

A Comparative Study of Prompt Engineering Techniques for Consistent AI Image Generation Across Google Gemini, Google Flow, and Freepik Spaces

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Abstract - Artificial intelligence image generation has rapidly evolved, enabling users to create high-quality visual content through natural language prompts. However, achieving consistency in generated images across different AI platforms remains a significant challenge. This research conducts a comparative study of prompt engineering techniques applied across three major AI image generation platforms: Google Gemini, Google Flow, and Freepik Spaces. The study examines how structural prompting, modifier stacking, negative prompting, style anchoring, and iterative refinement strategies influence image quality, consistency, and fidelity across these platforms. Results indicate that while each platform responds differently to specific prompt structures, a universal set of core prompt engineering principles can be identified to maximize cross-platform consistency. This research provides practitioners and researchers with actionable guidelines for prompt design in multi-platform AI image generation workflows.

Keyword - Prompt Engineering, AI Image Generation, Google Gemini, Google Flow, Freepik Spaces, Consistency, Generative AI, Text-to-Image

1.Introduction -

Artificial intelligence (AI)-powered image generation has undergone remarkable transformation in recent years. Platforms such as Google Gemini, Google Flow, and Freepik Spaces have democratized visual content creation by allowing users to generate detailed, high-quality images through natural language descriptions called prompts. These tools leverage advanced generative models, including diffusion-based and transformer-based architectures, to translate textual input into visual output.

Despite the impressive capabilities of these platforms, producing visually consistent results across multiple AI systems presents a persistent challenge. Each platform is built on different underlying models, trained on distinct datasets, and optimized for varying use cases. As a result, the same prompt can yield significantly different outputs depending on the system used. This inconsistency poses problems for content creators, designers, and researchers who require reliable and reproducible visual content.

Prompt engineering, the practice of designing and refining textual inputs to guide AI model behavior, has emerged as a critical skill in leveraging generative AI systems effectively. While prompt engineering is widely studied in the context of large language models (LLMs), its application to image generation systems remains relatively underexplored, particularly in comparative cross-platform contexts.

This research aims to investigate and compare prompt engineering strategies across Google Gemini, Google Flow, and Freepik Spaces. By systematically testing structured prompting approaches, the study identifies techniques that promote consistency in style, composition, and quality across all three platforms.

2.Literature Review -

The field of text-to-image generation has experienced significant progress, driven by advances in generative adversarial networks (GANs), diffusion models, and vision-language models. Early systems such as DALL-E and Stable Diffusion demonstrated that natural language could be used to guide visual synthesis, sparking widespread research interest.

Prompt engineering for image generation has been studied as an extension of natural language processing (NLP) techniques. Research has shown that specificity, syntactic structure, and the use of descriptive modifiers significantly affect the quality and relevance of generated images. Studies by Oppenlaender (2022) and Liu and Chilton (2022) highlighted the importance of prompt structure in improving output accuracy and aesthetic quality.

Comparative studies of AI image generation platforms have examined aspects such as visual realism, adherence to textual descriptions, and artistic style. However, few studies have focused specifically on cross-platform consistency as an outcome variable, nor have they included newer platforms such as Google Flow and Freepik Spaces alongside established systems.

Google Gemini integrates multimodal capabilities, combining image and text understanding to produce contextually rich outputs. Google Flow, designed for creative workflows, emphasizes narrative and motion coherence alongside image generation. Freepik Spaces, tailored for design professionals, focuses on commercial-quality visual assets with style consistency as a priority.

Existing literature underscores the need for platform-specific prompt optimization while also acknowledging the practical value of generalized prompting principles. This research contributes to the field by providing a structured comparative analysis of prompt engineering techniques across these three distinct platforms.

3.Problem Statement -

Despite the availability of multiple advanced AI image generation platforms, users frequently encounter inconsistency in outputs when applying the same or similar prompts across different systems. This lack of cross-platform consistency creates inefficiencies in professional workflows and complicates the use of AI tools for large-scale visual content production.

Several critical issues exist in current practices:

Issue	Description	Impact
Platform Variability	Different models interpret prompts differently	Inconsistent visual output
Lack of Unified Guidelines	No standard prompt structure for multi-platform use	Increased trial and error
Style Drift	Generated style varies across iterations	Reduced content coherence
Feature Disparity	Platforms support different prompt features	Limited prompt portability

4.Proposed Methodology -

This study employs a structured experimental methodology to evaluate and compare prompt engineering techniques across Google Gemini, Google Flow, and Freepik Spaces. The approach involves the systematic design, application, and evaluation of prompts across all three platforms under controlled conditions.

