

*A Study of Visual Language Extraction From Uttarakhand's
Cultural and Natural Resources for Application in Ringaal Craft Design*

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Abstract

The objective of this research is to examine the feasibility of designing a visual language that can be employed in Ringaal crafts, one of Uttarakhand's many traditional craft forms. By examining the forms and colours found in Uttarakhand's cultural traditions, architecture, and natural resources, the research aims to create visual design patterns for application to Ringaal craft products. Although colour referencing is frequently adopted in other industries, there is a lack of prior studies focusing on its application in craft design. This study investigates how visual design elements influence product aesthetics and contribute to crafting a distinctive local identity for Ringaal products. The research gathered 16 photographs depicting Uttarakhand's culture, nature and architecture. These were processed by Visual Designers to derive colour palettes for application on Ringaal products by artisans. An Aesthetic Pleasure Value (APV) rating was obtained with assistance of three Communication Design specialists. The study compared APV scores for 60 craft products with patterns (CWP) and without patterns (CWoP), finding a significant difference: CWoP (Mean = 22.16, SD = 2.19) and CWP (Mean = 27.33, SD = 2.62). The study shows that the integration of design elements escalates the beauty of products to higher levels. This study contributes to the field of visual communication in craft design, offering insights into using local visual elements to enhance traditional crafts. Additionally, the color palettes developed could be applied to products such as home appliances and stationery, expanding their aesthetic appeal while fostering a connection to Uttarakhand's cultural and natural heritage.

Keywords: Cultural Elements, Ringaal Craft, Visual Language, Aesthetic Pleasure Measurement

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Introduction

Creating new works of art and craft involves the process of visual language extraction, which requires examining visual elements from a variety of sources (Ball, 2016; Benyus, 1997). Researchers have highlighted that fields such as graphic design, traditional art forms, digital media, fabric patterns, and others can serve as inspiration for this approach (Panofsky, 1979; Davis & Simon, 1992; Jones & Smith, 2013). Examples of these diverse sources include digital media, which includes modern graphic design and digital art; Photography, which uses cameras to capture moments and artistic compositions; Architecture, which includes geometric structures, aesthetic materials, and decorative designs; cultural artefacts reflecting traditional crafts, symbolism and iconography; nature, which provides inspiration through landscapes, natural formations, plants and animals; and art history, offering techniques and compositions from the classical to the present.

Visual language extraction may also involve the use of digital tools and the expertise of designers. Software such as Adobe Photoshop, Illustrator, and other image editing programs are often used to capture specific visual elements and color patterns. In addition to these tools, designers use their drawing and observation skills to document lines, shapes, colors and textures. Despite the potential of these methods, it has been observed that the extraction of visual language elements from cultural traditions, architectural styles and natural resources has not been widely applied to Ringaal craft products in the past.

The market currently offers a range of Ringaal craft products for various uses, with customers mainly purchasing them offline for functional and decorative purposes, such as storage baskets or home accents such as lampshades and flower vases. Field observations suggest that if Ringaal craft products were made available online through e-commerce websites and mobile applications, their demand could increase substantially. Aesthetics and appearance of products in that case will play a bigger role in influencing consumers' online purchasing behavior.

To assess this, we measured the aesthetic pleasure value (APV) based on previous literature (He et al., 2022). This study draws inspiration from three key categories—Uttarakhand's cultural traditions, architectural styles, and natural resources—to create visual elements for the design patterns used in Ringaal craft products. Uttarakhand's natural environment provided a wealth of subject matter, forming the foundation for numerous images representing a wide spectrum of visual design themes. The development of a visual language involved a systematic process of observing, documenting, and interpreting the colors and patterns derived from these sources.

Table 1 summarizes prior studies that examine how visual language has been extracted from different sources for application in art and craft. This research builds on those findings to integrate Uttarakhand's cultural and natural heritage into Ringaal craft products, aiming to enhance their aesthetic appeal and marketability.

