UNIVERSITI TEKNOLOGI MARA

JIIICaS 2024
JOHOR INTERNATIONAL INNOVATION, INVENTION COMPETITION AND SYMPOSIUM

PROCEEDINGS OF JOHOR INTERNATIONAL INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2024 (JIIICaS 2024)

"Flourish and Nurturing Sustainable Innovation for a Prosperous Nation"

JIICOS 2024
JOHOR INTERNATIONAL INNOVATION, INVENTION COMPETITION AND SYMPOSIUM

Editorial Board

e ISBN: 978-967-0033-25-9

Published in Malaysia by
Universiti Teknologi MARA Cawangan Johor
Kampus Pasir Gudang
81750 Masai

Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor International Innovation Invention Competition and Symposium 2024 (JIIICaS2024), where JIIICaS2024 is a virtual platform for all creative minds to share and present their invention and innovation. Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students and get some ideas to develop future innovation products.

Foreword Rector

Assalamualaikum warahmatullahi Wabarakatuh, Salam Sejahtera, Salam Malaysia MADANI and Salam UiTM Dihatiku.

In the name of Allah, the Most Gracious, the Most Merciful.

It is a great honor to welcome you to the Johor International Innovation, Invention, Competition, and Symposium 2024 (JIIICaS 2024). This event connects various disciplines, focusing on education and engaging educators, students, researchers, and innovators from all walks of life.

Innovation is not just about ideas; it demands perseverance, creativity, and determination to turn those ideas into reality. The remarkable projects showcased today highlight the dedication and spirit of all participants. Initiatives like this not only explore new technologies but also cultivate skills and leadership among our youth. At Universiti Teknologi MARA (UiTM) Johor Branch, we are fully committed to fostering a dynamic culture of innovation, promoting the commercialization of new products, and encouraging meaningful collaborations with industry and society.

As we celebrate this event, I would like to extend my heartfelt gratitude to all sponsors, judges, the College of Computing, Informatics and Mathematics, UiTM Pasir Gudang Campus as the event organizer, as well as to the researchers and participants for their hard work in making this event a success. Let us continue striving for innovation and excellence. May the ideas presented today inspire us and lay the groundwork for future achievements.

Thank you.

Associate Professor Dr. Saunah Zainon
Rector
Universiti Teknologi MARA (UiTM)
Johor Branch

(A-PP029) AI-MEDIASUITE: ADVANCED TOOLS FOR MULTIMEDIA PROCESSING

Teh Jun Yuan[1], Shaffika bte Mohd Suhaimi[1], Khairunnisha binti Ismail[1], Lee Lin Huie[1]

[1] Southern University College,
PTD 64888, Jalan Selatan Utama, KM 15,
Off, Skudai Lbh, 81300 Skudai, Johor

Corresponding author: B230085A@sc.edu.my (Teh Jun Yuan)

ABSTRACT

The rapid evolution of multimedia content creation necessitates efficient and comprehensive editing tools. Traditional methods often fail to deliver quick, intuitive, and secure solutions, especially given the ethical implications of AI-generated content. This paper introduces an AI-powered multimedia editing platform designed to address these challenges. Utilizing advanced machine learning technologies such as Convolutional Neural Networks (CNNs) which this platform provides tools that enhance efficiency and ensure the integrity of edited content. The primary objective is to develop a toolbox that streamlines multimedia processing, enabling users to edit their content swiftly and effectively. Additionally, the platform incorporates a watermarking system to embed invisible markers in processed content, crucial for maintaining ethical standards and preventing misuse by ensuring traceability and authenticity of AI-generated modifications. This solution not only promotes ethical AI practices but also increases user trust in AI tools. By integrating watermarking and comprehensive edit histories, the platform addresses concern about the authenticity and ethical use of AI in multimedia. The project's impact includes promoting ethical standards in AI, enhancing trust in AI-powered tools, and boosting market competitiveness and industry leadership. In summary, our AI toolbox for multimedia editing offers a pioneering solution to modern content creation challenges. It combines efficiency, security, and ethical consideration, setting new benchmarks in the multimedia industry and ensuring responsible and effective use of AI technologies.

