2008) explained that *petirtaan*, which is a combination of temples and baths, built during the ancient Javanese kingdom, is a replica of Mahameru (a mountain in Hindu and Buddhist cosmology). Ancient Javanese kings considered mountains as sacred places because the mountains drained water that was used to bless these kings during their reign. During the Singhasari Kingdom, the mountain that was considered sacred was Mount *Penanggungan* because every temple was built facing Mount Penanggungan (Chutiwongs 2008).

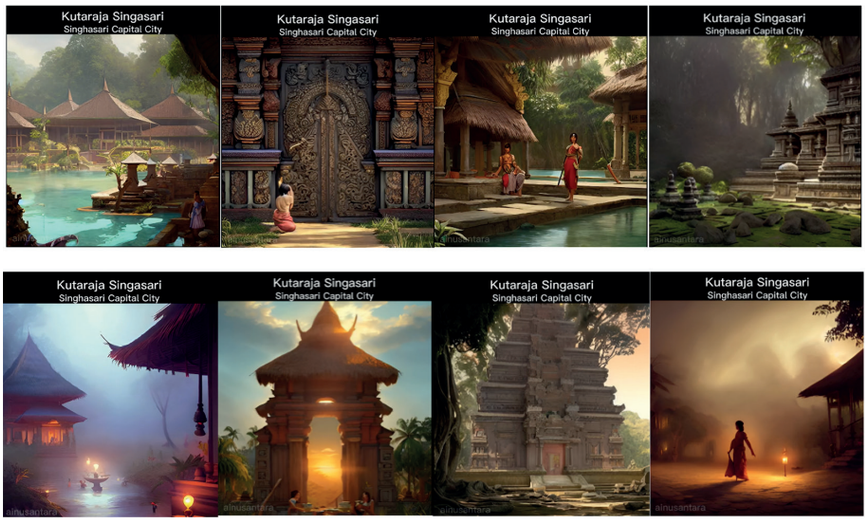
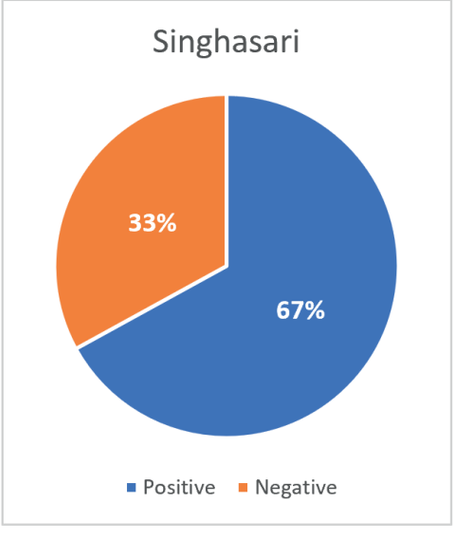


Figure 9. AI visualisations of Singhasari Kingdom by AI Nusantara account (Source: Tiktok @ainusantara) used with the creator's explicit permission (granted via email on 12 November 2024).



Graph 4. Analysis of the sentiment of the Singhasari Kingdom (n = 54). Source: author

The results of the sentiment analysis show that the images of Singhasari Kingdom received 36 positive comments and 18 negative comments. This percentage indicates that the audience was quite impressed with the AI visualisation of the Singhasari Kingdom's capital city. Audience responses appear in the comments on

the AI Nusantara account. Netizens' reactions can be grouped into several main topics. The most dominant reaction expresses admiration or appreciation for the AI visualisation results. Positive comments imply a sense of pride because now there is a famous swimming pool in Malang that was named after Ken Dedes to appreciate her beauty and elegance. Other positive comments express their awe regarding the scenery. Meanwhile, the negative responses related to the inaccuracy of the costumes used for the figures in the image, and the unclear visual quality in some parts, casting doubt on the results of the AI.

