

Artificial Intelligence-Based Image-to-Text Extraction and Big Data Analysis of Fashion Brand Design Archives - Focusing on the Louis Vuitton 2022–2024 Collections -

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Abstract: This empirical study extracts brand design archives using big data analysis of designer collections, aiming to review the applicability of artificial intelligence (AI) technology in the fashion design process and related basic data. We collected collection images of Louis Vuitton from Vogue Runway for the S/S and F/W seasons of the last three years (2022, 2023, and 2024). Additionally, we used Describe Picture, an image-to-text AI generation model, to generate text descriptions for each image. Text mining techniques were then applied to derive key co-occurrence and TF-IDF words related to design elements. Network visualization and CONCOR analysis were performed using UCINET-6 to derive the brand design archive. Using Describe Picture, the research identified core features such as silhouette, color, material, pattern, and mood across each brand's images. Big data analysis revealed that frequently extracted keywords aligned with the brands' overarching design directions. CONCOR analysis identified four major style clusters, facilitating the derivation of a brand-specific design archive. A comparison between the Louis Vuitton archive and official Vogue Runway descriptions confirmed that the AI-derived elements accurately reflected seasonal characteristics. These findings demonstrate the potential of prompt-based generative AI as a practical tool for effectively analyzing fashion collections and supporting future design development.

Key words: collection analysis, big data, design archive prompt clusters, describe picture, generative AI

1. Introduction

Artificial intelligence (AI) has emerged as one of the fastest-developing scientific methods for real-world applications in recent years (Anantrasirichai & Bull, 2022). According to a research paper, AI-powered digital transformation is not just a buzzword but a powerful force that fuels innovation, creativity, efficiency, and competitiveness across sectors (Aldoseri et al., 2024). Within this broader context, the fashion industry has increasingly adopted AI technologies, particularly in areas related to design development, trend analysis, and digital content generation.

Recent research suggests that AI technologies are beginning to reshape fashion design practices by supporting designers' creative workflows rather than replacing human creativity. O'Connell (2024) argues that AI tools in fashion design function as assistive systems that enhance productivity and ideation by processing large volumes of visual and textual data. Among these technologies, gen-

erative AI—capable of producing new images, text, and design outputs has gained particular attention for its potential to support early-stage concept development through pattern generation, visual exploration, and stylistic variation.

The creative directors of luxury brands and mass-market fashion retailers can use generative AI to analyze various types of unstructured data in real time, rather than depending solely on market analysis and trend reports to inform designs for the upcoming season's collection, according to an article by McKinsey & Company titled Generative AI: Unlocking the Future of Fashion (Harreis et al., 2023). By leveraging AI-based analytical tools, fashion brands may complement intuition and experience-driven design processes with data-informed insights, allowing for more systematic engagement with historical design elements and stylistic continuity. However, while such reports highlight the practical potential of AI, they often lack methodological transparency and academic validation.

Traditionally, fashion design has relied heavily on designers' knowledge, visual sensitivity, and accumulated experience. Although recent studies have explored AI as a creative support tool, existing research largely focuses on image generation techniques or prompt engineering strategies, with limited attention given to how fashion brand archives themselves can be analytically extracted, structured, and reused as a resource for design development. As a result, there remains a gap between the growing technical capabilities of gen-

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erative AI and a systematic understanding of how brand-specific design characteristics can be operationalized within AI-assisted design processes.

Against this background, the present study aims to explore an AI-assisted framework for fashion design development through the analysis of brand collection archives.

This study explores the potential use of artificial intelligence to enhance creativity and efficiency in the field of fashion design by employing image-to-text extraction and big-data analysis to identify recurring brand design elements and to propose an exploratory methodological approach. Through this approach, the study aims to provide designers and brands with insights into the potential of AI as a tool for strategic analysis and creative decision-making.

2. Literature review

Big data is a powerful tool that offers new and exciting opportunities for fashion designers. It is used for different purposes such as understanding consumer behavior, predicting trends, and creating more personalized products (Çetiner, 2024). Fashion design can better meet market demands and brand characteristics while greatly improving the efficiency and quality of fashion design by doing big data analysis (Zhao et al., 2021).

According to Jain et al. (2017), Big data has gained significant importance in the fashion world in the last decade. They further state that the Fashion industry generates and creates various sources of data. All this data comes in various forms, like words, images, etc. Since it is the era of fast fashion, the data is rapidly growing and changing. Hence, this data can be termed as fashion big data as it portrays all the features of big data. An and Park (2020) explore the potential of big data analysis in fashion by applying text mining and semantic network analysis to 29,436 blog posts on jackets, identifying style, color, fabric, and pattern trends, and categorizing them into increasing, decreasing, evergreen, and seasonal clusters. Their study highlights how consumer text data can streamline fashion forecasting and provide practical, consumer-driven design insights. An and Park (2023) developed and applied an AI-based clothing design process within a collaborative industry-university fashion design class, demonstrating that AI tools can support data-driven convergent thinking by enabling students to construct fashion product databases, analyze trending design elements quantitatively, and integrate computational insights into the design development process. Their findings suggest that AI-assisted workflows offer a structured and reproducible approach to the design process that extends beyond the limitations of traditional methods. Song and Lim (2021) investigated perceptions and trends of digital fashion technology through big data analysis of

8,144 online texts collected between April 2019 and April 2021. Using text mining, network analysis, and visualization methods such as word clouds, N-grams, and dendrograms, they identified frequent keywords including fashion, digital, and technology, along with emerging topics such as platforms, digital transformation, and start-ups. Their clustering revealed four thematic groups—fashion, digital technology, start-ups, and AR/VR—emphasizing the growing integration of digital technologies in fashion. The study contributes to understanding consumer and industry perspectives on digital fashion technology and provides a foundation for future research in areas like smart factories and platform-based innovations.

Kim and Lee (2019) examine consumer perceptions of fashion shows by applying big data analysis, text mining, and semantic network analysis to online data collected from Naver and Daum between 2015 and 2018. Their results reveal that while consumer interest initially centered on visual aspects such as models and clothing, it later shifted toward recognizing the value of designers and brands. The study highlights the evolving role of fashion shows as both marketing tools and indicators of brand image, providing a theoretical framework for applying big data in fashion industry research and strategy. Lee et al. (2021) applied semantic network analysis and CONCOR to over 15,000 news articles to examine discourse surrounding smart fashion factories. Their big data approach revealed key themes such as automation, unmanned and intelligent operations, and public concerns regarding job loss, hacking, and machine malfunction. By analyzing large-scale media data, the study demonstrated how public perception shapes the direction of digital transformation in the fashion industry. This highlights how big data text analysis can capture societal narratives and industry challenges, providing a model for applying similar methods to fashion trends and design studies. An and Park (2018) applied big data text analysis and semantic network analysis to over 38,225 blog posts to evaluate fashion design elements and emotional responses. By mapping the relationships between design elements (e.g., pattern, color, style, fit) and sentiment terms (e.g., trendy, casual, slim), the study demonstrated how big data can systematically capture consumer perceptions and inform design evaluation in fashion. Kim and Lee (2018) examined fashion industry trends shaped by the convergence of big data and artificial intelligence during the Fourth Industrial Revolution. Their study highlighted applications such as data-driven decision-making tools (e.g., Edited, Stylumia), personalized services (e.g., StitchFix, Thread), AI-powered retail platforms (e.g., Botshop, Lyst), and digital fashion design (e.g., Ivyrevel). The findings demonstrate how big data combined with AI enhances personalization, retail innovation, and design processes, underscoring its central role in the

rapidly evolving fashion industry. DuBreuil and Lu (2020) compared traditional human-based forecasting (WGSN) with big-data-driven forecasting (EDITED) by analyzing 20 paired womenswear trend forecasts in the U.S. market. The findings suggest the overall feasibility and the great potential of using big data tools to aid the fashion creation of new products.