Keywords: Digital watermarking, AI in media production, Ethics in AI, AI toolbox

1.0 INTRODUCTION

The fast improvements in multimedia content material creation have brought about a growing demand for green and available modifying equipment. Traditional multimedia editing software program, while powerful, frequently falls quick in meeting the needs of users who searching for quick, intuitive, and steady solutions. The emergence of synthetic intelligence (AI) gives a promising avenue to revolutionize this area, particularly through the integration of advanced device getting to know techniques which include Generative Adversarial Networks (GANs), Convolutional Neural Networks (CNNs), and Recurrent Neural Networks (RNNs).

The motivation in the back of growing this AI-driven multimedia modifying platform stems from the need to address 3 tremendous challenges inside the current landscape. Firstly, there's a pressing want for efficient multimedia enhancing gear that could lessen the time and complexity concerned in content material advent. Current solutions are much less available to informal users and small companies, creating a gap that AI can fill by means of democratizing multimedia modifying.

Secondly, the dearth of comprehensive edit histories in modern-day system gives a barrier to every getting to know and effective content material cloth control. Users often require an in depth records in their edits to music adjustments, analyze from their approaches, and revert to preceding versions if wished. Incorporating this feature might beautify person enjoy by way of the usage of imparting greater manipulate and transparency.

Finally, as AI-generated content material becomes an increasing number of indistinguishable from human-created content material, ethical issues approximately authenticity and misuse rise up. The implementation of watermarking in AI-edited content is important to ensuring the responsible use of those technologies, supplying traceability and deterring unethical practices.

This progressive platform pursuits to address those demanding situations, imparting a solution that combines efficiency, protection, and moral considerations, putting new requirements inside the multimedia enterprise.

2.0 OBJECTIVE

As a starting point of this project aim, the project will develop an advanced platform which designed to enable users efficiently edit and enhance image elements using AI technology. This platform will prioritize ease of use, allowing users to process their images in a significantly shorter time compared to traditional methods.

Moreover, the platform will include a feature that logs the history of all edits made to multimedia elements. This allows users to easily review or revisit previous versions of their work, ensuring they can track changes and make informed decisions during the editing process.

As the final point, this project will promote the ethical use of AI tools by applying watermarks on the processed image. This feature is particularly important for scenarios where the distinction between original and AI-modified content must be clearly indicated, helping to maintain transparency and integrity in the use of AI-generated media.

3.0 METHODOLOGY

In this toolbox, we are focusing on the image element. The application has provided with the image processing service which include with the image restore, generative fill, object remove, object recolor, background remove and an AI search history. In this system, all the transformed images will be embedded with the watermark (Generated by AI) which consider the image is processed by the AI to ensure the user not abuse the images.

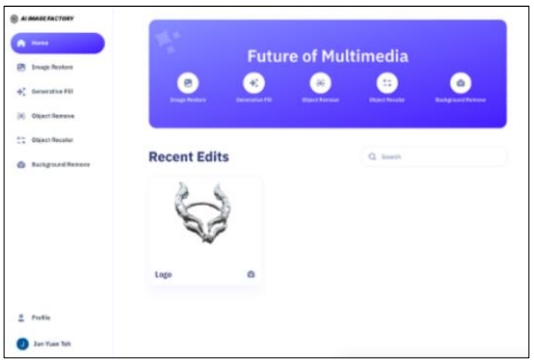

Figure 1 Home page

In this function, it shows the history of edited images and the search function.

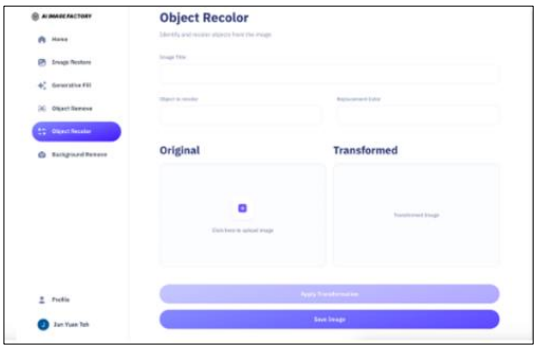

Figure 2 Image recolor module

In this function, using AI, it allow user to recolor the specific objects required.

