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Autogeneration Social Media Content (TikTok, Instagram, Facebook, Twitter) Based On AI & RPA

Jihan Luthfia Fauziah[1], Harul Fadiya Baiti Hanifah[1], Kris Sujatmoko[1]
[1]Department of Telecommunications Engineering, School of Electrical Engineering, Telkom University, Indonesia

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ABSTRACT

Robotic Process Automation (RPA) is an automation solution for creating content on social media. This RPA technology can imitate human behavior. This process is assisted by Artificial Intelligence (AI) to help produce video content using AI tools. Activities such as determining content topics, creating videos, saving videos and uploading them are done automatically. So that the resulting content can be maximized in its publication, it is necessary to determine a topic that can help it. Social media has trending topics which, if turned into content, can have an effect on increasing views, because the content can be more easily found by people who are interested in the content and motivate them to interact. Automatic content creation according to trending topics can be assisted through web scaping. Web scraping is a technique for getting information from websites automatically without having to copy it manually using Python. The implementation of web scraping is in the form of searching for topics that are trending on the Facebook platform.

Corresponding Author:

Jihan Luthfia Fauziah
Department of Telecommunication Engineering
School of Electrical Engineering, Telkom University
Bandung, Indonesia
Email: jihanlf21@gmail.com

1. INTRODUCTION

The development of social media was marked by the emergence of social networking sites such as Twitter in 2006, Facebook in 2004, and Instagram in 2010, there is even the use of social media that focuses on video use such as YouTube and TikTok [1]. Among social media users, both individuals and groups can communicate with each other. The use of social media is not only limited to communicating, but users also use social media as a facility to promote their products. Some of them seek income from social media, such as becoming content creators.

The robot and automation revolution has developed in the era of globalization. The existence of RPA (Robot Process Automation) and AI leads to faster information processing in a short time [2]. RPA is a general term for tools that operate on the user interface of another computer system in the way that humans do. RPA aims to replace humans with automation. RPA is currently seen as a way to quickly return high investment (ROI). There are dedicated RPA vendors such as UiPath that only offer RPA software [3]. The RPA is not a physical robot which is able to move or process physical paper (non-digital document) [4]. RPA is a software technology that mimics human actions when they interact with computer and performing rule-based tasks such as: sending email, opening attachments, logging into enterprise application, moving files or folders, filling form, scarping data from webpage, extracting structured data from pdf document, and so on

[5]. The existence of RPA (Robot Process Automation) and AI leads to faster information management processes in a short time [6].

In creating content, it takes a long time to determine the ideas that will be used as content topics, the content creation process, and the workforce to edit the resulting content if you want to make the content more interesting. So ease in creating content is needed. One way to make content creation easier is to use the capabilities of artificial intelligence (AI). Then, the way to help manage this content so that it becomes automatic is with RPA.

In this program, it is proposed to create content using the Auto Generated Content (AGC) system. AGC was previously implemented in website creation. However, in this program, AGC was created to help create video content automatically. Autogeneration of Social Media Content will require the ability to quickly search for trending information to use as a topic for content creation. This can be helped through web scraping obtained from searching for information via social media. Then the system can create content automatically from the information that has been obtained. So, the content can be uploaded on the desired social media.

The purpose of this program is to create a Social Media Content Autogeneration program by using web scraping to search and collect information that is trending on social media. Then, implementing RPA to automate content creation steps, content uploading, post scheduling and AI tools to create content. Finally, using Social Media Optimization (SMO) strategies to increase visibility and response from audiences on social media.

2. METHOD

This system design is divided into 3 sub systems, namely the web scraping process, autogenerated video content, and uploading to social media. This process will take place in UiPath Studio assisted by UiPath Assistant and compiled into a file with the extension ".exe." so that it can be executed or run on the Windows operating system. So when the user wants to run the program, the user only needs to press run on the UiPath Assistant then all processes will be carried out automatically until the program is finished without using any more human assistance.