A brand archive in fashion is a collection of a brand's past work, including garments, sketches, photographs, fabric samples, and other materials that record the brand's design history over time. These archives are not simply storage spaces, they are actively used as creative and strategic resources within fashion companies (Vacca & Vandi, 2023). The concept of brand heritage helps explain why archives matter: a brand's history, when consistently communicated, adds meaning and value to its current identity (Urde et al., 2007). In this sense, archives serve both as reference tools for designers and as storytelling assets that communicate a brand's cultural value and authenticity to consumers (Petrov, 2021), reinforcing the kind of heritage-driven identity that Crewe (2017) identifies as central to how fashion brands construct meaning and distinction.

Looking back at past collections for design inspiration is a well-established practice in the fashion industry. Many major fashion houses, including Chanel and Dior, have built formal archive systems where designers regularly study historical pieces to develop new collections that remain consistent with the brand's visual identity (Pecorari, 2021). At Gucci, for example, creative director Alessandro Michele drew extensively from the brand's archive from the 1960s to 1980s, reinterpreting past silhouettes and prints into a commercially successful and critically recognized aesthetic direction (Pecorari, 2019). Beyond design, archives have also become important marketing tools. Brands such as Dior and Chanel have used their archives to develop exhibitions and heritage campaigns that communicate exclusivity and cultural authority to consumers (Martin & Vacca, 2018; Pecorari, 2019).

With the growth of digital technology, brand archives have become more accessible and more widely used. The digitization of archival content has made it easier to search, share, and apply historical design knowledge — not only within companies but also for researchers and the public (Pecorari, 2019). More recently, artificial intelligence has begun to be applied to fashion archives, offering new ways to extract, classify, and reinterpret design elements from large image collections (Al-Ghamdi & Yusuf, 2026). However, while AI shows strong potential in identifying visual patterns, it does not always accurately capture the cultural meaning embedded in specific design details, highlighting the need for more systematic and methodologically transparent approaches (Al-Ghamdi & Yusuf, 2026).

Recent studies have further shown that design elements embedded in fashion images can also be computationally extracted and analyzed in a structured way. Kiapour and Piramuthu (2019) demonstrated that deep convolutional neural networks can capture brand-specific visual features beyond logos, including color patterns, textures, and silhouettes, identifying the visual cues that define brand identity. Hsiao and Grauman (2017) proposed an unsupervised method to discover stylistic patterns directly from large fashion image collections without manual labelling, revealing recurring structures in silhouette, color, and composition. Meng (2025) similarly applied multi-view image fusion to automatically classify core garment elements such as shape, texture, and color across collections at scale. Collectively, these studies demonstrate that visual fashion data, when processed computationally, can yield structured, brand-specific design patterns, pointing to the potential of fashion brand image archives as a meaningful resource for AI-assisted design analysis.

Despite growing interest in both text-based computational analysis of fashion data and AI-based visual feature extraction from collection imagery, a systematic investigation into the integration of brand archives as a source for generating text prompts, subsequently analyzed through computational text mining techniques, has remained unexplored. The present study addresses this gap by proposing a methodological pipeline that combines AI-based image-to-text extraction with text mining analysis to systematically build and analyze fashion brand design archives, offering a structured and reproducible approach to identifying brand-specific design characteristics.

3. Research methodology

The purpose of this study is to analyze fashion design big data of designer collections, and examine AI utilization technology in the fashion design process, and provide related basic data. By integrating AI-powered tools with Big Data analysis, this study investigates how AI can extract and interpret fashion design elements, ultimately contributing to a more efficient and innovative design process. This research seeks to establish AI as a creative collaborator rather than merely a technological tool, demonstrating its capacity to enhance ideation, streamline workflows, and introduce new approaches to fashion design processes.

The overall framework of the study is presented in Fig. 1, which outlines the sequential research procedure adopted in this research. In this study, data were collected from the spring/summer (S/S) and fall/winter (F/W) collections of Louis Vuitton, covering the years 2022, 2023, and 2024.

The brands were selected based on the 2024 "Top 10 Most Valu-

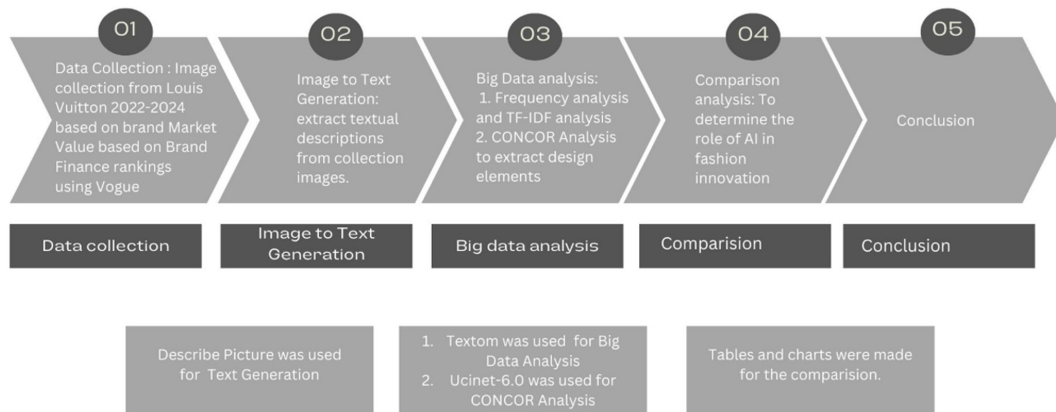


Fig. 1. Research flowchart.

able Apparel Brands 2024" ranking published by Brand Finance, a globally recognized consultancy specializing in brand valuation and strategy. Brand Finance is known for its rigorous and objective methodology in assessing brand market value, financial performance, and consumer perception. Their reports are based on empirical data and market analysis, ensuring that the rankings are both accurate and trustworthy. (Brand Finance, 2024b)

While Louis Vuitton's top ranking in the Brand Finance 2024 report confirms its global market standing (Brand Finance, 2024a), the brand was selected for its deeply archival approach to design. Founded in Paris in 1854, Louis Vuitton has accumulated over 170 years of documented design history, with its signature Monogram canvas continuously reinterpreted across successive creative directors — including Marc Jacobs, Nicolas Ghesquière, Virgil Abloh, and Pharrell Williams — each adapting archival codes while retaining the brand's core visual structure (Don-Alvin Adegeest, 2025; Louis Vuitton, 2024a). This archival orientation is central to the brand's design identity; upon joining the house, Ghesquière drew directly on historical details from vintage trunks, quilting patterns, and trunk hardware, translating these into contemporary collections (WWD, 2014).

As Ghesquière has stated, his work at Louis Vuitton is built on "extraordinary heritage and a constant focus on innovation" (Louis Vuitton, 2024b, para. 3). Louis Vuitton is therefore selected not only for its commercial prominence, but because its design practice is consistently and demonstrably grounded in archival reference, making it a highly appropriate case for a study focused on extracting and analyzing brand design characteristics through AI-based methods.

The Collection images from Designer collections were selected because they follow a consistent structure—Spring/Summer (S/S) and Fall/Winter (F/W)—providing seasonally organized data. These collections emphasize brand identity, making them suitable

for extracting meaningful prompts for generative AI. Designer brands typically release full runway collections that are concept-driven and professionally documented, offering high-quality visual references.

Collection images were obtained from Vogue Runway, a globally renowned fashion platform. Vogue's reputation for providing up-to-date, accurate, and curated content ensures the authenticity and reliability of the images selected for this study. A total of 384 images were ultimately collected from Louis Vuitton S/S and F/W, 2 seasons, over 3 years.