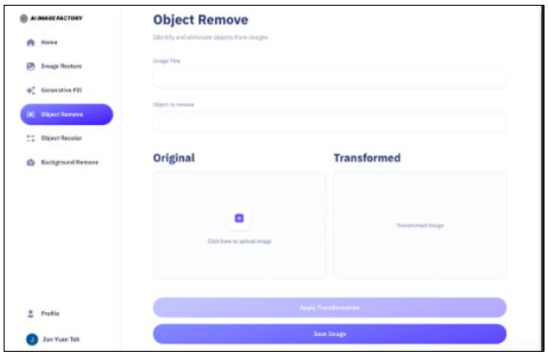

Figure 3 Image remove module

In this function, using AI, it allow user to remove the specific objects required.

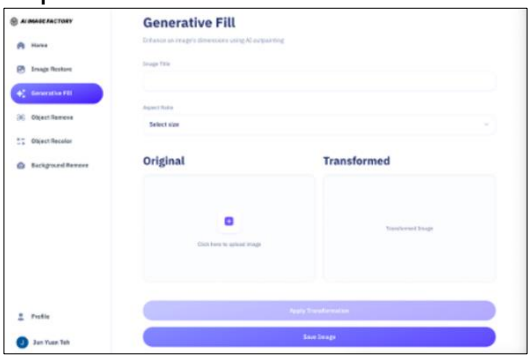

Figure 4 Image resize module

The generative fill is the function to use the AI to resize the image either expand or shrink the image.

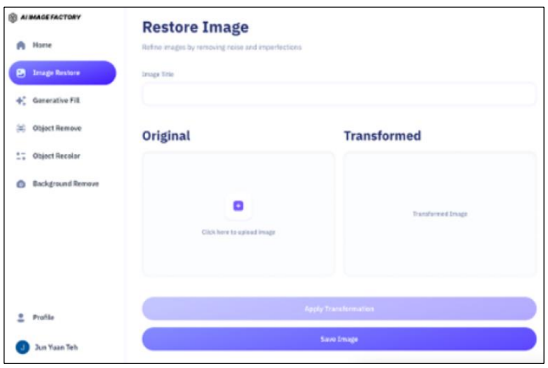

Figure 5 Image restore module

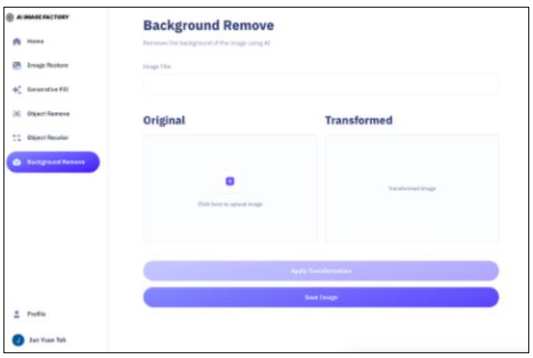

Figure 6 Background remove module

Image restores is used to restore the blur images to more clearly.

The background remover is used to remove the background and keep the main object.

Figure 7 Watermark Example

All the transformed image will embed with the watermark “Generated By AI”.

The Generative Fill is a feature leverages AI to dynamically resize images by either expanding or shrinking them. This function is particularly useful when the users need to adjust an image to fit specific dimensions without losing an important content.

The Object Recolor and Object Remove features use advanced AI to detect specific objects within an image that a user wants to modify or eliminate. In Object Recolor, it allow the users to change color of a particular object within an image. To apply it, once AI detected the object, the user can select a new color to apply which makes it easy to match the object with the desire needs. While in the Object Remove is designed to helps users eliminate unwanted objects from their image. The AI would identifies the objects that need to be removed and then intelligently fills the space with an appropriate content to ensure a natural look.