The system follows a step-by-step process to identify trending topics on social media. In this system, we achieve this by searching for trends through the Facebook API. This process is referred to as web scraping using RPA, which generates trending topics. Subsequently, from the identified trends, the topic ranked first is selected for content creation. The chosen topic is then processed to generate a descriptive text representing the topic. Next, the topic undergoes further processing to transform it into content using AI tools. The implementation of SMO strategies in video AGC can help improve the visibility, engagement, and results of the content. Once the content creation is complete, it is automatically uploaded to social media platforms using UiPath as the orchestrator of the upload process. A more detailed explanation of the system methodology is as follows:

2.1. Web Scraping

The first step for this program to run involves web scraping to gather information about trending topics. The web scraping method in the AGC system is performed automatically with the assistance of Python, eliminating the need for manual data processing. The social media object used for data extraction in web scraping utilizes the Facebook-scraper library and the Facebook API. The Facebook API is obtained by creating an account on Facebook Developer. The program also utilizes the pytrends.request library to access the Google Trends API and acquire popular search trends in Indonesia. In the context of the system, the use of an API Key is essential for retrieving comments from a particular post.

Subsequently, the identified topics are connected to the Bing search engine or Copilot Microsoft Bing. Additionally, a cookie obtained from the Copilot Microsoft Bing platform using GPT-4 is necessary for authentication during interactions with the Bing search API.

2.2. Auto Generated Content Video

After performing web scraping, the data is processed to become the main topic for content creation within the AGC system. This process is developed in UiPath Studio with the assistance of tools provided on futurepedia.io, specifically woxo.tech. Woxo.tech is an AI-driven video content creation solution that is user-friendly and leading in the industry. In this process, a multiple-choice dialog is also provided, allowing the user to decide whether to proceed with the topic options obtained from web scraping. UiPath Studio is organized into several sequences.

The first step in the main UiPath program is to create a new sequence by selecting the Python Scope function in the UiPath activities. This will call the 'trend' variable and execute the Python script directly in UiPath. The second process involves presenting a dialog in the form of a message box. The dialog's title is

'Trending,' with the input label being 'Today's Trend: ' + pythonOutput2.ToString + 'Is this going to be the content?' The third process, within the Use Browser Chrome sequence: New Tab – Google Chrome, includes a new activity called Type Into 'editable text,' with the input being the link to woxo.tech. The fourth process occurs when Woxo.tech is accessible by UiPath. In the Do command, a new activity is created: Type Into 'editable text,' with the input being the web scraping result from Python, representing the trend to be used as the content creation topic with a data type of string. The final process takes place when the video is completed and displayed on the Woxo.tech page; it will be downloaded to the device. The subsequent Do command will create a new activity: Click with a single type, repeatedly clicking the same object. This is designed to click the save button, initiating the video-saving process. Then, a delay is implemented to allow time for the video upload process.

2.3. Uploading to social media and using the SMO method

The final step is the upload to social media using Social Media Optimization (SMO) methods. This process will continue within UiPath Studio and UiPath Assistant to schedule the upload. In the first sequence, the script is imported from the data file and loaded into memory for execution using the 'load python script' command. Subsequently, the content upload to TikTok, Instagram, Facebook, and Twitter takes place, with the addition of hashtags to enhance the upload process for maximum visibility.

The first process involves importing the script from the data file and loading it into memory for execution using the 'load python script' command. The Python script is then called into UiPath as an object. The second process entails using the 'type into' function to input the link leading to the desired social media account's web page. Subsequently, the 'enter' key is pressed on the keyboard. This action is recorded by UiPath and will be repeated in the automation process. The third process utilizes the desired social media web page, adding a 'click upload' activity to instruct the program to navigate to the content upload page. The fourth process, in the upload menu, prompts the selection of the video file to be uploaded. The chosen file is entered into the 'type into' field, allowing RPA to automatically locate the file. The fifth process involves reviewing the video before uploading it to social media. During this review, comments and settings for the video are added, with the comments or captions typically comprising trending hashtags. The final process is the video upload. Prior to this, a delay or waiting time is added to account for situations where the video has not finished uploading, requiring execution time before proceeding to the next activity. A one-minute delay is provided. The subsequent activity is the 'click post' to upload the video post.