Images were then processed using AI Describe Picture, which extracts textual descriptions from images based on object recognition, mood analysis, and contextual interpretation. Describe Picture was selected for Image-to-prompt generation due to its rapid responses and the advantage of being freely accessible at the time of the experiment, making it efficient for generating descriptive prompts. An AI-powered tool at the time of the experiment. Article by SaaS AI Tools suggests that Describe Picture allows users to explore details and narratives within Images, offering insights into elements and visuals, such as styles, symbols, and themes (SaaS AI, 2024).

According to the AI Describe Picture website, its image-to-text feature includes AI deep analysis of image content, precise extraction of visual features, and artistic styles (Describe Picture 2024). A total of 1991 prompts were produced using the fashion images. Fig. 2 shows Describe AI, image to generation. Only images were uploaded into the AI Describe Picture in the image to prompt feature. The output prompts were generated in a descriptive format in natural language. No input instructions were needed for prompt generation because of its prompt-to-image generation feature, making it easier to use the application.

In this study, Textom (The IMC, 2023) was used for big data analysis. With the development of information and communica-

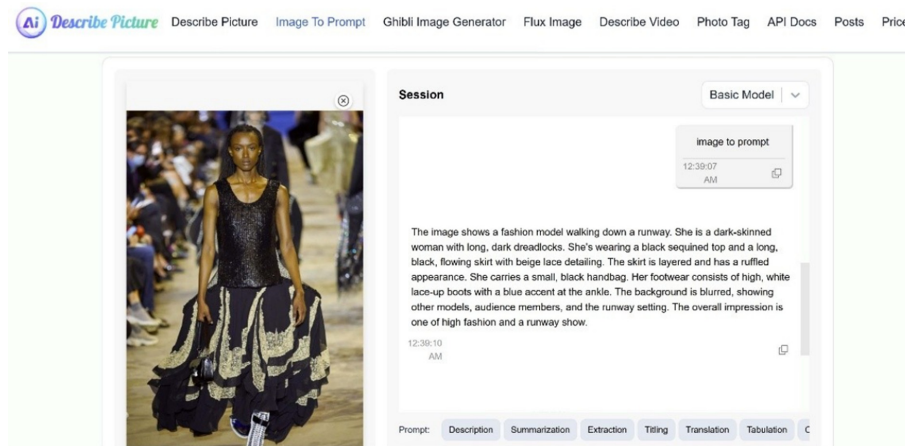


Fig. 2. AI describe picture. <https://describepicture.org>

tion, the spread of high-performance IT devices and mobile devices is increasing, and a myriad of data is being generated and shared in real-time. As a result, the use of big data is being expanded in various fields, and data from website search statistics and social media are analyzed for market forecasting and product development, and economic value-creation effects are expected (Eom & Oh, 2017).

Each season was uploaded separately, including all 3 years: 2022, 2023, and 2024. These three years were selected due to being the most recent years with both S/S and F/W collections at the time of data collection. Each seasonal collection typically consists of approximately 50 to 70 images per season, resulting in a combined total of around 170 to 200 images from 3 years of a single brand. This volume of visual data was deemed sufficient to conduct an analysis. Therefore, limiting the scope to three years ensured a manageable yet representative dataset. Data cleaning and morphological analysis were conducted to derive meaningful words for research analysis. For data cleaning, morpheme analysis, and data pre-processing were conducted. In the morpheme analysis stage, the analysis column was selected, and morphological analysis based on the CoreNLP library was applied. Part-of-speech tagging criteria were set to extract meaningful linguistic elements such as nouns, verbs, and adjectives. As a result, non-essential connecting words—such as “is,” “and,” and “are”—were automatically filtered out. In the data pre-processing phase, cleansing options such as duplicate removal were applied. Using the content-based deduplication feature, exact duplicate entries in the selected column were removed. This ensured that repeated text entries did not distort the keyword frequency analysis, thereby enhancing the clarity and accuracy of the results. The collected data was analyzed to identify the frequency of keywords, which were then compared using TF-IDF, a metric that highlights the significance of specific terms within the text. CONCOR analysis was performed using

Ucinet-6 (Borgatti et al., 2002) to detect structural patterns and clusters within the network, offering a comprehensive understanding of the relationships between significant terms. In this study, CONCOR analysis was conducted using the top 100 words from the matrix analysis.

4. Analyzing and discussing the result

4.1. S/S collection

4.1.1. Frequency analysis

The top 100 words that appear with the highest frequency in Louis Vuitton S/S collection data are shown in Table 1. In the frequency analysis of the Louis Vuitton Spring/Summer (S/S) collection, the top ten most commonly occurring words were: black (203), white (103), light (81), orange (69), texture (61), boot (56), beige (56), skirt (55), color (55), and style (48). These terms highlight the most visible components in the dataset, reflecting dominant color usage, materials, garment types, and stylistic features within the visual data.

When comparing these results to the TF-IDF analysis—which identifies words that are not only frequent but also uniquely significant to the dataset—the top-ranked terms included: orange (68), white (66), light (57), brown (57), lace (57), beige (55), leather (55), style (54), texture (54), and color (54). The presence of both frequent and distinctive terms like white, light, orange, beige, style, texture, and color in both analyses suggests that these elements are not only widely used but also central to the identity of the S/S collection. In contrast, terms such as black, boot, and skirt, though appearing in the top frequency list, were absent from the top TF-IDF list. On the other hand, terms like lace, leather, and brown ranked highly in TF-IDF but did not appear in the frequency top ten.

Table 1. Frequency analysis and TF-IDF of Louis Vuitton S/S

No.	Word	Frequency	Word	TF-IDF	No.	Word	Frequency	Word	TF-IDF
1	Black	203	Orange	68	51	Overall	14	Small	31
2	White	103	White	66	52	Bold	14	Muted	31
3	Light	81	Light	57	53	Belt	14	Belt	31
4	Orange	69	Brown	57	54	Accent	13	Wide	31
5	Texture	61	Lace	57	55	Wide	13	Bag	30
6	Boot	56	Beige	55	56	Coat	13	Coat	30
7	Beige	56	Leather	55	57	Bag	13	Pleated	30
8	Skirt	55	Style	54	58	Pleated	13	Accent	30
9	Color	55	Texture	54	59	Asymmetrical	12	Green	30
10	Style	48	Color	54	60	Green	12	Short	30
11	Dress	44	Skirt	53	61	Long	12	Pink	29
12	Top	43	Dress	53	62	Toe	12	Yellow	29
13	Red	42	Dark	53	63	Short	12	Dramatic	29
14	Dark	41	Boot	51	64	Heel	12	Asymmetrical	29
15	Brown	41	Red	51	65	Pink	11	Heel	29
16	Leather	41	Top	50	66	Tan	11	Toe	29
17	Tights	41	Pattern	50	67	Layer	11	Long	29
18	Tone	36	Tights	49	68	Dramatic	11	Trousers	28
19	Ankle	35	Detail	49	69	Textured	11	Large	28
20	Detail	35	Tone	48	70	Sheer	11	Textured	27
21	Pattern	34	Jacket	47	71	Yellow	11	Sheer	27
22	Lace	34	Ankle	47	72	Large	11	Layer	27
23	Jacket	33	High	46	73	Trousers	11	Tan	27
24	Handbag	32	Handbag	46	74	Flow	10	Pale	27
25	Aesthetic	29	Gold	45	75	Purse	10	Fabric	26
26	Mini	28	Cream	45	76	Fabric	10	Flow	26
27	Gold	27	Mini	44	77	Strap	10	Purse	26
28	High	27	Look	43	78	Shoulder	10	Shoulder	26
29	Cream	25	Lighting	42	79	Pale	10	Design	26
30	Lighting	24	Vibrant	42	80	Layered	9	Strap	26
31	Structured	24	Structured	41	81	Rich	9	Bodice	24
32	Pants	24	Pants	41	82	Heeled	9	Heeled	24
33	Sandal	23	Blue	41	83	Bodice	9	Layered	24
34	Vibrant	22	Striped	41	84	Metallic	8	Rich	24
35	Palette	22	Sandal	40	85	Purple	8	Clothing	22
36	Feature	21	Palette	39	86	Blurred	8	Pair	22
37	Striped	21	Feature	39	87	Cape	8	Metallic	22
38	Blazer	20	Drape	38	88	Neutral	8	Contemporary	22
39	Chunky	20	Gray	38	89	Pose	8	Blurred	22
40	Blue	20	Ruffle	38	90	Sleeveless	8	Platform	22
41	Ruffle	19	Blazer	38	91	Clothing	8	Button	22
42	Midi	18	Chunky	38	92	Pair	8	Modern	22
43	Gray	18	Black	37	93	Contemporary	8	Match	22
44	Drape	17	Oversized	35	94	Modern	8	Surface	22
45	Oversized	17	Floor	35	95	Match	8	Purple	22
46	Embellish	16	Embellish	34	96	Surface	8	Cape	22
47	Sunglass	16	Sunglass	34	97	Button	8	Neutral	22
48	Shoe	15	Shoe	32	98	Futuristic	7	Sleeveless	22
49	Muted	14	Bold	32	99	Decorative	7	Velvet	21
50	Small	14	Overall	31	100	Length	7	Olive	21