In this project, we implement Claudinary as AI tool to process an image as object. Cloudinary's AI-based image editing implements a mix of sophisticated algorithms and neural networks to realize better images and manipulation. It initiates with the input of the image, then normalizing and resizing. Convolutional Neural Networks (CNNs) form the core of most image editing operations through feature extraction, for example, objects, edges, and textures from images. Among the mentioned AI capabilities, Cloudinary provides the following: Auto-enhance, doing things like color correction and exposure adjustments; manipulate objects for tasks like removing backgrounds; restore images by removing noise or repairing damage. It often indicates the before and after comparison view that allows users to see how edits have changed the image and be sure that modification is according to quality standards set by them. Inbuilt into Cloudinary, this CNN integration utilizes the real-time processing framework to empower delivery of powerful and versatile image editing solutions.

4.0 RESULTS

The emergence of AI-powered multimedia editing tools marks a new era in content production, offering a wealth of innovative capabilities and transformative

impacts on the industry. One of the primary advantages of AI-powered multimedia editing platforms is their efficiency. By leveraging advanced artificial intelligence techniques, these platforms significantly reduce the time and complexity involved in content creation. Tasks that once required hours of manual work, such as object removal, background replacement, and colour correction, can now be accomplished with a few clicks.

Accessibility is another crucial benefit of these platforms. Unlike traditional tools, AI-driven platforms make multimedia editing accessible to everyone. This system user-friendly design accommodates the beginners as well offering an advance feature for professionals. In addition, control and transparency are enhanced through features like detailed edit histories. Users can track changes, learn from their editing process, and revert to previous versions, giving them unprecedented control over their work.

The impact of these platforms on the industry could be transformative. Traditional editing software companies may need to adapt their business models to compete, and the job market for multimedia editors may shift towards AI-assisted editing skills. Moreover, new categories of content creators may emerge, leveraging the platform's capabilities to produce innovative forms of media.

Ethical considerations are also at the forefront of these platforms' design. By incorporating watermarking to ensure the traceability of AI-edited content, they set new ethical standards within the industry, particularly in addressing concerns about authenticity and misuse of AI-generated content.

Moreover, the learning and skill development opportunities provided by these platforms are significant. The comprehensive edit history feature serves as a learning tool for users, helping them improve their editing skills by studying their past work. Interactive tutorials, AI-powered suggestions, and integration with online learning platforms offer users the chance to enhance their skills continuously.

The results of using such platforms are multifaceted. Users can produce high-quality multimedia content in a shorter time, leading to increased productivity and potentially more frequent content updates or releases. The ability to review and revert to previous edits results in better content management, reducing errors and improving the quality of the final product. With watermarking, the platform ensures that AI-edited content remains identifiable, thus reducing the risk of unethical use, such as passing off AI-generated content as entirely human-made.

The novelty of these platforms lies in their integration of advanced AI techniques like GAN’s. This modern approach distinguishes them from traditional software and opens up new possibilities for content creation. Unlike existing tools that cater to a more professional audience, these platforms aim to make advanced editing capabilities available to a broader range of users, a novel approach in the multimedia editing space.

In conclusion, AI-driven multimedia editing platforms represent a significant advancement in content creation technology. By offering enhanced efficiency, accessibility, and control, they are set to transform the industry, democratize advanced

editing tools, and establish new ethical standards. As these platforms continue to evolve, they promise to reshape how we create, manage, and interact with multimedia content, opening up new possibilities for creativity and innovation in the digital age.

5.0 CONCLUSION

The AI-powered multimedia modifying platform presented in this project gives a transformative approach to the challenges confronted through modern-day content creators. By leveraging modern AI technology together CNNs, the platform no longer simplest enhances the performance and accessibility of multimedia modifying however also addresses crucial moral worries. The integration of capabilities like digital watermarking and complete edit histories ensures that the platform promotes accountable and transparent use of AI gear, safeguarding the authenticity of AI-generated content material. The innovative method of democratizing advanced enhancing capabilities makes this platform a pioneering pressure inside the multimedia industry. By placing new moral standards and lowering obstacles to entry, it holds the capability to revolutionize content introduction, making professional-grade equipment available to a wider audience and fostering industry-extensive transformation. Ultimately, this mission now not most effective advances the sphere of multimedia enhancing however also underscores the significance of moral AI practices, ensuring that the future of content material introduction is both efficient and principled.