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Content Engine and Marketing Assistant for Business

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Abstract: — SMEs are increasingly adopting online platforms to reach their customers, yet a majority of these entrepreneurs are constrained by time, skills, and financial resources when producing marketing content. In this paper, I shall discuss a content engine powered by AI with a marketing assistant that can generate product descriptions, social media marketing, blogs, and email marketing campaigns without any human intervention. I shall also discuss a latest NLP model with an innovative online platform to generate search engine optimized and target group-specific content, ensuring that such a solution would reduce reliance on external agencies and, as a result, small-scale entrepreneurs can increase their online visibility with greater marketing efficiency. It would offer multi-criteria forms of diverse content, tone-form changes, and a common content management system, ensuring that this would form a cost-effective solution to contemporary online marketing challenges.

Index Terms - Artificial intelligence, content generation, content management, digital marketing, marketing automation, natural language processing, small and medium-sized enterprises, web-based applications

I. Introduction:

The growing use of digital platforms brings about a major shift in the way organizations market their products or services. Digital platforms like websites, social networking sites, or even email marketing platforms have become major marketing channels for reaching the customer base. Although large organizations have specialized marketing professionals and appropriate technology at their disposal, SMEs or small to medium-sized organizations face challenges in maintaining their online presence.

Content generation is an important part of digital marketing; however, this process is many times time-consuming and tedious process for small businesses.

Even for many small businesses, product descriptions, promotion posts, and marketing emails are generally done either manually or through some external agency. As a consequence, there are increased operational expenses, variability in quality, and a certain amount of time delay involved in marketing campaigns. Also, due to a lack of search engine optimization and targeting, the effectiveness of marketing is brought down.

Recent breakthroughs in Artificial Intelligence, specifically in Natural Language Processing, have led to the development of automated systems that can produce text like a human and be contextually relevant. Such advancements have opened a door for a more streamlined marketing process by utilizing AI for automating the creation of text. However, current methods or systems used for marketing automation have been fragmented or have been a manual process.

In order to overcome these issues, the present work introduces an AI-enabled content engine and marketing assistant that uses automation in the creation of marketing content through an efficient centralized interface. This proposed system helps small-scale businesses in writing product descriptions, social media posts, blogs, and emails with ease, thus making their marketing process efficient.

II. OVERVIEW OF EXISTING LITERATURE

With the increased use of artificial intelligence in various business functions, there is considerable research interest in this area, especially with respect to small and medium-sized enterprises (SMEs). Various research studies have been undertaken to examine how SMEs can benefit from the use of artificial intelligence-based applications.

Aggarwal et al.[1] analyzed the role of generative AI in overcoming the challenges posed to small businesses by designing their solutions using the method of design thinking. The authors were able to prove that the use of content generation via AI can help improve creativity, reduce labor, and improve competitiveness, although the study involved designing without the implementation of the system to execute the marketing processes.

Kedi et al.[2] examined the application of AI technologies, such as machine learning and natural language processing, to personalized marketing automation for SMEs. The authors emphasized that AI-driven systems help companies provide customers with highly targeted and personalized content, thus enhancing customer experience and raising revenues. Even so, this study underlined that most of the existing solutions need difficult configuration settings and generally do not provide easy-to-use interfaces for end-users who are not computer specialists.

In reference [3], Abebe and Wortmann described the role of artificial intelligence in serving as a catalyst for the growth of small and medium-sized enterprises. From the study, the adoption of AI technology has the potential of reducing costs and time spent in marketing and related content. Even though the reference gave insight into adopting AI technology strategically, it did not give insight into AI technology in creating content or managing it.

Though various research studies exist that verify the efficacy of AI technology for marketing automation and content personalization, there is a need to fill this research gap to create an integrated, easy-to-use content generation AI system that combines automation, customization, and management. The proposed system intends to fill this research gap to provide a content engine that is specifically designed to cater to SME marketing requirements.

DRAWBACKS OF EXISTING SYSTEM

- High Manual Effort: It requires a lot of time and rewriting effort for content creation.
- Inconsistent Quality: There may be variations in the level of outputs that are done manually or outsourced.
- Inadequate Personalization: Most tools lack the ability to personalize content according to the intended audience or objectives
- Fragmented Workflow): Using various unlinked tools affects workflow efficiency.
- Cost Dependency: Dependence on third-party agencies or freelancers adds to overhead costs

III. METHODOLOGY

In the proposed system's methodology, there is a detailed description of the systematic procedure that has been followed in designing and developing an AI assistant that creates marketing contents and assists small companies. In the development of the system, it has been built as an actual application that has functionality similar to that of a cloud software. This application creates marketing contents automatically through a scalable design. The methodology has phases that are interlinked and entail different duties in creating marketing contents.