Analysis of comments on the AI-generated Singhasari images revealed diverse sentiments beyond simple appreciation or criticism. Netizens expressed nostalgia for the royal era and connection to historical sites in the vicinity of modern Malang. High public interest was evident through requests for visualisations of other Indonesian kingdoms, indicating potential for AI-based historical content. While some critical comments noted visual or historical inaccuracies, the majority sentiment was positive, reflecting interest and pride in Indonesian history and cultural visualisation potential.

An integrated analysis of the visualisations and sentiment suggests potential biases inherent in the prompt or the generative process. Visually, the images idealised Singhasari, often focusing on stereotypical temple architecture. This may reflect a bias towards portraying a 'golden age' rather than a comprehensive historical depiction. The depiction of figures, notably characterised by blurred faces or imprecise clothing details, suggests technical biases or influence from potentially biased or historically inaccurate training data, which may include modern imagery. A strong visual association with *Petirtaan* Ken Dedes/Watugede, despite the differing historical eras of Singhasari and Majapahit, suggests the AI may uncritically incorporate popular narratives prevalent in its training data. These outcomes highlight AI's generative capabilities but also challenges and biases in reconstructing history through this technology.

Pyramids in Sundaland

Based on colonial-era maps purportedly depicting pyramid mapping on Mount Padang, Mount Sadahurip, and Mount Lalakon, the 33-second video titled 'Pyramids in Sundaland' presents AI-generated imagery of alleged pyramids on these mountains. The AI visuals depict monumental, stepped structures with flat levels and precisely cut stone blocks. These forms represent a stark departure from the original landscapes' natural contours, reimagining the mountains as vast, imposing edifices. Each clearly defined level creates an impression of immense scale and deliberate construction, underscoring the AI's transformative interpretation.

These imposing, AI-generated structures incorporate prominent architectural features, such as grand central staircases and textures indicative of ancient

stonework, sometimes partially blended with vegetation. Dramatic lighting, mist, and occasionally a luminous blue light enhances the ancient and mysterious atmosphere. Visually, the AI's design draws heavily upon the complex, stepped pyramid architecture characteristic of ancient Mesoamerican civilisations over the smooth, triangular faces typical of Egyptian pyramids. The video concludes by aligning the three depicted pyramids with the formation of the Giza Pyramids and the Orion constellation.

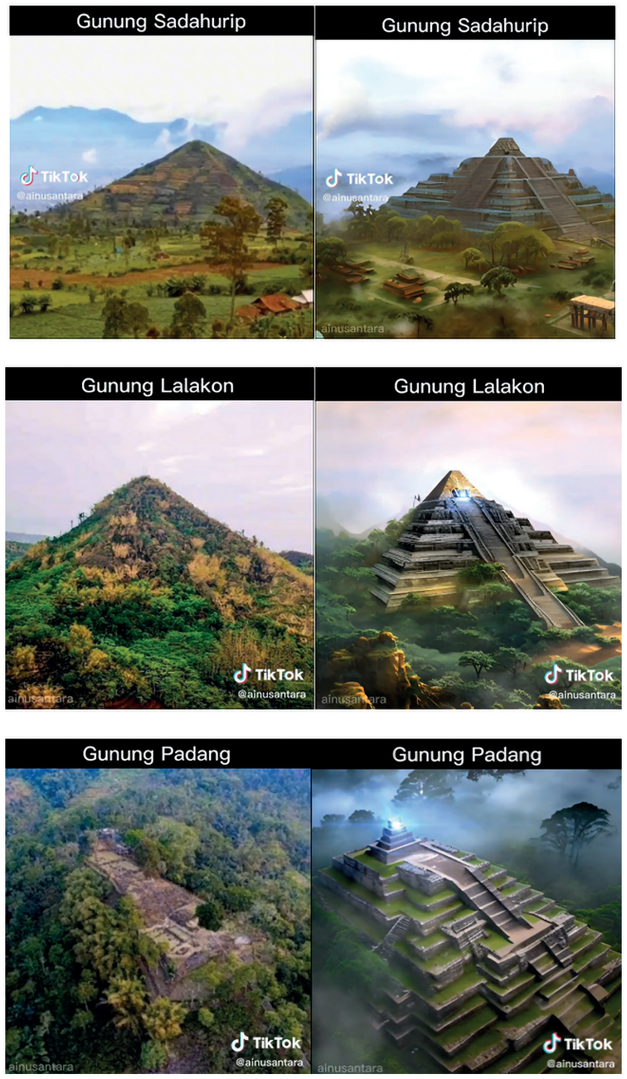
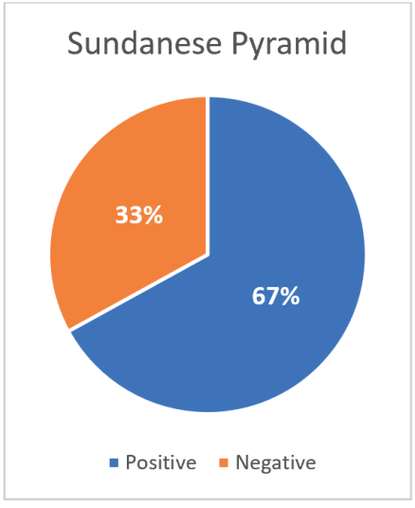


