

AI-Driven Product Content Generation and Community-Integrated E-Commerce Platform for Artisan Empowerment

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Abstract—The rapid growth of online shopping platforms has resulted in an increased need for quality product content to attract more customers and increase product exposure. However, many small-scale artisans and individual sellers face the challenge of creating quality product content, which requires time and expertise. This paper proposes an AI-based product content generation system, which will be integrated with the community-based platform to empower artisans. The online shopping platform will generate product content through its AI model, which will be implemented using the Genkit framework to generate content based on user information. The web development technology used will be Next.js, with the Firebase framework providing the authentication, storage, and community interaction functionalities. Besides the content generation, the system will allow the user to publish articles and interact with the community through the use of comments, which will encourage the artisans to share their knowledge with each other.

Keywords— *Generative AI, Large Language Models, E-commerce Automation, Product Content Generation, Artisan Empowerment, Web Applications, Cloud-Based Systems.*

I. INTRODUCTION

The fast expansion of digital marketplaces has completely changed how businesses promote and sell their products. E-commerce platforms such as Amazon, Etsy, and Shopify enable businesses and independent artisans to access customers worldwide. Successful online selling depends on businesses creating product descriptions that are easy to understand and attract customers while being optimised for search engines. Businesses that develop high-quality product content help customers understand products better, while their content helps improve search visibility and conversion rates. The process of creating effective product descriptions demands that marketers spend time developing their skills while learning about different platform content

standards, which most small-scale artisans and independent sellers do not possess.

The marketing and selling process for products has experienced major changes because of the fast development of digital marketplaces. The e-commerce platforms Amazon, Etsy and Shopify enable both companies and independent sellers to showcase their products to customers worldwide. The successful online selling process depends on businesses creating product descriptions that customers can understand. Customers achieve a better understanding of products through high-quality product descriptions, which also help businesses increase their search engine visibility. Many independent sellers and small-scale artisans lack the necessary marketing skills and format knowledge needed to create effective product descriptions.

The recent advancements in artificial intelligence research have demonstrated potential for automating content development tasks through LLM technology. Google Gemini demonstrates effective natural language processing capabilities, which allow it to handle structured data and produce text that humans can read. The system enables sellers to create their product descriptions through automated processes that require minimal human involvement.

The process of creating high-quality product content can benefit from both automated content creation and knowledge sharing among sellers. Community-based platforms enable users to exchange product marketing and online selling practices, which helps them build successful marketing strategies. The combination of AI technology with community features will create a digital space that helps artisans and small business owners succeed.

This paper proposes a system for AI-driven product content generation integrated with a web platform with a community-oriented approach for empowering artisans in e-commerce scenarios. The proposed system utilises the Genkit framework in generating product titles and description for e-commerce platforms through the use of a generative AI system. The system is built using a web architecture with a frontend built using Next.js and a backend using Firebase services. The system includes a discussion module which allows users to create posts and participate in comments as they exchange ideas and knowledge.

The proposed system delivers the following three main contributions:

1. Development of a system that can generate product titles and descriptions for e-commerce platforms using AI-driven technologies.
2. Integration of AI-driven technologies with a web architecture to create a web service for content generation.
3. Development of a system that incorporates a module for users to share posts and engage in comments to share ideas and insights for artisans.

II. LITERATURE SURVEY

Chen et al. [1] developed a method for creating product descriptions which uses knowledge-based systems to produce content for online shopping websites. The authors constructed a system which generates customized product descriptions by utilizing both structured product data and their acquired semantic knowledge base.

Li et al. [2] developed a system which creates product descriptions through its multimodal approach that combines textual attributes with product-related data. The authors' approach showed that using multiple input sources can enhance the quality and accuracy of generated product descriptions.

Peng and Sollami [3] built XFBoost which allows users to control text generation processes in order to produce high-quality texts that maintain coherence. The authors' approach showed that controlling the decoding process is essential in improving the quality and reliability of generated text.

Yang et al. [4] developed a generative semantic indexing method which helps e-commerce platforms better understand their product offerings. The authors developed a system which uses generative models to create semantic product information which enables better product search and generation capabilities.

The Transformer architecture was created by Vaswani et al. [5] because their system uses attention mechanisms to obtain contextual information from textual data. The system has become essential for various advanced language models which automatically produce written content.

Devlin et al. [6] created the BERT model which uses transformer-based technology to help users understand how words relate to each other in written texts. The system has enhanced the results of multiple natural language processing applications.