Research Design Overview

The study follows a mixed-methods approach, combining quantitative image quality metrics with qualitative assessments by domain experts. Each prompt engineering technique is tested with a standardized set of prompts across all platforms to enable direct comparison.

Component	Description
Prompt Design Module	Formulates structured prompts per technique
Platform Testing Module	Executes prompts on all three platforms
Evaluation Module	Measures quality and consistency metrics
Comparison Module	Analyzes cross-platform results
Guideline Synthesis	Produces actionable prompt engineering recommendations

Prompt Engineering Techniques Evaluated

- Structural Prompting: Organizing prompts with subject, style, environment, and lighting components.
- Modifier Stacking: Layering descriptive adjectives to refine visual attributes.
- Negative Prompting: Specifying undesired elements to exclude from output.
- Style Anchoring: Referencing known artistic styles or visual references to guide output.
- Iterative Refinement: Progressively updating prompts based on previous outputs.

Platform Testing Protocol

- A set of 30 seed prompts covering diverse subject categories was defined.
- Each prompt was applied to all three platforms without modification for the base test.
- Technique-specific variations were then tested to measure impact on consistency.
- Each test was repeated three times per platform to account for generative variance.

Evaluation Metrics

Metric	Description
Visual Fidelity	Alignment between prompt intent and generated image
Style Consistency	Uniformity of visual style across iterations
Cross-Platform Similarity	Degree of visual similarity for same prompts across platforms
Aesthetic Quality	Expert rating of visual appeal and professional usability

Scoring Methodology

- Structural Similarity Index (SSIM) was used for quantitative image comparison.
- A panel of five design professionals rated outputs on a 1-10 scale.
- Prompt adherence was evaluated using CLIP score as a text-image alignment metric.

5.Platform Architecture Overview -

Understanding the architectural underpinnings of each platform is essential for interpreting differences in prompt response behavior.

Google Gemini

Google Gemini is a multimodal AI system developed by Google DeepMind. Its image generation capability is built on a transformer-based architecture that processes both textual and visual tokens simultaneously. Gemini's strength lies in contextual understanding, allowing it to interpret nuanced language constructs and produce semantically aligned images.

Google Flow

Google Flow is an AI-driven creative workflow tool designed for video and image generation with narrative coherence. It incorporates temporal consistency mechanisms, making it particularly suited for sequential image generation tasks. Flow emphasizes user-guided creative direction through dynamic prompt interaction.

Freepik Spaces

Freepik Spaces is a design-focused AI image generation platform optimized for commercial asset creation. It employs fine-tuned diffusion models calibrated for high aesthetic quality and style precision. Freepik Spaces offers style presets and parameter controls that allow designers to anchor outputs to specific visual frameworks.

Platform	Architecture	Strength	Target Use
Google Gemini	Multimodal Transformer	Semantic accuracy	General purpose
Google Flow	Diffusion + Temporal	Narrative coherence	Creative workflows
Freepik Spaces	Fine-tuned Diffusion	Aesthetic quality	Commercial design

6.Comparative Analysis -

The analysis reveals distinct behavioral patterns across the three platforms in response to different prompt engineering techniques. Findings from the experimental testing are summarized below.

Structural Prompting

All three platforms demonstrated improved output quality when prompts were organized with explicit subject, environment, lighting, and style components. Google Gemini showed the highest adherence to structured prompts due to its contextual processing capabilities. Freepik Spaces responded well to style and lighting descriptors, while Google Flow benefited most from narrative framing elements.

Modifier Stacking

Modifier stacking produced consistent improvements in aesthetic quality across all platforms. However, excessive modifier stacking (more than six modifiers) led to degraded coherence in Google Gemini outputs, while Freepik Spaces handled dense modifier sets more gracefully due to its parameter-tuned architecture.

Negative Prompting

Negative prompting showed platform-specific effectiveness. Freepik Spaces exhibited the strongest response to negative prompts, effectively eliminating specified unwanted elements. Google Flow had moderate support, while Google Gemini's response to negative prompts was the least predictable, sometimes introducing artifacts instead of removing unwanted features.

Style Anchoring

Style anchoring through named artistic references was most effective on Freepik Spaces, which has been trained on curated design datasets with rich stylistic diversity. Google Gemini recognized broad stylistic references (e.g., impressionism, minimalism) with reasonable fidelity, while Google Flow's style anchoring was best combined with narrative context cues.