A. USER ONBOARDING AND DASHBOARD INITIALIZATION

The system starts with a secure user registration system. Here, the business owner creates accounts using a registration portal and verifies their identity using login details. Once the verification is successful, the user is allotted a customized dashboard.

These are the main functions that the dashboard performs as the work environment where all users can:

- a) Upload products management
- b) Access previously produced content
- c) Store drafts and downloads

It guarantees data isolation for individual users, management of content, as well as a smooth user experience.

B. CONTEXTUAL UNDERSTANDING AND PROCESSING

The user has to input information such as the image of the product to create content for and the name for the said product to initiate the content creation process. The system then explores more information using the smart form to discover information such as type, target audience, type of content, and possibly keywords. This aggregated data helps in comprehension related to business intent, marketing, and objectives, resulting in more accurate and relevant content being generated.

C. IMAGE UNDERSTANDING AND FEATURE INTERPRETATION

As a result of uploading an image of a product, the system tends to utilize vision-based AI models, CLIP, or Vision Transformers. The reason behind this technique is to enable the system to relate product images with their descriptions, resulting in an improvement within the accuracy of content.

D. AI CONTENT GENERATION MODULE

"The primary functionality of the system features AI-powered content creation. In this case, a GPT language model processes product information, context information, and extracted features of the product image to create content for the purpose of marketing."

The produced output is comprised of:

- a) Product description, short and long
- b) Market slogans
- c) SEO-friendly keywords
- d) Relevant hashtags

Variations of content are created to give flexibility and the ability to choose the best-suited version.

E. PLATFORM-SPECIFIC CONTENT CUSTOMIZATION

The system facilitates the generation of content on a platform-level basis. The user is required to choose the marketing medium that the generated contents must meet. This includes social media, blogs, and emails. The AI responds to the marketing medium choice and adjusts the contents accordingly. The length and form of the contents get changed. The tone and

For social media platforms, the system provides the capability to generate image captions, tags, or promotional calls-to-action. In creating blogs and email messages, it produces an outline, a complete article, headings, and an email body that has customer-specific placeholders such as {CustomerName}.

F. CONTENT STORAGE AND MANAGEMENT

All generated content is securely stored in a MongoDB database under the corresponding user and product profile. Users can edit, regenerate, reuse, or download the content in text or PDF format. Long-term content reuse is supported, hence reducing repetitive content creation to improve productivity.

G. SYSTEM TOOLS AND TECHNOLOGY INTEGRATION

The system is implemented using Flask on the backend, responsible for the API routing, business logic, and integration of AI services. It utilizes MongoDB as the database for the persistent storage of user data, products information, and content history. Integration of AI services has been done through the use of external APIs in generating languages and optional design support.

H. SCALABILITY AND FEATURE EXTENSIONS

It has been designed with scalability in mind: multi-lingual content creation, canned content templates, and analytics integrations are included as extensible modules within this system. Such design would evolve the system into a full-scale marketing SaaS platform.

IV. PROPOSED SYSTEM

ContentBotics is an integrated marketing content creation and management system that utilizes artificial intelligence. This system has the ability to centralize the creation and storage of marketing content in one place through the use of the generative artificial intelligence model. It ensures that the marketing content developed has a positive impact on the brand.

The system also includes content formatting, tone of voice, optimization for specific keywords, and content variation, allowing businesses to utilize marketing campaigns effectively without requiring technical skills.