Brown et al. [7] created advanced language models which enable users to perform natural language processing tasks using only a few training examples. The research demonstrated that language models can produce high-quality written content after receiving only a small amount of training.

Rendle et al. [8] explored neural collaborative filtering systems because they can enhance recommendation algorithms which online retailers use to suggest products. The results demonstrated that deep learning systems can enhance the precision of product recommendation systems.

Koren and Bell [9] have researched and presented various advancements in the field of recommender systems in e-commerce platforms through their work on collaborative filtering.

Wang et al. [10] have developed a recommendation system which uses deep learning to analyze user behavior and shopping patterns for generating product recommendations.

Chen et al. [11] have researched the various ways artificial intelligence can be applied to create content for digital marketing and e-commerce platforms.

Bawack et al. [12] have conducted a systematic review of artificial intelligence in e-commerce, which includes various aspects of AI technologies and their

usage in e-commerce, including recommendation systems and automation tools.

Stamkou et al. [13] investigated how users perceive artificial intelligence content on e-commerce platforms and found that structured AI-generated content improves user experience.

Xie et al. [14] have carried out research on generative AI shopping assistants and their effects on digital commerce and found that AI shopping assistants help customers make better purchasing decisions.

Israfilzade [15] examined how generative artificial intelligence functions within e-commerce systems and showed how it can enhance digital marketing through its various applications.

III. METHODOLOGY

This section discusses the methodology for developing and implementing the proposed AI-based product content generation and community-based e-commerce platform. The methodology for developing the proposed system is based on the following steps: input acquisition and validation, AI-based content generation, community interaction management, and cloud-based data storage.

A. Overall System Architecture

The proposed AI-based product content generation and community-based e-commerce platform are based on the following modular architecture, which combines web-based user interface management, AI-based product content generation, and cloud-based data management.

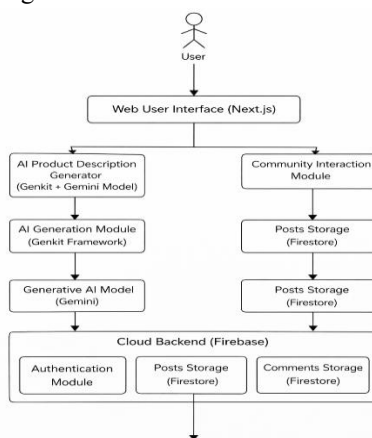


Figure 1: Overall System Architecture

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The proposed AI-based product content generation system together with the community-based e-commerce platform begins its operational process by receiving product information from users through the platform's web-based user interface. The system starts its input validation process after it receives user inputs which it will send to the AI-based product content generation module. The AI-based product content generation module produces platform-specific product titles and descriptions after it receives inputs from the system. Users can interact with each other on the platform through the posts that have been shared on the platform.

B. Input Collection and Validation

The system collects product information from users via an interactive web form. The users provide input data which contains product information and product details and information about the e-commerce platform. The system uses schema-based validation to check whether input data meets all necessary requirements.

The validation process checks for the minimum character requirements for product names and product descriptions, while the platform checks for the supported e-commerce platforms. The process establishes requirements which enable the generative AI model to produce better results through structured input data.

C. AI-Based Product Content Generation

The proposed system operates with a primary function which uses a generative AI model to create product titles and descriptions. A generative AI framework is employed to interact with a language model for context-based product content generation.

The process of AI generation is based on a "prompt-based" mechanism. In this mechanism, a structured input is provided to the user, which is then embedded into a template-based prompt that instructs the language model to develop "optimized" product content suitable for a particular "e-commerce" website. The language model analyzes the product's characteristics and creates a short "product title" and a detailed "product description."

This automated mechanism of content generation reduces the time required to create content manually while still being informative and "engaging".

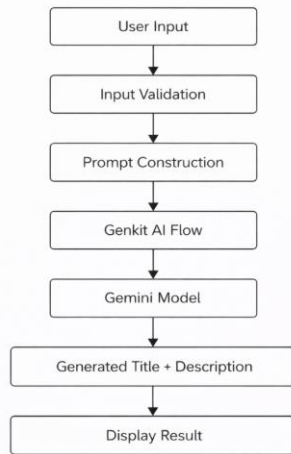


Figure 2: AI Product Description Generation Workflow

Figure 2: AI Content Generation Workflow

D. Community Post and Discussion Module

In addition to content generation, a module for interaction in a community is integrated into the system. This module allows users to share their created content with others. The system provides a feature for users to create posts that can include product descriptions and optional images. The created content is then displayed in a discussion feed for users to view, share, and provide comments.