Figure 10. The visual design of the pyramid at the Sunda Level by AI displayed on AI Nusantara's social media (Source: TikTok @ainusantara) used with the creator's explicit permission (granted via email on 12 November 2024).



Graph 5. Analysis of pyramidal sentiment in Sundaland (n = 458). Source: author

Sentiment analysis of comments on the 'Pyramids in Sundaland' visualisation indicates 308 positive responses against 150 negative, revealing a predominantly favourable audience reaction (over 50%) to the AI-generated imagery. The AI's dramatic and monumental depiction significantly contributes to this positive reception, visually corroborating pre-existing beliefs or aspirations among netizens regarding a distinguished ancient civilisation in Indonesia. The striking visuals, particularly the massive, geometrically precise stepped structures resembling large stone blocks, resonate strongly with narratives of hidden history and advanced ancestors. Prominent architectural elements like wide staircases and, in some instances, a mystical blue light from the summit enhance the sense of wonder and ancient power. Instead of commenting on the visual, the public emphasised the existence of pyramid in Sundaland which is a megalithic structure that has similarities to the pyramids in Egypt. Some of the comments even state the belief that the pyramid structure was made by King Solomon, which fuelled speculative narratives. These comments demonstrate how the evocative AI imagery, which visually aligns more with Mesoamerican stepped pyramids than natural formations or Egyptian styles, acts as a powerful catalyst for asserting alternative historical narratives linked to pre-existing beliefs or legends. Conversely, negative responses included expressions of scepticism, rejection, and perceived absurdity, often conveyed through dismissive language. This negative sentiment frequently arises from the visual incongruity between the artificial, geometric AI structures and the known characteristics of the sites, prompting scepticism or outright dismissal from those who perceive the visualisation as misleading or fantastical.

Based on research conducted by the Institute of Sciences (LIPI) in 2018, Danny Hilman Natawidjaja stated that, although the buried structure resembles a pyramid, the structure is different from the Mayan pyramid (Putri 2018). This also confirms that Mount Padang has inside it a man-made structure in the form of a pyramid. In 2024, an article published by Natawidjaja related to Gunung Padang entitled 'Geo-archaeological prospecting of Gunung Padang buried prehistoric pyramid in West Java, Indonesia' was withdrawn by its publisher due to an error in measuring the age of the pyramid (Wuragil 2024). However, this does not rule out the existence of the pyramid structure on Mount Padang.

As for Lalakon and Sadahurip, it has been proven that there are no pyramids there. This has been stated by Bandung Archaeology Center Principal Researcher Lutfi Yondri together with several experts from the Bandung Geological Museum (Muslihah 2012). The same thing has also been revealed by Natawidjaja (2011) in disaster exploration in the area, in fact no pyramid structure was found. He added that the proof of the existence of the pyramids of Mount Lalakon and Sadahurip was obtained from a group of foundations that claimed to get *wangsit*, when in fact it has been empirically proven that there are no pyramids on Mount Lalakon and Sadahurip (Muslihah 2012).