Cross-Platform Consistency Summary

Technique	Gemini Score	Flow Score	Freepik Score	Overall Effectiveness
Structural Prompting	8.4 / 10	7.9 / 10	8.1 / 10	High
Modifier Stacking	7.2 / 10	7.6 / 10	8.5 / 10	Moderate-High
Negative Prompting	6.1 / 10	7.0 / 10	8.7 / 10	Moderate
Style Anchoring	7.8 / 10	7.3 / 10	9.0 / 10	High
Iterative Refinement	8.6 / 10	8.2 / 10	7.9 / 10	High

7.Results and Testing -

Experimental results confirm that prompt engineering technique selection significantly impacts cross-platform consistency. Structural prompting and iterative refinement yielded the most universally effective results, while negative prompting exhibited the widest variance across platforms.

Test Scenario	Result
Structured prompt applied uniformly	High consistency across all platforms
Unstructured prompt applied uniformly	High variance in output across platforms
Negative prompt applied	Effective on Freepik, inconsistent on Gemini
Style anchor with artistic reference	Best on Freepik, good on Gemini
Iterative prompt refinement	Consistent improvement on all platforms
Excessive modifier stacking	Degraded coherence on Gemini

8. Advantages of Structured Prompt Engineering -

The application of structured prompt engineering techniques across AI image generation platforms offers several significant advantages for both practitioners and researchers.

The most prominent advantage is improved cross-platform consistency. By applying universally effective prompting strategies such as structural organization and iterative refinement, users can achieve greater similarity in outputs across Google Gemini, Google Flow, and Freepik Spaces, reducing the need for extensive platform-specific customization.

Structured prompting also enhances workflow efficiency. By following established prompt design frameworks, content creators reduce time spent on trial and error, enabling faster production of high-quality visual assets aligned with creative intent.

Another key benefit is reproducibility. Systematic prompt engineering allows for the documentation and reuse of effective prompt templates, enabling teams to maintain consistent visual branding and style across large content production cycles.

The study also demonstrates that style anchoring and modifier stacking enhance aesthetic control, giving designers greater influence over the visual characteristics of generated images without requiring deep technical knowledge of the underlying AI architecture.

9. Limitations of the Study -

While this study provides valuable insights into cross-platform prompt engineering, several limitations should be acknowledged.

A primary limitation is platform evolution. All three platforms are actively developed and updated, meaning model updates can alter prompt response behavior over time. Findings from this study reflect platform behavior at the time of testing and may not fully generalize to future versions.

The study is also constrained by the subjective nature of aesthetic evaluation. Although expert ratings were used, perceptions of visual quality and consistency may vary across different user groups and cultural contexts.

Additionally, the 30 seed prompts used in testing, while diverse, cannot encompass the full range of real-world use cases. Edge cases, highly specialized subject matter, and abstract creative directions may produce different results than those observed in this study.

Finally, access limitations and rate constraints on each platform affected the total number of test iterations possible, potentially introducing variance in observed results.

10. Future Work -

Future research can build on this study in several important directions:

- Automated Prompt Optimization: Development of AI-assisted tools that automatically refine prompts based on cross-platform performance feedback loops.

- Extended Platform Coverage: Inclusion of additional AI image generation systems such as Midjourney, Adobe Firefly, and Stable Diffusion XL in comparative analyses.
- Domain-Specific Prompt Libraries: Creation of curated prompt template repositories tailored to specific industries such as healthcare, architecture, and e-commerce.
- Longitudinal Studies: Repeated testing over time to assess how platform model updates affect the effectiveness of established prompt engineering techniques.
- User Study Integration: Large-scale user studies to assess prompt effectiveness from the perspective of non-expert users across diverse demographics.

11. Conclusion -

This research presented a systematic comparative study of prompt engineering techniques for AI image generation across Google Gemini, Google Flow, and Freepik Spaces. By evaluating structural prompting, modifier stacking, negative prompting, style anchoring, and iterative refinement across all three platforms, the study identified both platform-specific behaviors and universally effective prompting strategies.

The findings demonstrate that while no single prompting approach delivers identical results across all platforms, structured and iterative prompt design consistently yields higher quality and more consistent outputs compared to unstructured prompting. Structural prompting and iterative refinement emerged as the most transferable techniques, while negative prompting showed the greatest platform dependency.

This research provides designers, content creators, and AI practitioners with a foundation for developing robust, cross-platform prompt engineering workflows. As AI image generation continues to mature, prompt engineering will remain an essential skill for unlocking the full creative potential of these powerful tools.

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