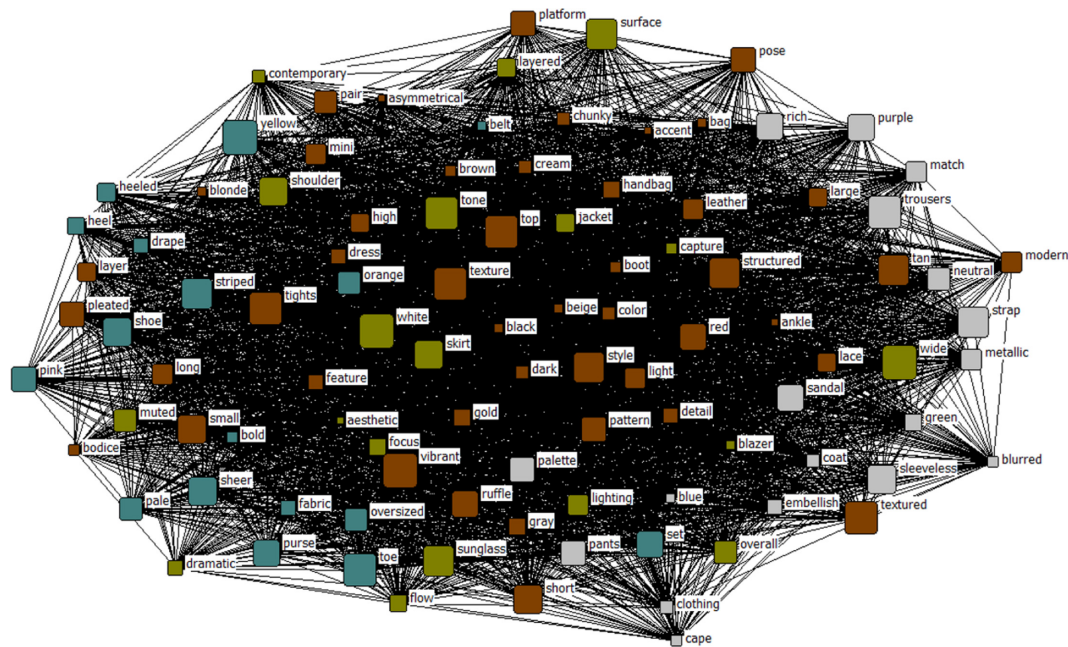


Fig. 3. Network visualization of top appearance words for Louis Vuitton S/S.

4.1.2. CONCOR analysis

To identify the interconnected structure among key terms, the top 100 most frequent words were selected. This study applied CONCOR analysis to these words to explore the relationships within the overall trends observed in the seasonal collections of the brands.

The results of network analysis using Ucinet-6 (Borgatti et al., 2002 for Louis Vuitton S/S are shown in the Fig. 3. The network

visualization analysis represents text as individual nodes, with node size indicating text frequency. The thickness of the connecting lines between nodes reflects the strength of their relationship, whereas thicker lines signify a higher co-occurrence frequency between texts.

The CONCOR visualization of the Louis Vuitton S/S collection, as shown in Fig. 4, reveals distinct four groups of keywords, each representing different aspects of the collection. The clusters are

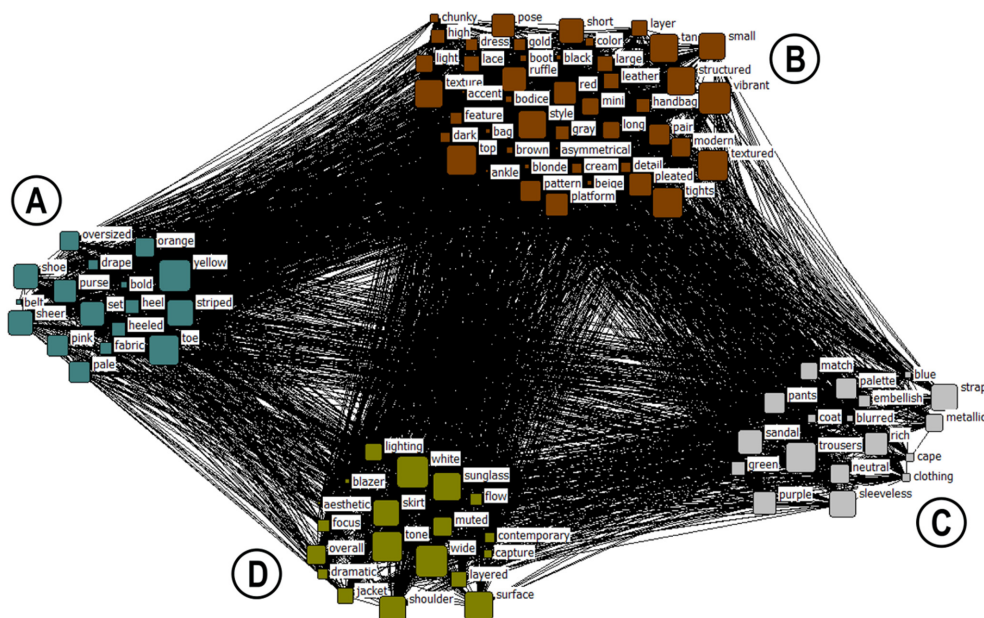


Fig. 4. Visualize the CONCOR analysis of top appearance words for Louis Vuitton S/S.

named Style A, B, C, and D because the components of each cluster represent the design elements that define each style. Style A contains words like (pink, bold, fabric, heel, drape, striped, set, yellow, heeled, sheer, pale, shoe, orange, belt, oversized). Style B revolves around words like (textured, vibrant, pose, pattern, pleated, modern, handbag, structured, color, small, dark, gray, bodice, feature, leather, light, beige, detail, large, asymmetrical, high, tan, boots, platform, pose, accent, ankle, brown, gold, dress, detail, red, chunky). Style C consists of words (purple, sandal, neutral, trousers, clothing, sleeveless, rich, metallic, green, cape, embellish, palette, blue, blurred, coat, strap, pants, match) and Style D contains words (wide, lighting, mute, layered, focus, sunglasses, shoulder, flow, contemporary, blazer, white, dramatic, jacket, overall, tone, aesthetic, skirt, aesthetic, capture).