Analysis indicates bias in the AI's interpretation of 'ancient pyramids in Tatar Sunda,' influencing netizen sentiment. The AI model, likely trained on global architectural forms, tended to render structures akin to Mesoamerican stepped pyramids with geometric precision and prominent staircases, rather than incorporating Sundanese cultural elements or the step pyramids (*Punden Berundak)* structure. This suggests a bias favouring global archetypes over regional specifics implied by the prompt. The dramatic visuals became a potent focal point; individuals predisposed to belief in a hidden ancient civilisation felt validated by the AI's compelling, potentially biased, imagery, fuelling positive sentiment and speculation. Conversely, those grounded in archaeological or geological realities reacted negatively, viewing the interpretation as fantastical or inconsistent with documented sites, highlighting visual bias as misinformation. The prompt framing and biased output thus created a feedback loop, shaping sentiments based on pre-existing beliefs rather than objective representation.

Discussion

AI Visual Reconstruction

The visual reconstruction by AI gains mixed responses. As an evolving technology, AI is one of the most promising reconstruction media to date. AI can increase public engagement with historical objects, through visual reconstruction combined with narrative that provides a more immersive experience. This potential requires AI to be based on rigorous research and respect for cultural context. In responding to AI's visual reconstruction, the users of TikTok were able to demonstrate public perception, which in this case is considered to represent a community that has an interest in issues of history, archaeology, and digital culture. Opinions expressed through the comments section show a polarised sentiment towards the accuracy and ethical implications of the visual reconstruction.

Positive Response

In general, TikTok users give a positive response to the visual design results of the two historical sites, Singhasari and the pyramids in Sundaland. Some positive comments in the form of praise are aimed at the visual appearance and the scenery. However, in responding to the existing landscape, the social media public does not really care about the accuracy of AI. On the other hand, the discussion that is built from the visual design of the pyramids in Sundaland is more in the context of the desire to visit the place. There are some commentaries that debate the façade of the visual design of the Sundaland pyramids, equating them either with the pyramids at Machu Picchu, step pyramids (*punden berundak)*, or even the pyramids in Egypt. Many comments expect in-depth research into the existence of pyramids in Sundaland.

On this side, visualisation by AI turned out to be able to trigger public curiosity on social media about the situation and conditions of the pyramids in Sundaland. There are also a few comments that point to a scientific discussion of the situation presented by AI. The AI visualisation manages to provoke public curiosity about existing historical sites. In addition, some comments also relate the visual design to the reality of the condition of these historical sites, such as in the picture of Singhasari Kingdom which shows a bathing pool surrounded by temple stones and many springs originating from Mount Arjuno. This shows that visualisation by AI not only elicits curiosity and scientific discussion but also allows people to compare with the real situation of the historical place. Overall, visualisation by AI has a positive impact on TikTok users in expanding knowledge and understanding of Indonesian history and culture. Although there is some speculation and debate about the accuracy of visual design, visualisation by AI remains one of the effective ways to introduce history and culture to the public.

Negative Response

The negative response to the AI-generated images of the historical figures is higher than the positive response. The results in this regard show that the public has high expectations for the accuracy and quality of visual designs of these historical figures. This is due to the public's expectation that the visual design results match the description and growing knowledge about the figure in Indonesia. As a result, netizens tend to insult or ridicule visual designs that did not meet their expectations. They even compare the faces of historical figures with the present-day public figures or Indonesian athletes. They state that the AI visual of Gajah Mada looks like a comedian or footballer, while some netizens show disappointment since Gajah Mada was a royal commander who was supposed to look dashing and impressive. The public has high standards for the accuracy of visual designs of historical figures, otherwise they will give a negative response if the image does not meet these expectations.