Table 1: Literature on Visual Language Extracted From Nature, Architectures, and Cultural Events for Craft Design

Source	Study Title	Authors	Year	Key Findings
Nature	"Biomimicry in Design: Inspiration from Nature"	Benyus, J. M.	1997	Explores how natural patterns and forms inspire design and art, leading to sustainable and innovative artistic expressions.
	"The Aesthetic Significance of Patterns in Nature"	Ball, P.	2016	Discusses how natural patterns such as fractals, symmetry, and spirals are translated into visual art, enhancing aesthetic appreciation and creativity.
	"Nature as a Source of Inspiration for Textile Design"	Mallik, A., & Das, D.	2018	Analyzes how natural elements like flora and fauna influence textile patterns, leading to the creation of innovative designs in fashion and interior decor.
Architecture	"Architectural Inspirations in Contemporary Art"	Goodman, D., & Jennings, H.	2004	Examines how modern and classical architectural forms are integrated into contemporary art, shaping the visual language and structural composition of artworks.
	"The Influence of Gothic Architecture on Modern Art"	Panofsky, E.	1979	Discusses the impact of Gothic architecture's verticality and ornamentation on the development of modern artistic styles and motifs.
	"Minimalism in Architecture and Art: A Comparative Study"	Meyer, J.	2001	Compares minimalist principles in architecture and art, highlighting how architectural simplicity informs visual language in art and design.
Cultural Events	"Artistic Expressions in Cultural Festivals"	Turner, V.	1969	Explores how cultural events like festivals inspire visual motifs in art, emphasizing the role of communal experiences in artistic creation.
	"Visual Culture in Rituals and Ceremonies"	Davis, W., & Simon, H.	1992	Investigates how rituals and ceremonies shape visual culture, leading to the creation of symbolic art forms and craft traditions.
	"The Role of Cultural Heritage in Contemporary Craft"	Jones, M., & Smith, R.	2013	Discusses how cultural heritage, preserved in traditional events, influences contemporary craft practices, merging historical and modern visual languages.

The objective of this study is to identify color palettes and extract them from three different categories: culture, architecture and nature. It also investigates how visual language influences product aesthetics and examines the systematic process of extracting visual design patterns from various sources to create a new range of marketable craft products, thereby contributing to knowledge creation. To achieve this, a research methodology was developed and a quantitative study was conducted as described in the following section. The results are then presented, followed by a discussion of the results and the conclusion of the study.

Methodology

This study includes two main phases. In the first phase, we collected data (photos) from three sources and created colour samples (schemes) for various Ringaal craft products. In the second phase, an experiment was conducted to determine the difference between products with patterns and products without patterns by measuring the aesthetic pleasure value (APV). Figure 1 shows both the phases and the sequence of steps contained in the phases. It also illustrates the methodology used for data collection, which was then analysed to extract patterns for application to craft product designs.

In Phase 1, the study included a field visit to four provinces in the Indian state of Uttarakhand, during which interviews were conducted with 35 Ringaal artisans. The aim was to gain an in-depth understanding of the process involved in creating Ringaal craft designs, explore the visual design patterns on the products, and identify the challenges artisans face

with regards to craft design. The demographic information of the artisans surveyed is summarized in Table 2.

Table 2: Demographic Data of the Artisans

	Age	Years of Experience	No. of Products
Mean age	47.65	28.03	15.24
SD	13.17	13.96	6.99
Male			
Mean age	47.42	27.82	15.24
SD	13.31	14.12	7.1
Female			
Mean age	40.4	14.4	15.2
SD	7.36	10.44	5.53

In addition to interviews, data were collected through direct observations at various culturally significant sites including temples, fairs and festivals, traditional houses, national parks, and scenic locations. These observations were supplemented by photographic documentation of the local flora, fauna and natural landscapes with images of flowers, birds and animals. Figure 2 shows the craft products with and without the design patterns. Products with basic shapes were used to conveniently apply the design patterns created using colour palettes derived from photographs of nature, cultural events and architecture. A total of 16 photos were shortlisted for the same. A total of 60 craft products (with and without patterns) were shown to the participant to collect APV values.