4.1.3. Exploratory comparison of fashion collections based on style clusters

Following the CONCOR analysis, the resulting Styles A, B, C, and D were systematically organized into a structured tables of design elements to facilitate further interpretation. The classification of design elements was conducted and reviewed manually by three fashion practitioners, including a Master's degree and two doctoral degrees, to ensure the accuracy, consistency, and relevance. The overlapping terms between the style clusters and the top 10 words derived from frequency and TF-IDF analyses were highlighted using block marking.

Word category for Louis Vuitton S/S shown in Table 2 reveals that, in terms of silhouettes, Style A mentions oversized silhouette. Style B has silhouette-related words like asymmetrical and short. In contrast, silhouette-related words were not identified in Style C. Style D features a wide overall. Style A places the strongest emphasis on color. It includes colors such as pink, yellow, orange, pale, and yellow, indicating a vibrant and playful palette. Style B, in contrast, contains dark, gray, beige, red, vibrant, light, brown, and tan, showing a heavier use of darker and neutral tones with occasional brightness. Style C features purple, neutral, green, and blue, suggesting a mix of soft and rich tones. Style D focuses on more muted shades with white, muted, and tone, emphasizing minimalism and softness. When it comes to texture, all the styles seem to have limited words. Style A contains the word sheer for texture. Style B has words, texture, and textured. Style C contains the word metallic for texture. All the styles also have limited words for patterns. Style A contains the word striped. For textiles, Style A contains the word fabric whereas Style B contains words like leather. When it comes to items, Style B includes dress and tights, Style C, which has more words compared to others, lists cape, trousers, coat, and pants, and Style D mentions blazer, jacket, and skirt. Accessories in Style A

include belt, shoe, heel, heeled, and purse. Style B by handbag, boots, gold, and ankle. Style C contains sandals, and Style D has sunglasses.

Overall, Style A is characterized by key material and pattern elements, primarily centered on the categories of color and accessories. Style B demonstrates a broad distribution across multiple categories, including silhouette, color, texture, textile, item, detail, accessory, mood, and others. Style C shows concentration in color and item words, while Style D presents a relatively balanced distribution across silhouette, color, item, detail, accessory, mood, and others. These results reflect the differentiated lexical composition of the four clusters identified through CONCOR analysis.

Based on the design elements derived from each style cluster, an exploratory comparison was conducted with the seasonal collection reviews provided by Vogue Runway.

According to Vogue's review, the 2022 S/S collection for Louis Vuitton was rich in contrasts: beaded slip dresses worn with jeans, tailcoat-style denim jackets, and playful capes ranging from vampiric elegance to club-ready flair. A bias-cut slip dress paired with jeans, or a denim jacket cut with the proportions of a tailcoat. Capes were another motif throughout the season. One cape in polka dots came with a jaunty jabot; others cut diagonally across the body leaned toward going-out tops suitable for a club, not a ball; and a few appearing at the "threshold of couture" shimmered from what looked like feathery, frayed chiffon. The designs reflected the blurry lines between past, present, and future, artifice and authenticity.

Louis Vuitton 2023 S/S, designers experimented with scale and size, enlarging everyday fashion details like zippers, key holders, wallet chains, and leather tags. Clothes featured oversized elements, such as giant zipper pulls, exaggerated necklines, padded hips, and straps resembling sporty panniers. Materials and fabric techniques were also important in this collection. Easy-walking boots, external utility pockets, and playful yet commanding details were the highlights. Embroidered Tweed, wavy texture were seen. Some pants were woven with elastic to create a wavy, 3D texture before being printed.

Louis Vuitton 2024 S/S collection emphasized fluid silhouettes and material experimentation. Flowing skirts in mousseline and charmeuse were paired with silk blouses, bomber jackets, and wide leather belts, creating a contrast between softness and structure. The collection introduced new shapes, including off-the-shoulder corseted tops with high-waisted pants, sail-like shirts with trailing trains, and a beaded jumpsuit designed with the relaxed movement of a slip dress. Additionally, jackets that appeared to be traditional tweed were revealed to be crafted from laser-cut fine materials, highlighting technical innovation and refined surface treatment.

Table 2. Louis Vuitton S/S word category

Style	Silhouette	Color	Texture	Pattern	Textile	Item	Detail	Accessory	Mood	Others	
A	Oversized	Pink	Sheer	Striped	Fabric		Drape	Belt		Set	
		Yellow						Shoe		Bold	
		Orange						Heel		Toe	
		Pale						Heeled			
								Purse			
B	Asymmetrical	Dark	Textured	Pattern	Leather	Dress	Layer	Handbag	Modern	Pose	
	Short	Gray	Texture			Tights	Detail	Boot		Feature	
		Beige					Pleated	Gold		Accent	
		Red					Lace	Ankle		High	
		Vibrant								Platform	
	Color								Blonde		
	Brown								Pair		
	Black								Light		
	Tan								Chunky		
									Structured		
									Bodice		
									Large		
									Small		
									Style		
	C		Purple	Metallic			Cape	Embellish	Sandal	Rich	Match
			Neutral				Trousers	Strap			Blurred
			Green				Coat	Sleeveless			Clothing
			Palette				Pants				
			Blue								
D	Wide	White				Blazer	Layered	Sunglasses	Dramatic	Lighting	
	Overall	Muted				Jacket			Aesthetic	Focus	
		Tone				Skirt				Capture	
										Shoulder	
									Flow		

Comparing each Style cluster with Louis Vuitton collections from Vogue Runway overviews reveals several alignments. Each cluster reflected some design elements that were specific to the season. For the S/S collections, garment items such as capes, jackets, pants, and skirts appeared consistently across both analyses. For example, the prominence of capes in Style C directly corresponds to the 2022 S/S collection, where capes were described as a recurring motif ranging from polka-dot versions with jabots to chiffon styles at the “threshold of couture.” Similarly, jackets and structured tailoring identified in Style D align with the 2024 S/S collection’s refined laser-cut jackets and bomber silhouettes. The inclusion of pants in Styles B and C reflects the 2023 S/S experimentation with three-dimensional textured party pants and structured forms, while long sweeping skirts in 2024 correspond with Style D’s wide silhouettes and layered detailing. The orange, yellow, and pale colors in Cluster A, along with accessories like belts and purses, were key colors and items that were featured in the

Vogue S/S 2024 runway article. The striped pattern in cluster A was a prominent design feature in the 2024 S/S collection. Leather with asymmetrical silhouettes from Cluster B seemed to be prominent in the S/S 2023 Collection featured in the Vogue article. Black, grey, red, and brown were frequently seen in S/S 2023, along with items such as dresses and tights. Metallic Texture with embellished detail from Cluster C was a design element seen in S/S 2022. Cluster D with white, muted tones and items such as blazer, jacket, and skirt were in the S/S 2022 Collection. Sunglasses as accessories were also prominent in the S/S 2022 collection.