Some negative comments show that there was dissatisfaction among netizens with how the image is presented. Netizens who are caught up in pseudoscience or views that are not based on actual historical facts doubt the validity of the visual design. Some commentaries also contain speculation about the historical background and connect with other historical events, such as the existence of Noah's Ark and the continent of Atlantis. There have even been some negative responses to the visual rendering of historical sites, leading to unfounded conspiracy theories related to the plot of famous fictional manga such as One Piece. However, this kind of view is often driven by fear or discomfort regarding things that are unfamiliar. This shows the importance of better education and understanding of history, so that people can appreciate and understand creative and innovative interpretations of historical figures. In addition, the use of conspiracy theories or unfounded assumptions can undermine public confidence in valid and accurate historical information. Therefore, historians and visual designers should collaborate to ensure the accurate and credible visual representation of historical objects. In developing visual designs of historical figures and at the same time maintaining historical accuracy, it is also necessary to consider creative aspects and aesthetic visual appeals, to attract the attention of the public to learn history in a more interesting and effective way.

In general, there are still negative perceptions towards the use of AI in historical and cultural visual design. Although there is positive sentiment, the difference is not too far from negative sentiment. The negative responses focus on the accuracy problem of AI-generated visuals. This accuracy is related to the data used, so that all data needs to be criticised for its source so that it can be used as an accurate source of knowledge (Haddi et al. 2013). In the comments uploaded, there are two trends in knowledge sources that are referenced in responding to the use of AI in historical

and cultural visual design of the past. The first tendency is to rely on valid academic sources, which emphasises the scientific side and the accuracy of information. The second tendency is the source of opinion that is trusting in a community group, which tends to look at it from the point of view of local beliefs and wisdom.

Several comments draw upon academic perspectives, referencing both scholarly literature and expert opinion. For instance, some mention an article reporting that the government halted the research project for unspecified reasons, while others speculate about the pyramid's origins, suggesting it dates back to the megalithic era around 1500 BC. Comparisons are also made to the discovery of Borobudur Temple, with commenters noting that, much like Mount Padang, Borobudur was once hidden beneath a hill and remained buried under layers of volcanic ash and dense vegetation for over a thousand years. Alongside these academically grounded remarks, there are also opinions rooted in oral tradition. Notably, one comment draws attention to the perspective of so-called 'smart' individuals or shamans, who assert that contemporary depictions of Gajah Mada's face diverge significantly from how he would have appeared in historical reality. Thus, the sources of knowledge are not limited to empirical ones but also include oral information from ancestors/shaman/elders which also contributes to public interpretation of historical objects.

The reference sources used as a starting point for visual design by AI is one of the pivotal factors (X. Wang 2022). In term of Prabu Siliwangi's visual, they used Prabu Siliwangi's painting in Cirebon Palace as the reference. People believe that the painting was made by a talented painter with sixth sense abilities, and his spiritual experiences reflected in his painting of Prabu Siliwangi. The AI-generated image of Prabu Siliwangi closely resembles the painting, and some comments approve, noting that it accurately depicts Prabu Siliwangi. The painting by the capable or talented artist can be used as reference in generating AI images. However, regarding the unusual techniques by which the painting was made, the painting needs further scrutiny in order to assess its cultural significance and its relevance to societal context.

In terms of the relation between beliefs and scientific evidence, Singer and Benassi (1981) explain how knowledge or beliefs can be formed psychologically and sociologically without scientific basis and cognitive bias. The phenomenon is largely driven by the influence of mainstream media. The information that is widely spread on social media is often simply accepted as fact without critical evaluation or verification from reliable sources. This condition is exacerbated by the limited involvement of academics in providing credible information through social media. In contrast, social media users utilise social media platforms largely for entertainment purposes. Therefore, it requires an effort to encourage greater academic participation in social media to disseminate information that can be

critically evaluated and trusted by the public (Mahdiuon et al. 2020; Singer and Benassi 1981).