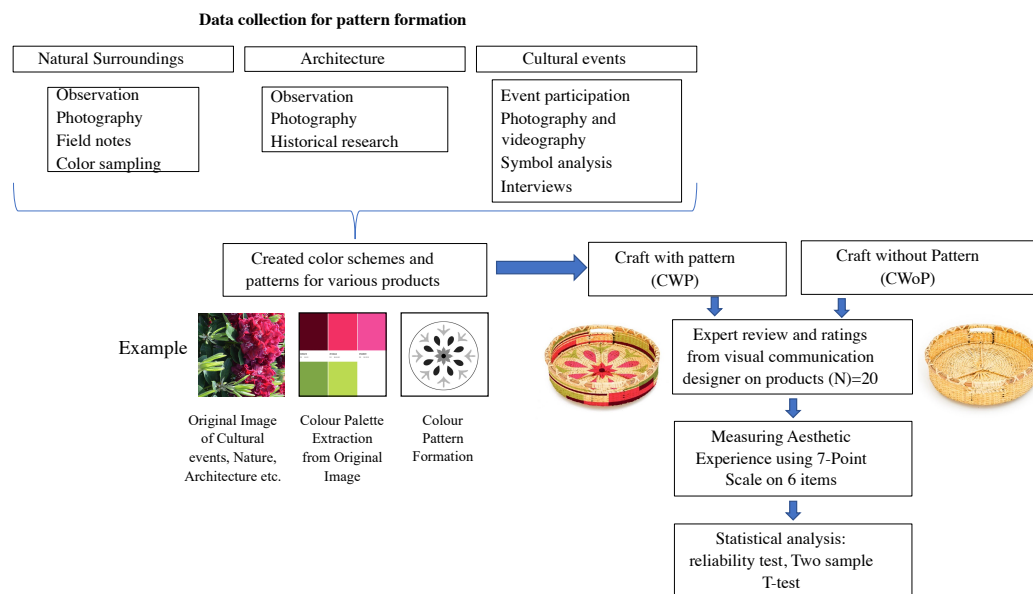


Figure 1: Research Methodology



Figure 2: Images of Crafts With and Without Pattern

For Phase 2, the experiment described is a between-subjects design in which participants were exposed to one of two conditions: craft products with patterns (CWP) and craft products without patterns (CWoP). The study included a single independent variable: craft design, which was manipulated at two levels – craft products with patterns and craft products without patterns. A total of 20 craft products were evaluated for each category, representing each level of the independent variables (CWP and CWoP). The dependent variable, aesthetic pleasure value (APV), was rated for each craft product with and without a pattern by three design experts. A total of 20 products x 3 categories (nature, architecture, culture) = 60 items each for CWP and CWoP.

In this study, photos (60 images) from three categories were used to extract color palettes and create patterns for Ringaal craft products. Each Ringaal craft product image was rated on a scale of 1 to 7 for APV measurement. The APV ratings were based on the aesthetic experience of the design expert. There were 7-point rating scale on 5 questionnaire items 1. Beauty (1= Not beautiful at all, 7 = Very Beautiful) 2. Pleasure (1= Not Pleasurable at all, 7 = Extremely Pleasure) 3. Desire to own (1= Not Desirable at all, 7 = Very Desirable) 4. Elegance (1= Not Elegant at all, 7 = Extremely Elegant) 5. Well Designed (1= Not Designed well at all, 7 = Very well designed). The five question items is presented in Table 3.

Table 3: Description of the Question Items Which Was Explained to the Experts for the Ratings

Question items	Description
Beauty	A combination of qualities, such as shape, color, or form that pleases the aesthetic senses, especially sight.
Pleasure	A feeling of happiness, satisfaction and enjoyment.
Desire to own	To have a strong wish to own or enjoy something.
Elegance	The quality of being graceful and stylish in appearance.
Well designed	Artistically or skillfully planned, especially for a particular purpose.