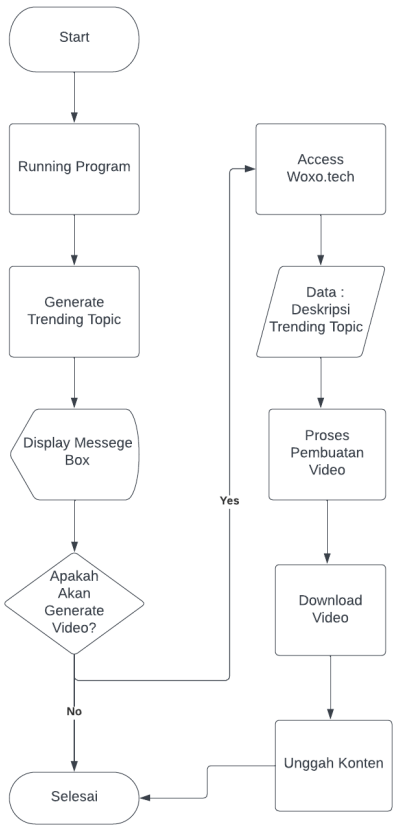

Figure 1. AGC System

Based on the AGC system flowchart in Figure 1. The initial step in the AGC system is to run the program by running the program. After the program starts execution, the program will generate trending topics or search and collect information on trending topics on social media. This process is called web scraping using python to generate trending topic keywords. Then the program will display a message box about the trending topic. The message box asks the question "Will you generate a video" with a choice of "Yes/No" options. If the user chooses the "Yes" option, the program will access the AI tools used, namely Woxo.tech. This tool is used to create video content based on the selected trending topic. The trending topic keywords obtained from web scraping are processed into description text. The text is then processed into a video content. Furthermore, the content that has been created is downloaded and then put into a file on the device. The downloaded content is then uploaded to social media automatically using RPA then the program will stop. If the user chooses the "No" option, the program will stop immediately.

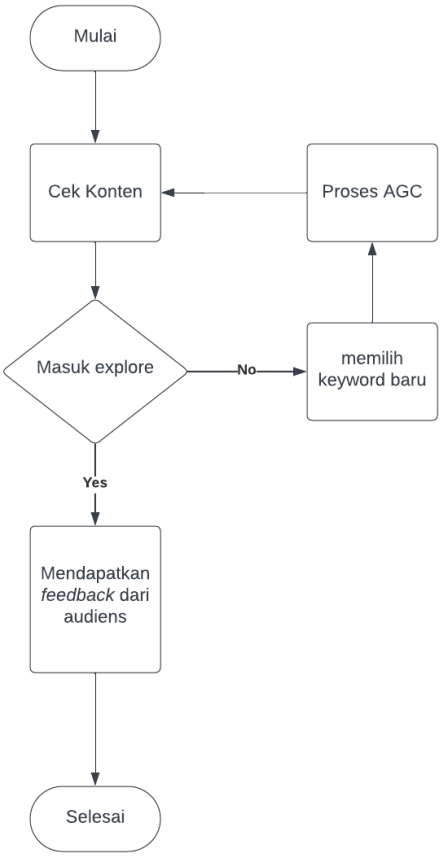

Figure 2. SMO Startegy

Based on the SMO strategy flowchart in Figure 2, it is explained that process of implementing an SMO strategy begins with the observation and monitoring of content that has been uploaded to various social media platforms. At this stage, it is important to actively observe the responses and interactions received by the content from social media users. The expected result of SMO implementation is to get a positive response reflected in the form of increased likes, views, and comments. The SMO strategy used is to use popular hashtags or trending topics. Currently, hashtags are widely used by marketers as tools for marketing communication and promotion. Because the use of hashtags can increase engagement [7].

3. RESULTS AND DISCUSSION

This system requires a comprehensive testing scenario that encompasses all critical and relevant aspects to ensure the success and reliability of the program. The testing is designed to verify various aspects, including the relevance of video content to trending topics, the quality of the generated content, the success of content on social media, the speed of content creation, and the ease of content creation. These testing scenarios are conducted to provide the best user experience, demonstrating that the program can accurately replicate current trends and produce relevant and high-quality video content.