Together, the four clusters capture the range of design characteristics present across Louis Vuitton's S/S collections from material-driven construction and garment variety to color expression and tailored refinement. Each cluster represents a distinct but recurring design direction, and their consistent appearance across three seasons suggests that these groupings reflect stable characteristics of the brand's design identity. Notably, Style B, centered on leather,

Table 3. Frequency analysis and TF-IDF of Louis Vuitton F/W

No	Word	Frequency	Word	TF-IDF	No.	Word	Frequency	Word	TF-IDF
1	Black	142	Gray	82	51	Muted	17	Neutral	38
2	Light	102	Light	79	52	Match	17	Match	37
3	White	102	Dark	73	53	Asymmetrical	16	Sweater	37
4	Gray	96	Black	70	54	Contemporary	16	Knit	37
5	Texture	78	Pattern	68	55	Sweater	16	Contemporary	36
6	Pattern	75	White	64	56	Knit	16	Asymmetrical	36
7	Color	72	Beige	64	57	Silver	16	Long	35
8	Dark	72	Color	63	58	Sophisticated	15	Vibrant	35
9	Wear	68	High	63	59	Long	15	Taupe	35
10	Boot	64	Texture	62	60	Accent	15	Sophisticated	34
11	High	58	Style	61	61	Vibrant	15	Midi	34
12	Aesthetic	58	Skirt	60	62	Evoke	14	Accent	34
13	Skirt	55	Leather	59	63	Line	14	Line	34
14	Beige	51	Dress	58	64	Pair	14	Evoke	33
15	Brown	50	Brown	57	65	Drape	13	Pair	33
16	Dress	49	Wear	57	66	Taupe	13	Drape	33
17	Leather	47	Oversized	56	67	Embellish	13	Navy	33
18	Jacket	47	Aesthetic	56	68	Navy	13	Floral	32
19	Handbag	41	Blue	55	69	Image	13	Blazer	32
20	Oversized	40	Boot	55	70	Trim	13	Trim	32
21	Ankle	38	Fur	55	71	Blazer	13	Embellish	32
22	Feature	37	Jacket	55	72	Bright	13	Bright	32
23	Fur	37	Cream	54	73	Floral	12	Sequined	31
24	Overall	35	Coat	54	74	Shirt	12	Mid	30
25	Coat	35	Handbag	53	75	Sleeve	12	Sleeve	30
26	Blue	35	Detail	53	76	Sequined	12	Capture	30
27	Pants	33	Ankle	52	77	Mid	12	Shirt	30
28	Cream	33	Overall	52	78	Capture	12	Short	28
29	Detail	32	Feature	52	79	Tan	11	Rich	28
30	Modern	30	Pants	51	80	Architectural	11	Architectural	28
31	Structured	29	Print	49	81	Silhouette	11	Tan	28
32	Textured	27	Backdrop	49	82	Winter	11	Winter	28
33	Lighting	27	Structured	49	83	Short	11	Silhouette	28
34	Print	25	Textured	48	84	Rich	11	Bag	28
35	Palette	24	Modern	48	85	Bag	11	Shoe	28
36	Tone	24	Lighting	46	86	Belt	11	Minimalist	28
37	Geometric	24	Geometric	45	87	Minimalist	11	Belt	28
38	Top	23	Gold	44	88	Shoe	11	Model	28
39	Look	22	Top	44	89	Scarf	10	Small	27
40	Wide	22	Tone	44	90	Emphasize	10	Glove	27
41	Gold	22	Palette	44	91	Small	10	Emphasize	27
42	Faux	22	Faux	43	92	Glove	10	Scarf	27
43	Focus	20	Wide	42	93	Trousers	9	Stone	26
44	Leg	19	Muted	40	94	Layer	9	Subtle	26
45	Mini	18	Red	40	95	Stone	9	Trousers	26
46	Yellow	18	Yellow	40	96	Subtle	9	Abstract	25
47	Length	18	Length	39	97	Fall	9	Fall	25
48	Red	18	Silver	39	98	Pleated	9	Pleated	25
49	Neutral	17	Mini	38	99	Crop	9	Bold	25
50	Dramatic	17	Dramatic	38	100	Sandal	9	Crop	25

asymmetrical silhouettes, and dark textured materials — appeared as the most structurally consistent cluster, suggesting that material richness and construction are the most stable dimensions of Louis Vuitton's S/S identity, while color and accessory expression in Style A functions as the more variable, season-specific layer.

4.2. F/W collection

4.2.1. Frequency analysis

The top 100 words that appear with the highest frequency in Louis Vuitton F/W collection data are shown in Table 3. black (142), light (102), white (102), gray (96), texture (78), pattern (75), color (72), dark (72), wear (68), and boot (64). These results suggest a visual dominance of core color tones and recurring material/textural elements, reflecting key design components in the collections.

The TF-IDF analysis, which highlights words that are not just frequent but also uniquely significant within this specific dataset, offered a slight difference. The top-ranked terms by TF-IDF were: gray (82), light (79), dark (73), black (70), pattern (68), white (64), beige (64), color (63), high (63), and texture (62). While some overlap with the frequency list exists (e.g., black, light, gray, pattern, texture, white, color), TF-IDF highlights terms like beige and high that are more distinctive within this dataset, indicating their specific importance in defining the identity of the F/W collection. By comparing both analyses, certain core words (black, white, light, gray, texture, pattern) are both frequent and distinctive, others such as boot and wear, were highly frequent. Words like beige,

high, and style stood out more prominently in the TF-IDF, suggesting a crucial role in F/W collection.

4.2.2. CONCOR analysis

The results of the network analysis and CONCOR visualization for Louis Vuitton's F/W collection are shown in Fig. 5 and 6. It reveals several distinct groups of keywords that represent key themes in the collection. In Style A, words like (vibrant, winter, silver, architectural, minimalist, embellished, print, exhibit, top, white, mini, mood, jacket, overall, bright, accent, emphasize, asymmetric, texture, bag, look, bright, fur, long, drape, aesthetic, fall, shoe, bad, skirt, aesthetic). The most prominent Style B has words (muted, sophisticated, silhouette, focus, match, color, taupe, sandal, gold, rich, coat, palette, handbag, subtle, stone, red, structured, belt, blazer, knit, oversized). Style C contained (crop, wide, layer, pants, scarf, floral, leg, neutral, trousers, shirt) and Style D contains words like (sweater, detail, gray, leather, boot, lighting, light, high, pleated, beige, texture, dark, length, dark, brown, geometric, knee, small, length, cream, dress, black, blue, midi, navy, contemporary, dramatic, carry, sleeve, ankle, glove, pair, style, contrast, sleeve, style).

4.2.3. Exploratory comparison of fashion collections based on style clusters

Word category for Louis Vuitton F/W shown in Table 4 reveals that, for silhouettes, Style A contains words such as mini, long, asymmetrical, and overall. Style B, for silhouette, contains words like oversized and silhouette. Style D contains midi and short. Style

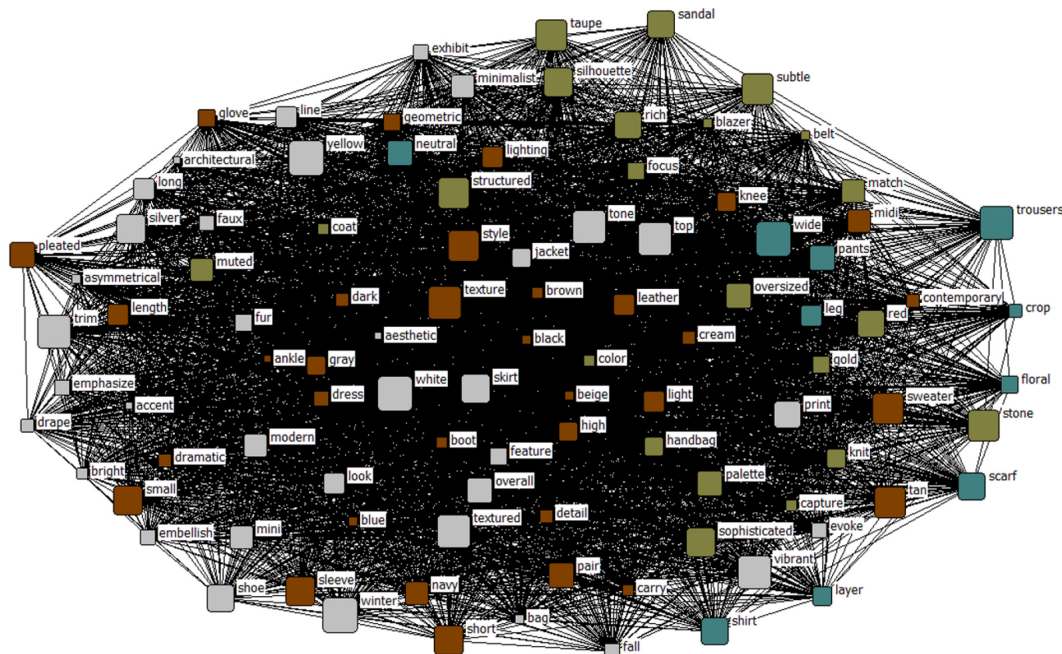


Fig. 5. Network visualization of top appearance words for Louis Vuitton F/W.