The comment module is integrated into the system to enable users to share comments regarding created content. This module helps in collaborative learning for artisans and sellers. The system is also enabled for anonymous posting, which helps users to share ideas without exposing their identities. This is a way of encouraging others to learn from their strategies in marketing and presentation of products.

E. Cloud-Based Data Storage and Management

All of the data that the platform accumulates, such as user posts and comments, are managed and stored using its back end system that makes use of cloud computing resources. It is using a database that keeps all documents organized regarding each post and its corresponding comments. The post documents include information that is relevant to it, such as user and timestamp information, and content information. Comments are also managed and are stored in a nested collection and are linked to a post.

This helps in the efficient management and retrieval of the data related to the discussions, and the scalability of the system is also achieved with the increase in the number of users.

IV. RESULTS AND DISCUSSIONS

This section shows the results achieved after implementing the proposed AI-driven product content generation system and its effectiveness in generating platform-specific product content with community interaction capabilities.

A. System Implementation Results

The proposed AI-driven product content generation system was implemented as a web-based platform with integrated capabilities for AI generation and community interaction. The user interface was implemented using modern web technologies to support user input for product content generation and selecting the e-commerce platform for generating product titles and descriptions. The proposed AI generation process was implemented using a large language model through the Genkit framework for generating structured product content.

The proposed AI-driven product content generation system was successfully implemented for generating product titles and descriptions based on user input for product name, product details, and e-commerce platforms. The generated output is displayed instantly in the user interface for user use in e-commerce platforms.

Figure 3: User Interface for Product Content Generation

This shows that the AI module is able to provide coherent and contextually relevant product descriptions. The prompt structure of the platform is able to allow the system to adapt the content according to the requirements of various e-commerce platforms, thereby making it more relevant.

B. AI Content Generation Performance

The effectiveness of the AI content generation module was assessed based on three main factors, namely accuracy of generation, response time, and usability of the generated content. The system is able to produce significant content in the form of product titles and descriptions when provided with structured product information.

The accuracy of the response time in producing product descriptions remained low due to the efficient integration of the generative AI model with the web app architecture. This makes it possible for users to easily retrieve product content without requiring significant human intervention in editing the content.

Figure 4: Example of Generated Product Title and Description

Descriptions generated include information about product features, materials, and even possible usage of the products.

C. Community Interaction Module

Apart from content generation, the system offers a facility that enables users to interact with each other in a community forum. Users can create posts and share information regarding products. Users also have an option to attach images to their posts. Other users can read the posts and provide feedback in the comment section of the post.

This facility promotes cooperation and collaboration between artisans and sellers in that they can communicate and learn from each other regarding their marketing strategies.

Figure 5: Community Post and Comment Interface

The incorporation of a community interaction facility in the proposed system promotes a collaborative environment where users can discuss generated content.

D. Discussion

The results reveal that the proposed system is able to reduce the effort associated with creating product description content for e-commerce sites effectively. This is through the utilization of generative AI technologies to create structured content for product titles and descriptions that can be used on e-commerce sites.

The addition of a community interaction module makes the proposed system more efficient and effective through the utilization of shared knowledge and ideas on marketing products. This makes it an efficient solution for artisans and other small-scale sellers who may not be knowledgeable about marketing products.

Overall, it is evident that the proposed system is able to demonstrate the feasibility of utilizing generative AI technologies and other web technologies to create an efficient system that supports knowledge sharing and collaborative work.

V. CONCLUSION

The suggested AI-based product content generation and community-based platform shows an example of an effective approach to supporting artisans and small-scale sellers in developing high-quality content for their e-commerce platforms. The suggested system, based on the integrated AI model and modern web-based architecture, shows promising results in allowing users to automatically develop e-commerce platform-specific product titles and content based on structured input data. The results demonstrate that this method decreases content development work while maintaining high-quality content for users. The system enables users to share content through a community interaction system which allows them to interact with each other thus creating an effective learning environment through user-to-user learning.

Future work will be based on improving this system and developing it with more intelligent features to make it more effective and efficient. Some of the features can be based on developing multilingual content generation to allow users to develop content in multiple languages, developing image-based product analysis and content generation based on intelligent features, and developing recommendation systems to allow users to develop more effective marketing strategies.

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