3.1. Web Scraping Test Results

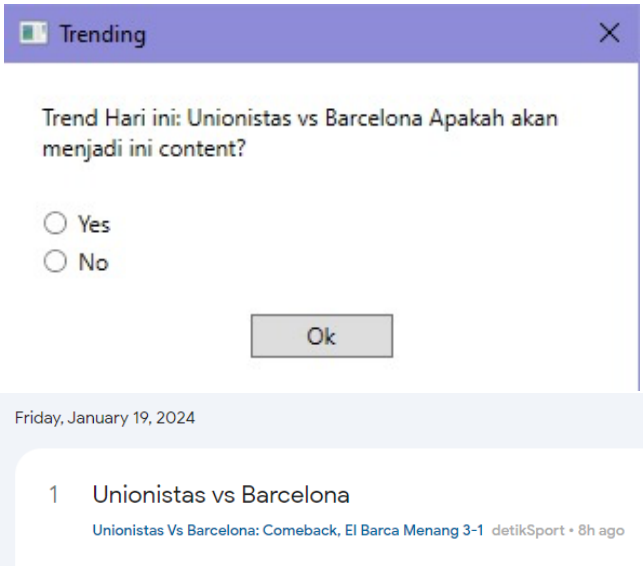

Figure 3. Trending Results from Web Scraping

Web scraping is tasked with searching for trending topics on the Facebook platform. Subsequently, these topics are connected to the Bing or Copilot Microsoft Bing search engine. The obtained results consist of the top five trending topics. During the execution of the system, a message box will appear, providing notifications about the content that is currently trending today. This allows for a decision on whether to use the topic for content creation or not. If affirmative, the process will proceed to the video content creation stage. So that it can be proven that the results displayed in the message box are in line with the current trend on Google Trends As can be seen in Figure 3..

3.2. Comparison of Manual Posting with Auto Generated Program

Image Source: tiktok.com/explorerbot Image Source: tiktok.com/ariefgolang

Figure 4. Comparison of Manual Posting with Auto Generated Program

The next step involves evaluating the uploaded videos on the account. Full control is then given to the account by examining feedback such as the number of likes and comments. This operational procedure needs to be conducted regularly to obtain maximum feedback. The executed program simplifies the user's ability to create video content on social media that aligns with trending topics. In Figure 4 are comparison of video content results produced by a robot and a human. On the left side of the image is the result of a video

obtained from the Autogenerate Content program, which garnered 43 likes. Meanwhile, on the right side of the image is content generated by a human with the TikTok account tiktok.com/ariefgolang, which received 15 likes. This indicates that content generated by both a robot and a human does not differ significantly in audience interest, as they contain the same information related to football, specifically the Salernitana vs Roma match. Therefore, using a robot as a tool for social media content automation can provide advantages due to the shorter time required to create content and the absence of human intervention in its creation.