The limitations of an illustrator or artist in making text-based visualisations can be greatly influenced by the references they have, including their background and life experiences (Wikayanto et al. 2019). With a similar process, AI can adopt the way humans interpret things based on experience and knowledge stored in our brains. The collected data is ready to be interpreted by AI, overcoming the limitations of illustrator or artist. Visualisation can also be limited to the imagination of a creator (Baskinger and Nam 2006; Lohr and Ursyn 2010). For example, famous *wayang* comic creators in Indonesia such as R.A. Kosasih, Teguh Santosa, Jan Mintaraga, and Is Yuniarto use the same references in presenting the character of Pandava and Kurawa from the Mahabarata epoch. The audience demonstrates subjectivity too in interpreting each character depending on their preferences. The AI technology can provide another version of the character from various point of view, as long as the results meet the audience's expectations.

The AI-generated visuals carried out by humans and artificial intelligence should both rely on credible data. The credibility of AI-generated images posted on social media can vary significantly, as they are influenced by the biases, knowledge, and experiences of those who create and interpret them. The interpretations generated by AI models, particularly generative systems like DALL-E, can be significantly influenced by biases embedded within the extensive datasets used for their training. In creative practice, the AI-generated visual is still problematic, too. Creativity is measured by the entire creative process from idea to final form. Using AI to produce work without human creativity often raises the issues of authenticity and credibility of the creator. Therefore, creators who create character figures based on historical figures are required to refer to credible sources and common knowledge by conducting some research before generating the image using AI technology (Crawford and Paglen 2021; Jarrahi et al. 2022).

Hofstede's cultural dimension framework offers deeper insight into how online users respond to AI-generated content. Users are more likely to fully accept AI-designed characters and places when credible, trusted institutions, such as universities or government cultural bodies with recognised authority, produce them. Research findings support this: visualisations of historical sites like the Singhasari Kingdom and the Sundaland Pyramids (both 67% positive sentiment) were met with greater acceptance, likely because the subjects are general, and netizens seem to acknowledge AI's technical image-generation capabilities as a form of authority. Conversely, sharp criticism of AI depictions of historical figures like Gajah Mada (59% negative sentiment) and Prabu Siliwangi (62% negative sentiment) indicates that users often reject AI outputs challenging established narratives or existing knowledge authorities, especially if they differ from widely known versions like

M. Yamin's portrayal of Gajah Mada. This observation underscores a clear user expectation: that depictions of figures with robust, pre-existing narratives should conform to 'official' or widely endorsed interpretations, often reflecting masculine cultural values emphasising strength and impressiveness for heroic characters (Spennemann 2024).

The individualism versus collectivism dimension also explains these dynamics. Although most Indonesian netizens culturally exhibit high collectivism, digital platforms empower strong individual expression, evident in frequent criticisms of AI reconstructions, particularly of historical figures, even from those with collectivist backgrounds. The influence of Uncertainty Avoidance is also significant, as evidenced by widespread doubts among users regarding the accuracy and potential for misinformation in AI reconstructions (Karpouzis 2024). This concern is reflected in negative sentiment towards the Gajah Mada and Prabu Siliwangi visualisations and requests for further clarification on the Sundaland Pyramids. To mitigate the discomfort arising from AI's visual ambiguity, users often seek certainty by consulting sources they deem valid—whether academic or rooted in local wisdom (Beerends and Aydin 2024). For historical sites, this can also involve a greater appreciation for aesthetic qualities over strict factual accuracy, aligning with feminine cultural values that prioritise aspects like visual appeal and atmosphere. This complexity shapes how netizens interact with and evaluate AI-generated historical content, influencing both their engagement and critical responses. While AI reconstruction is currently useful for the entertainment and creative industries, its long-term potential for preserving history and culture heavily depends on improving its accuracy—a dynamic further clarified by Hofstede's framework.