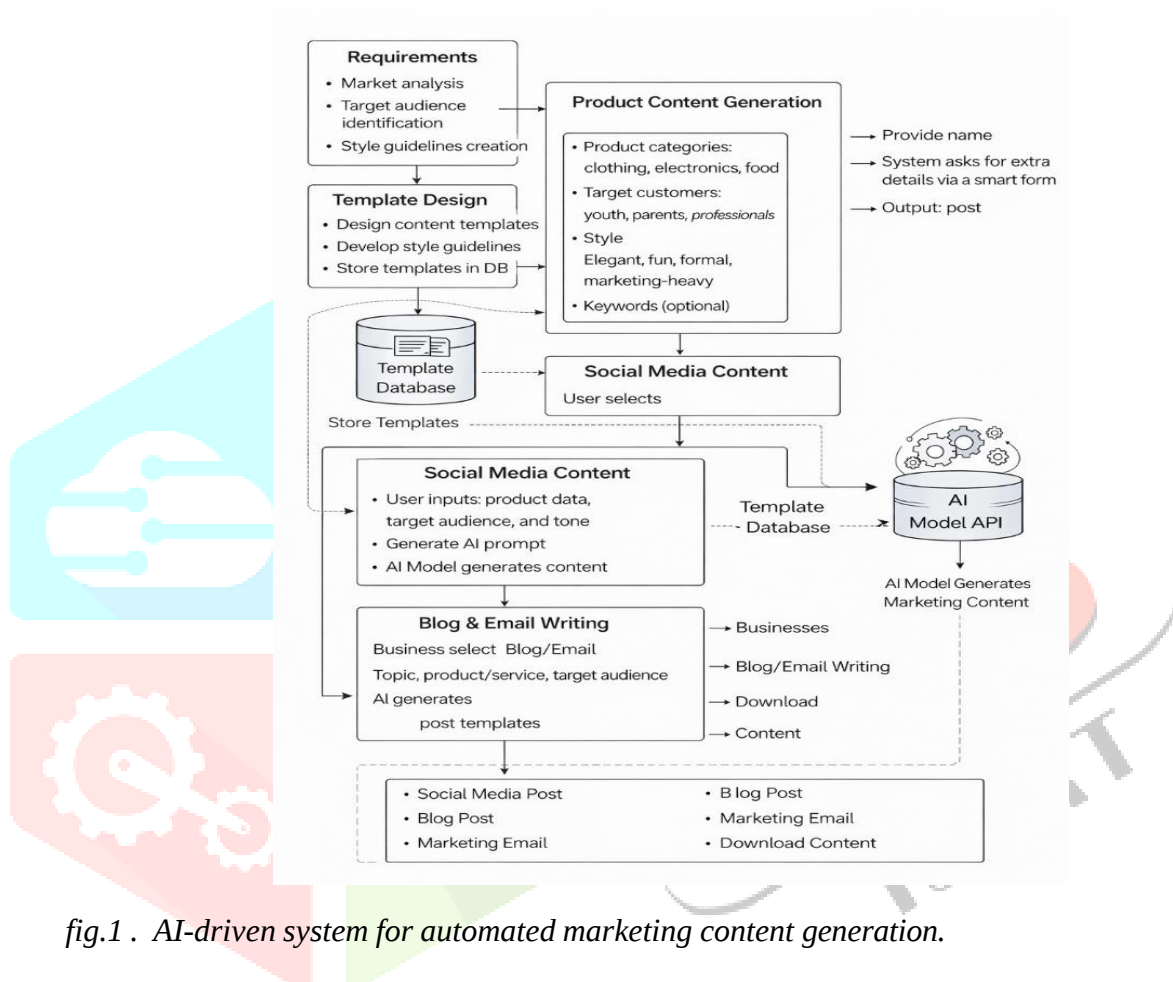


fig.1 . AI-driven system for automated marketing content generation.

V. SYSTEM ARCHITECTURE

The proposed system follows a simple layered architecture that connects the user interface, backend server, AI content generation module, and database. This structure ensures smooth communication between different components of the system.

The user interacts with the system through a web interface where product information and content requirements are entered.

The request is processed by the backend server, which manages user authentication, product details, and communication with the AI model. The AI module then generates marketing content based on the provided inputs.

All generated content and user data are stored in a MongoDB database. This architecture allows the system to generate marketing content efficiently while maintaining organized storage of information.