3.3. Best Time to Post on Social Media

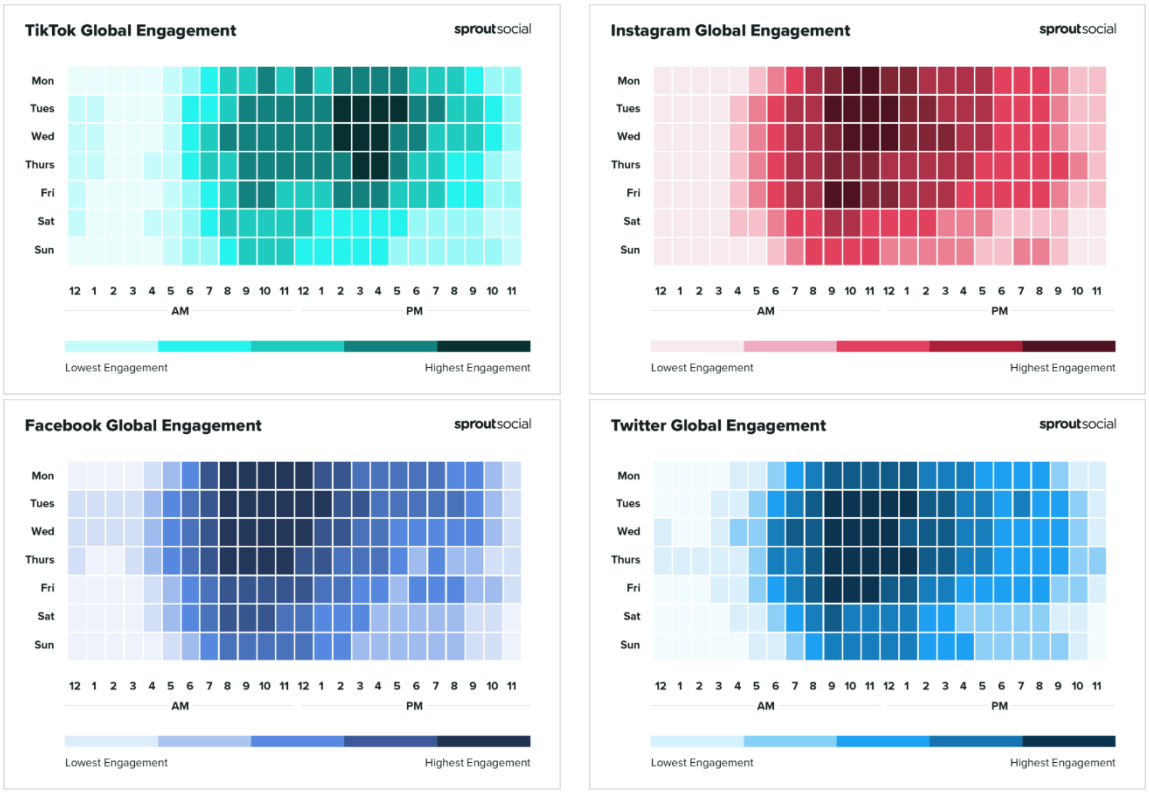

Figure 5. Social Media Global Engagement

Based on Sprout Social data in 2023 which is described in Figure 5, the best time to post content on the Tiktok platform is on Tuesday from 2 to 6 pm, Wednesday from 2 to 5 pm, Thursday from 3 to 5 pm. While Instagram, on Monday from 10 am to noon, Tuesday from 9 am to 1 pm, Wednesday from 10 am to 1 pm, and Friday from 9 to 11 am. Then Facebook, on Monday from 8am to 1pm, Tuesday from 8am to 2pm, Wednesday from 8am to 1pm, and also Thursday from 8am to noon. Lastly, Twitter is on Tuesday from 9am to 2pm, Wednesday from 9am to 1pm, Thursday from 9am to 2pm, and Friday from 9am to noon. However, all social media have their own algorithms that will affect changes in trends on social media, so the best time to post on social media also affects the algorithm. Algorithm is the process of turning input into output by analyzing user interests, interactions, user history and trending topics.

3.4. Video Content Testing Results

In the video content results analysis section, testing was carried out using a questionnaire with Google Form. Questionnaire is a data collection technique that is done by giving a set of questions or written statements to respondents to answer [8]. The Likert scale used in this test has a minimum score range of 1 to a maximum score of 5, with the aim of obtaining a clearer understanding of the tendency of responses from respondents [9]. The results obtained are in the form of respondent data. A total of 55 students have filled out the questionnaire. Analysis of whether the video has information that is relevant to the topic, the visual quality of the video, the audio quality of the video, and the effectiveness of delivering information through the video.