Conclusion

This study reveals that public reception of AI-generated historical imagery is complex and often contradictory, particularly for content posted on social media platforms like TikTok. Some individuals consult academic or credible sources to form their opinions, while others prioritise personal beliefs and folklore. The comments sections on social media posts clearly demonstrate this divergence in perspectives. While empirical evidence and academic research are crucial for understanding these objects, considering the cultural and historical context, including local beliefs and folklore, is equally important. By integrating academic knowledge with cultural traditions, we can gain a more comprehensive understanding of the past and appreciate the diverse perspectives that shape our understanding of history. This study's findings further illuminate the nuances of these interactions in the digital age.

A key finding of this research is that public reception of AI-generated historical

visualisations on social media is notably polarised and contextual, impacting digital heritage. Although overall sentiment is slightly positive, acceptance levels vary significantly. Historical sites (e.g., the Singhasari Kingdom, Sundaland Pyramids) receive positive responses because audiences appreciate their aesthetic appeal and AI's capacity to spark imagination, often overshadowing strict accuracy. Conversely, AI depictions of figures (e.g., Gajah Mada, Prabu Siliwangi) face more criticism due to expectations of accuracy aligned with established narratives (such as M. Yamin's version of Gajah Mada). AI visualisations deviating from these embedded cultural schemas often challenge historical authority, prompting nuanced negotiations of 'visual credibility' based on the object type.

Furthermore, this study identifies the public's reliance on a dualism of reference sources, drawing from both academic knowledge and local traditions. This positions AI not merely as a representational tool but as an active agent shaping 'digital living heritage' and fostering 'neo-mythologies' by amplifying local narratives in the digital sphere. Moreover, the strong 'affective engagement' that AI visuals evoke—ranging from awe to nostalgia—offers a potent, yet sometimes overlooked, pathway to deeper historical learning, even if the visuals lack precision. Social media's 'algorithmic curation' further shapes this interaction. Such curation can inadvertently legitimise or marginalise historical interpretations by promoting engaging AI content, thereby significantly constructing public historical consciousness and memory.

The current widespread adoption of AI technology has highlighted issues of accuracy and artistic innovation. Given contemporary online culture, where social media users are accustomed to rapid technological advancements, people can harness AI for both scientific endeavours and entertainment. Consequently, as user engagement demonstrates, AI-generated content on social media often prioritises entertainment value. This focus potentially sacrifices educational depth and nuanced historical understanding. While AI can support artists in developing fictional content by adapting to their vision, a challenge remains: this creative output must also foster an informed understanding of historical events, rather than solely prioritising aesthetic appeal or novel interpretations.

This study suggests several future steps: (1) Conduct a more comprehensive follow-up study comparing AI's visual results with empirical data to improve accuracy. (2) Future research should explore the ethical implications of AI in historical reconstruction, particularly concerning the creation of 'neo-mythologies' and the impact of 'algorithmic curation' on public historical understanding. This necessitates developing AI ethical guidelines that respect diverse cultures. These guidelines need to address the representation of contested histories or figures with strong cultural preconceptions, as identified in this study's findings on public reception. Additionally, investigating how to ethically harness "affective

engagement" for educational purposes is crucial. (3) We need to increase awareness regarding AI technology's use in cultural preservation efforts. Campaigns could educate the public on critically engaging with AI-generated historical content, especially concerning the biases inherent in both AI models and source data.

The analysis of social media comments in this study has limitations. The voluntary nature of online commentary means that expressed opinions may not represent the full spectrum of public sentiment, whether positive or negative. Furthermore, the flow of comments can obscure original meanings, necessitating human intervention in the analysis process. While these limitations warrant caution in generalising public sentiment, the clearly identified patterns of contextual acceptance and dual referencing offer crucial insights. These insights help assess not only accuracy but, more importantly, the societal impact and interpretation of AI-generated historical visualisations.

Declaration of AI Use

AI was used solely for language editing during manuscript preparation, with Gemini and Microsoft Copilot employed for grammar and clarity improvement. All substantive ideas, analyses, and conclusions were developed exclusively by the authors, who reviewed and edited all out-puts and take full responsibility for the content of the published article.

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