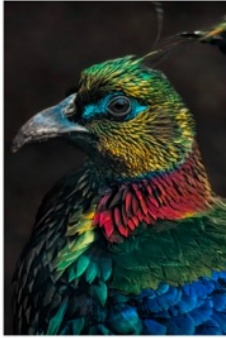





The APV values were collected separately for each level of craft design. To assess the reliability of the APV ratings provided by the design experts, Cronbach's alpha was calculated. An independent sample t-test was then conducted to determine whether there is a statistically significant difference in APV between patterned (CWP) and un-patterned craft products (CWoP).

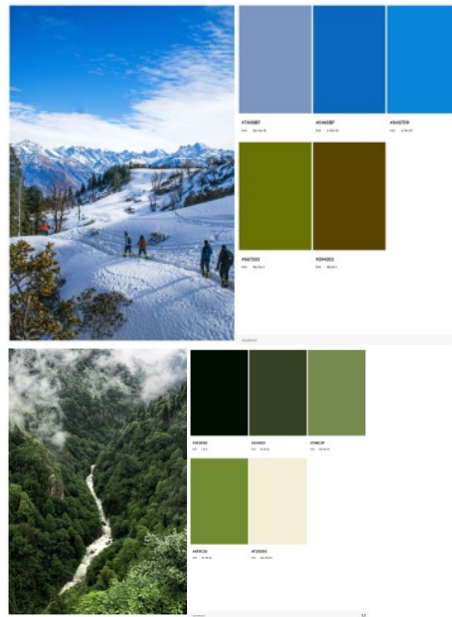
Results

The color palettes were extracted from three categories: nature, culture and architecture of Uttarakhand. The results were derived from the analysis of photographs and data collected

through interviews. Three visual designers individually extracted colors from the given photos and then common colors from each category were identified. Tables 4, 5 and 6 show the color palette created with the help of these designers along with their hex codes. These color palettes (shown in the appendix) were then used to create samples on products that were used to evaluate the aesthetic pleasure value of the 60 handcrafted products presented to the users on the computer screen.

Table 4: Color Palette From Nature Elements

Color Palette from Natural Elements Process	Images	Swatches	Hex Code
This study used photographs of Uttarakhand's flora and fauna to extract color palettes to create patterns for Ringaal products.			#035AA6
			#03588C
			#024059
			#038C73
			#D9BC66
			#142601
			#365902
			#84BF04
			#618C03
			#F1F2CE
			#590219
			#F23064
		#F24B99	
		#7FA646	
		#BCD952	
		#025373	
		#025E73	
		#D0ECF2	
		#72326	
		#9FBF89	



#7A98BF
 #0468BF
 #0487D9
 #667302
 #594302
 #010D00
 #344021
 #748C4F
 #6F8C30
 #F2EDD5

Table 5: Color Palette From Cultural Elements

Color Palette from Cultural Elements	Process	Images	Swatches	Hex Code
<p>This study used photographs of Uttarakhand's customs, traditions, and aesthetic beliefs to extract color palettes to create patterns for Ringaal products.</p>				#04971A6 #D5D96C #D9BB96 #BF2315 #F24141
				#F2E527 #F2BC1B #D96523 #401201 #D90404
				#731D2C #F299A9 #728C4A #A61F12 #0D0D0D



#1C4040
 #F2EADF
 #A6896F
 #F25757
 #8C3232



#BF0426
 #8C031C
 #7890BF
 #F29F05
 #D96704

Table 6: Color Palette From Architectural Elements

Color Palette from Architectural Identity

Process	Images	Swatches	Hex Code
This study used photographs of Uttarakhand's architectural elements to extract color palettes to create patterns for Ringaal products.			#418EF2
			#F2D230
			#D9A404
			#BF8173
			#F26B6B
			#65A603
			#618C03
			#5A7302
			#465902
			#D9D0C1



Internal reliability analysis (IRA) of the gathered Aesthetic Pleasure Value (APV) ratings, provided by three design experts for craft products without patterns (CWoP) and craft products with patterns (CWP), was conducted using Cronbach's alpha. The Cronbach's alpha for the APV ratings given by the three experts was $\alpha = 0.747$ for CWoP and $\alpha = 0.826$ for CWP. Both values were found to be significant ($0.7 \leq \alpha \leq 0.99$), indicating that the data gathered from the three design experts is reliable for further analysis.