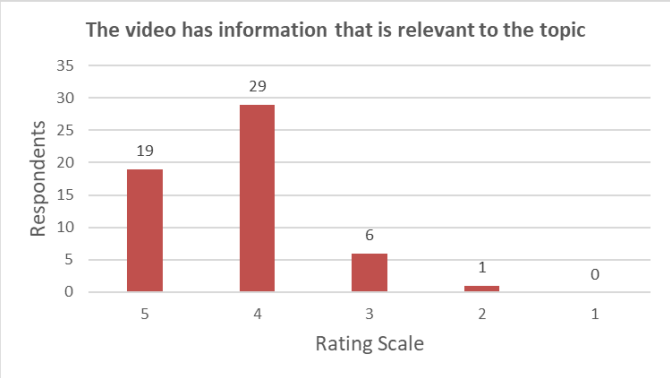

Figure 6. The Video Has Information That Relevan to The Topic

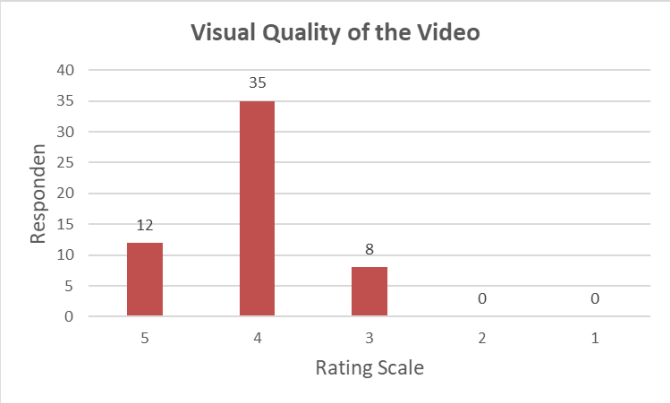

Figure 7. Visual Quality of The Video

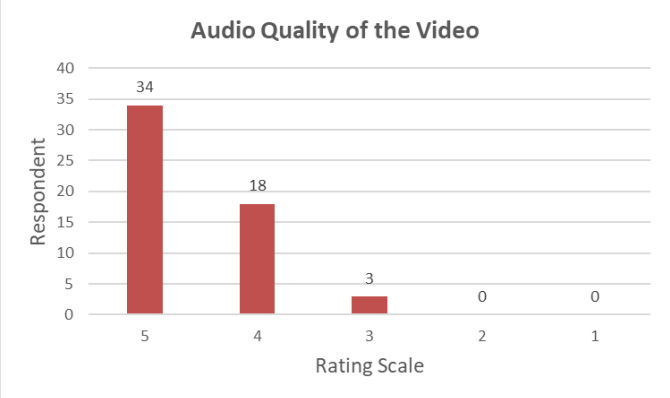

Figure 8. Audio Quality of The Video

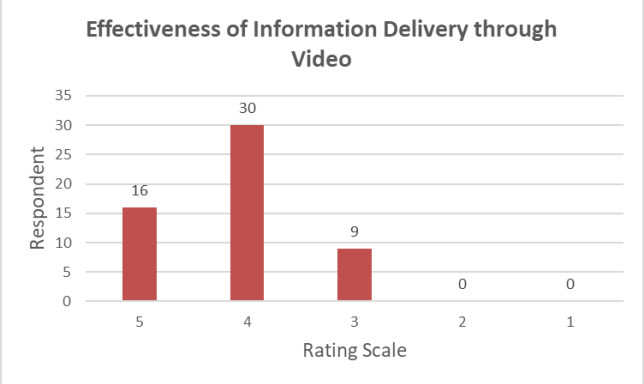

Figure 9. Effectiveness of Information Delivery trough Video

The video has information according to the topic, obtaining the highest score in 4 of twenty nine respondents, with fifty-two point seven percent and can be understood that the program is already quite relevant to the topics discussed as shown in Figure 6. Then, the visual quality of the video got the highest score in the 4 of thirty-five respondents, with sixty-three point five percent and can be understood video quality is already quite high as shown in Figure 7. Letter, the audio quality received the highest score in 5 points of thirty-four respondents, with Sixty-one point eight percent and can be interpreted as the audio quality of the content that has been made outstanding or excellent as shown in Figure 8. And the effectiveness of the transmission of information through video, obtained the highest score in the 4 points of thirty respondents, with Fifty-four point five percent and can be understood that the information provided has been sufficiently effective and well delivered as shown in Figure 9.

3.5. Video Content Testing Results in Social Media

The development of social media is characterized by the emergence of social networking sites such as Twitter, Facebook, Instagram, Youtube and Tikok. Many people use social media as a means of communication, sharing daily activities, promoting goods or services and much more. This social media is utilized as a forum for virtual social activities by its users. The spread of news or content is triggered by social media algorithms from the results of activities carried out by social media users such as giving likes. [10].After the testing process is carried out to determine the success of video content uploaded on social media, the results will be obtained in the form of the number of account interactions with the audience. The following is the maximum result obtained on Sunday, 8 February 2024.

Table 1. Result on Social Media

Platform	Followers	Most number of viewers	Most number of likes
Tiktok	613	1786	320
Instagram	232	423	202
Facebook	107	150	128
Twitter	118	593	27

Table 1 is the results obtained from this testing have positive impacts, such as content being deemed relevant to trending topics, the quality of the generated videos – both audio and visual – being considered good due to the AI tools adapting the audio and visual components. The ease of creating content using the program is also noted as easy and effective, as users only need to run UiPath Studio, and the program will execute according to the workflow. The success of content on social media is considered achieved, as the content is enjoyed by social media users and receives feedback in the form of likes.

4. CONCLUSION

Based on the results of the Autogeneration Social Media Content system development, this system proves to be more efficient in aiding social media content creation. The process involves web scraping to gather trending topics, utilizing Artificial Intelligence (AI) tools for video creation, and employing Robotic Process Automation (RPA) software to upload content to social media platforms. Therefore, this program holds significant potential and benefits if further developed. The system is designed to operate automatically without human intervention but can follow a workflow similar to that of a human.

To garner interest and achieve a positive impact, the content must align with social media user interests. This is achieved by identifying viral keywords and using them as topics. The system generates real-time, continually updated content topics. The resulting video content has a duration of less than 1 minute with an aspect ratio of 9:16. Subsequently, user accounts on TikTok, Instagram, Facebook, and Twitter are connected, facilitating content uploads on all these accounts.

The Autogeneration Social Media Content system focuses on video content creation. Research indicates that video content, employing Social Media Optimization (SMO) strategies, outperforms static images due to its alignment with our desired system solutions. With video content, we can trigger more active viewer interactions, easily disseminate content across various social media platforms, adjust quality as desired, and effectively convey information due to customizable expression, visualization, narration, and duration. This enhances aesthetic value and ensures content relevance to information.

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