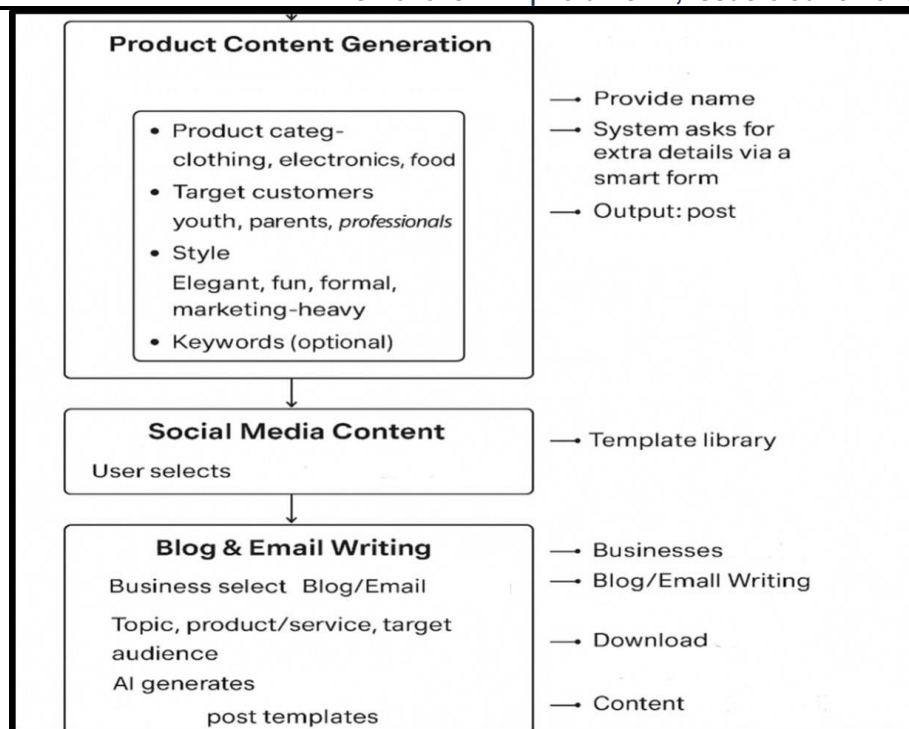


fig. 2. Workflow of the AI-powered marketing content generation system.

VI. SYSTEM MODULES

The proposed system is divided into several modules, each responsible for performing a specific function. This modular structure improves system organization and simplifies development.

A. User Authentication Module

This module manages user registration and login functionality. Users create accounts using their credentials and access the platform securely through authentication. The module ensures that only authorized users can access the system dashboard and its features.

B. Dashboard Module

The dashboard acts as the main interface of the system. After logging in, users can access all system features through the dashboard. It allows users to view products, generate marketing content, and access previously generated materials.

C. Product Management Module

This module allows users to add and manage product information. Users can provide details such as product name, category, target audience, and keywords. These inputs help the system generate relevant marketing content.

D. AI Content Generation Module

This module is the core component of the system. It uses AI-based language models to generate marketing content based on product details and user preferences. The generated content may include product descriptions, social media captions, blog outlines, and promotional messages.

E. Template Management Module

The system includes a set of templates designed for different marketing purposes. These templates guide the AI model to generate structured content for campaigns such as product launches or promotional offers.

F. Content History Module

All generated content is stored in the database and can be accessed later through the content history section. Users can review, edit, regenerate, or download previously generated content whenever required.

VII. IMPLEMENTATION

The system is implemented as a web-based application using modern development technologies. The backend is developed using the Flask framework in Python, which handles request processing and system logic.

The frontend interface is built using HTML, CSS, and JavaScript, providing an interactive user experience. Templates are rendered using Jinja, allowing dynamic content display on the web pages.

MongoDB is used as the database for storing user accounts, product information, and generated marketing content. The integration of these technologies allows the system to operate efficiently and provide real-time content generation.

VIII. RESULTS AND DISCUSSION

The developed system was tested with different product inputs to evaluate its performance. The AI module successfully generated marketing content for various product categories such as electronics, clothing, and food items.

The generated content was relevant to the product details and suitable for marketing purposes. The system was able to produce multiple content variations within a short time, which significantly reduces the effort required for manual writing.

The user interface was also tested to ensure ease of use. The results indicate that the platform provides a convenient way for small businesses to generate marketing content quickly and efficiently.

IX. ADVANTAGES OF THE PROPOSED SYSTEM

The proposed system provides several benefits compared to traditional content creation methods.

- Reduces the time required for creating marketing content
- Generates multiple content variations automatically
- Provides centralized management of marketing materials
- Offers a user-friendly interface for non-technical users
- Supports different types of marketing content such as blogs and social media posts

These advantages make the system useful for small businesses that require quick and efficient marketing solutions.

X. FUTURE WORK

Although the proposed system performs effectively, there are several possibilities for future improvements. The system can be extended to support multilingual content generation and automatic posting to social media platforms.

Integration with advanced AI models and marketing analytics tools can further enhance content personalization and campaign effectiveness. A mobile application version of the platform can also be developed to improve accessibility for users

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