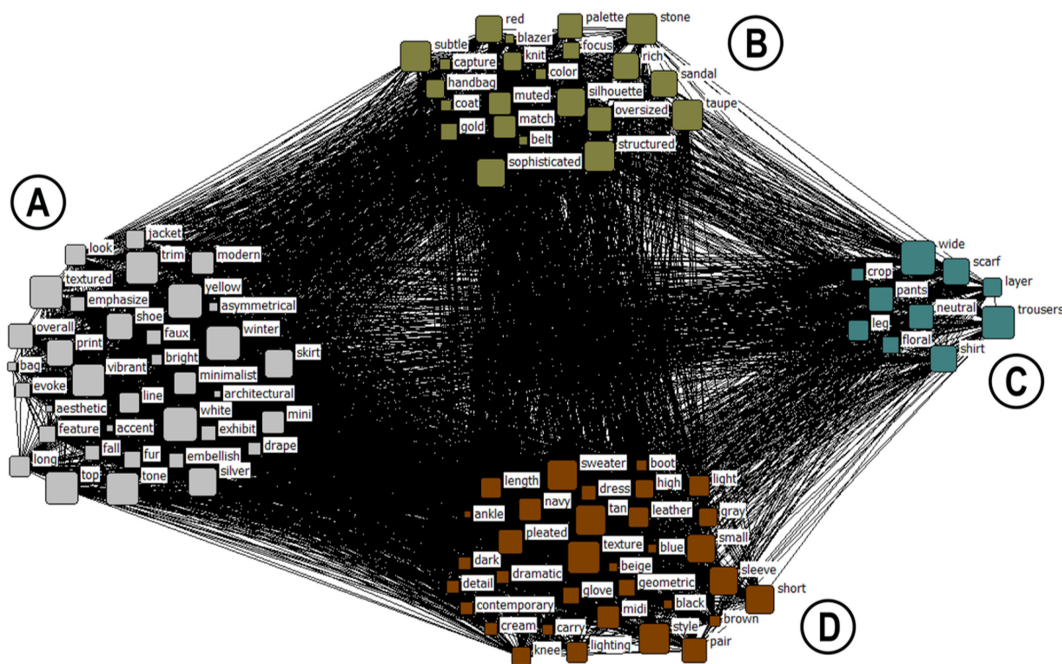


Fig. 6. Visualize the CONCOR analysis of top appearance words for Louis Vuitton F/W.

C contains the words crop and wide. Most of the Styles have an emphasis on colors. For Style A, we see words such as vibrant, white, silver, and bright. Style B, on the other hand, contains words like taupe, red, color, palette, and muted. Style D also has prominent words in color, such as gray, dark, brown, black, blue, navy, cream, and beige. Style C only contains one word for a color that is neutral. All the Styles lack words for texture, pattern, and textiles. the only few words seen are Style A contains textile such as fur. Style B contains textiles such as knit. Style D contains the word leather for textile. for pattern Style A contains print and Style D contains geometric, and Style C contains word floral for patterns. For Details, Style A contains words like embellished and drape, while Style B lacks any words. Style D contains words like detail, pleated, and sleeve. Style C, such as a layer. For items, Style A contains a few words like top, jacket, and skirt. Style B contains the words coat and blazer. Style D contains words such as sweater and dress. Style C contains the words pants, trousers, and shirt. For accessories, Style A contains words such as bag and shoe. Style B, on the other hand, has more words compared to other styles; it contains words such as sandal, handbag, belt, and gold. Style D also contains a few words, such as boot, glove, and ankle. whereas Style C contains a single word, scarf. When it comes to Mood, Styles A, B, and D contain few words. Style A has words like mood, minimalist, and aesthetic. On the other hand, Style B has words like sophisticated, rich, and subtle. Style D has words like dramatic and contemporary. other words such as exhibit, look, bad, winter in Style A, focus, match, structure, etc. in Style B, lighting, carry, style

in Style D.

Overall, it is observed that Style A demonstrates a wide distribution across silhouette, color, item, detail, accessory, mood, and others. Style B shows concentration in color, item, accessory, and mood words. Style D presents the most extensive range of color words and includes consistent representation across silhouette, textile, item, detail, accessory, mood, and others. Style C displays a more limited distribution, primarily centered on silhouette and item words. These findings indicate differentiated lexical characteristics across the four F/W clusters identified through CONCOR analysis.

Based on the design elements derived from each style cluster, an exploratory comparison was conducted with the seasonal collection reviews provided by Vogue Runway.

According to Vogue review, Louis Vuitton F/W 2022, rugby shirts and chunky sweaters casually thrown over elegant even-ingwear, androgynous oversized tailoring, and playful mix-and-match styling was seen.

Structured jackets, elongated coats, and strong shoulders, at the same time, softer counterpoints like fluid skirts, lace insets, and decorative detailing were the highlight. Cropped jackets were paired with longer hemlines or high-waisted trousers, and shorter dresses were styled with oversized outerwear, producing dynamic proportion play. Tweeds, jacquards, leather, metallic finishes, and lace were seen. The color palette leaned toward darker neutrals, black, charcoal, navy, punctuated by jewel tones. Sculptural coats and tailored blazers framed the collection. Accessories, including structured leather bags and substantial boots, were seen. Some sil-

Table 4. Louis Vuitton F/W word category

Style	Silhouette	Color	Texture	Pattern	Textile	Item	Detail	Accessory	Mood	Others
A	Mini	Vibrant	Textured	Print	Fur	Top	Embellished	Bag	Mood	Exhibit
	Long	White				Jacket	Drape	Shoe	Minimalist	Look
	Asymmetric	Silver				Skirt			Aesthetic	Bad
	Overall	Bright								Winter
										Accent
B										Fall
										Architectural
										Emphasize
	Silhouette	Taupe			Knit	Coat		Sandal	Sophisticated	Focus
	Oversized	Red				Blazer		Handbag	Rich	Match
C		Color						Belt	Subtle	Structured
		Palette						Gold		Capture
		Muted								Stone
D	Crop	Neutral		Floral		Pants	Layer	Scarf		Leg
	Wide					Trousers				
						Shirt				
E	Midi	Gray	Texture	Geometric	Leather	Sweater	Detail	Boot	Dramatic	Lighting
	Short	Dark				Dress	Pleated	Glove	Contemporary	Carry
		Brown					Sleeve	Ankle		Pair
		Black								Knee
		Blue								Style
		Navy								Contrast
		Cream								High
		Beige								Light

houettes were softened in knits and tweeds, making them more wearable.

For the Fall/Winter 2023, Structured tailoring, defined shoulders, and elongated proportions signaled authority were seen. Coats and jackets were sharply cut, sometimes cinched at the waist, sometimes left to fall cleanly and straight. Fluid skirts, delicate blouses, and subtle draping. Cropped tops were paired with high-waisted skirts or trousers; mini lengths were offset by tall boots; and slim silhouettes were contrasted with broader outerwear. Tweeds, leather, jacquards, and technical fabrics appeared throughout, sometimes combined within a single look. The palette leaned toward autumnal neutrals like black, gray, brown, deep navy. Materials like camel coat that looked like wool was actually embossed leather, and leather jeans had hand-painted pinstripes decorated with sequins. Dresses with three-dimensional metal embroidery, were seen.

Louis Vuitton 2024 presented its design characterized by a blend of futuristic elements and subtle deconstruction. Silhouettes referenced historical dress without feeling costume-like. Medieval and Renaissance influences appeared in structured bodices, elongated

lines, and decorative details, yet they were rendered in technical fabrics and modern constructions. Outerwear was a major focus. Tailored coats with sculptural shoulders, abbreviated capes, and precisely cut jackets demonstrated strong architectural control. Metallic threads, embroidery, and textured fabrics added depth and dimension. Boots and accessories grounded the collection, reinforcing wearability despite its theatrical references. The A-line leather jacket, round-collar blouse and sweater vest, and black patent pants were instantly recognizable.

Comparing each Style cluster with Louis Vuitton collections from Vogue Runway overviews reveals several alignments. Each cluster reflected some design elements that were specific to the season. For the F/W collections, garment items such as coats, blazers, dresses, sweaters, trousers, and jackets appeared consistently across both analyses. For example, the prominence of coat and blazer in Style B directly corresponds to the F/W 2022 and F/W 2023 collections, where structured jackets, elongated coats, and tailored blazers were central. The keywords oversized and silhouette in Style B align with Vogue's references to oversized tailoring and sharply cut outerwear. Similarly, the dominance of dark and neutral

tones in Style D, including gray, dark, brown, black, blue, navy, cream, and beige, corresponds directly to the darker neutral palettes emphasized across F/W 2022 and F/W 2023. Leather, identified in Style D, was repeatedly mentioned in the Vogue reviews, including leather coats and leather jeans. Accessories such as boot and glove in Style D align with the substantial boots described in F/W 2022 and the grounding accessories noted in F/W 2024.

The keywords embellished and drape directly correspond to Vogue's references to embroidery, metallic threads, and textured fabrics. The presence of fur in Style A aligns with faux fur elements mentioned in F/W 2023. Accessories such as bag and shoe correspond to structured leather bags and footwear highlighted in the reviews. Style C, which includes crop, wide, neutral, pants, trousers, shirt, and layer, reflects the layered constructions and proportion contrasts described in F/W 2022 and F/W 2023. The term neutral aligns with the repeated emphasis on dark and restrained seasonal palettes.

Overall, coats and blazers from Style B were strongly visible in F/W 2022 and F/W 2023; dark neutral color terms and leather from Style D were consistently present across all F/W seasons; embellished and bright elements from Style A appeared in decorative and metallic detailing; and layered construction from Style C aligned with the structural styling emphasized throughout the F/W collections.

Together, the four clusters capture the range of design characteristics present across Louis Vuitton's F/W collections from structured outerwear and material grounding to embellished expression and proportion play. Each cluster represents a distinct but recurring design direction, and their consistent appearance across three seasons suggests that these groupings reflect stable characteristics of the brand's cold-weather design identity. Notably, Style D, centered on dark neutral colors, leather, and structural details such as pleating and sleeve construction, appeared as the most consistently populated cluster, suggesting that material depth and color restraint form the most stable dimensions of Louis Vuitton's F/W identity, while the theatrical and embellished vocabulary of Style A functions as the more variable, season-specific layer.

5. Conclusion

This study explored the extraction of brand design archives through fashion design big data analysis of designer collections and examined the applicability of AI technology within the fashion design process.

To address this question, we collected collection images of Louis Vuitton from Vogue Runway for the S/S and F/W seasons of the last three years (2022, 2023, and 2024) and used Describe Picture,

an image-to-text-based AI generation model, to generate text descriptions for each image. Text mining techniques were then applied to derive key co-occurrence and TF-IDF words related to design elements, and network visualization and CONCOR analysis were performed using UCINET-6 to derive the brand design archive.

The conclusions of the study are as follows:

Describe AI was shown to effectively extract keywords related to design elements such as silhouette, color, material, pattern, and mood from each brand collection fashion image. Through big data analysis, it was confirmed that design elements related to the color, silhouette, mood, and items that the brand pursues as a whole were ranked high. This suggests that the Image-to-Text generative AI model tends to preferentially analyze the corresponding design elements from the presented images. As a result of CONCOR analysis of the top-appearing words, four meaningful style clusters were derived for each brand, and brand design archives corresponding to each style could be extracted. As a result of comparing each design element of the Louis Vuitton design archive, which was selected as a representative search brand, with the official collection overview provided by Vogue Runway, it was confirmed that design elements specialized for the corresponding season were included. This confirms the reliability of the analysis in capturing key seasonal themes reflected in expert fashion overviews. Through this, it was possible to effectively analyze the characteristics of brand design from brand collection fashion images using the generative AI program and to examine the possibility of utilizing it for continuous creative design development.

Beyond its methodological contribution, this study extends important theoretical conversations. It advances the concept of the brand design archive from a passive repository to an active, computationally accessible resource. While prior scholarship has positioned brand archives primarily as tools for heritage communication and marketing (Pecorari, 2019; Urde et al., 2007), this study proposes that archives can be disaggregated into design constants — elements that recur consistently across seasons — and seasonal variables — elements that shift with each collection. This distinction offers a new conceptual framework for understanding how brand identity operates across time, complementing existing models of brand heritage (Urde et al., 2007) and brand DNA (Koh & Kim, 2024). Furthermore, the study contributes to the growing literature on AI as a creative support tool in fashion design (Jin et al., 2024; O'Connell, 2024). While existing research has explored AI primarily for image generation and trend prediction, this study demonstrates a distinct application — using AI not to generate new designs, but to read and structure existing ones — positioning generative AI as an analytical instrument for capturing and preserving

design knowledge within fashion organizations.

This study has several limitations that should be considered when interpreting the findings. First, the analysis focused on a single luxury fashion brand, Louis Vuitton, which limits the generalizability of the results to brands with different design identities. In addition, the use of only the top 100 frequently occurring words derived from big-data analysis narrowed the vocabulary available for representing design elements and may have excluded less frequent yet conceptually significant design features. Second, the image-to-text extraction relied on a single generative AI model (Describe Picture), and the role of AI in this study was primarily limited to descriptive data generation rather than autonomous analytical interpretation. Third, fashion collection images were collected exclusively from Vogue Runway. Although Vogue Runway is a widely recognized and authoritative archive, reliance on a single platform may have limited curatorial perspectives and excluded alternative visual interpretations. Furthermore, the validation of AI-generated outputs relied primarily on qualitative comparison with Vogue Runway editorial reviews rather than quantitative evaluation measures such as inter-rater reliability or classification accuracy metrics. Future research may further strengthen methodological rigor by incorporating structured expert evaluation protocols, multiple archival sources, and diverse AI models, thereby enhancing analytical reliability and broadening interpretative perspectives.

Additionally, while AI-extracted design elements can provide structured archival references, designers should treat such findings as a source of inspiration rather than prescriptive guidelines, as over-reliance on recurring patterns risks limiting creative experimentation rather than supporting it.

This study exploratorily verified that the systematic use of AI tools can provide practical support for designers in the analysis, extraction, and interpretation of collection data, thereby confirming the potential for generating fashion design ideas. These findings suggest that AI can function not merely as an auxiliary tool but as a catalyst for creative ideation. Furthermore, the results highlight the potential for developing AI service systems that analyze the design characteristics of individual fashion brands and propose ideas accordingly, offering practical applications in professional design settings.

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