There are a total of 60 craft images ($20 \times 3 = 60$) across both categories, CWoP and CWP. Figure 3 illustrates the mean APV ratings for each type of craft in both categories. The mean and standard deviation of APV ratings, as evaluated by the three design experts for the 60 craft images, were analyzed. A two-sample t-test was conducted to compare the APV ratings between CWoP and CWP.

The results showed a significant difference in APV ratings between CWoP (Mean = 22.16, SD = 2.19) and CWP (Mean = 27.33, SD = 2.62), with $t(58) = -15.48$ and a p-value of 2.91×10^{-22} , effectively 0.000000000029. This p-value is far below the standard significance level of 0.05, indicating a highly significant result. These findings suggest that the design experts unanimously agreed that the visual design patterns significantly enhanced the aesthetic pleasure of the crafts. Additionally, the aesthetic appeal was notably higher in CWP compared to CWoP.

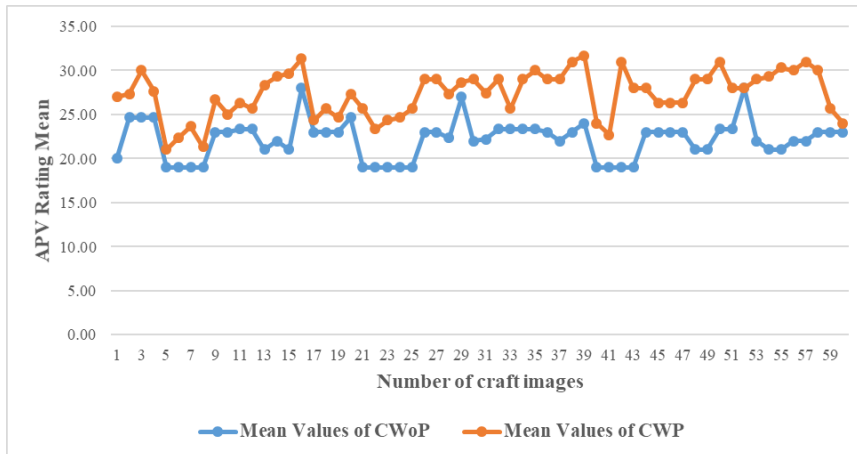


Figure 3: APV Rating Mean Values of 60 Images for CWoP and CWP

Discussion

The results of this study highlight the significant impact of integrating design patterns to develop a visual language - derived from the nature, architecture and cultural elements of Uttarakhand - in Ringaal crafts, particularly in the area of e-commerce. As online consumption continues to increase, the importance of visually appealing products becomes increasingly important. The use of visual design patterns significantly increases the aesthetic value and saleability of Ringaal craft products, increasing their appeal to both online and offline consumers. The research team used image editing software to create visual design patterns and apply them as surface decorations to high-quality 2D product images to effectively convey the essence and spirit of Uttarakhand's rich cultural heritage.

In the online marketplace, where consumer decisions are often driven by visual impressions alone, these colour patterns and designed visual elements play a critical role in distinguishing Ringaal products from other offerings. The pattern-enhanced designs not only grab attention, but also convey a deeper cultural narrative and promote an emotional connection that increases the likelihood of purchase. This digital integration of cultural aesthetics highlights that thoughtfully designed, pattern-rich crafts can fulfil the modern consumer's desire for authenticity and uniqueness, even when experienced through a digital screen.

The APV values (Aesthetic Pleasure Value) determined by design experts confirm that crafts with patterns (CWP) are significantly more attractive than those without patterns (CWOP). The increased APV values for patterned crafts also suggest that consumers may find products with these traditional, nature-inspired patterns more valuable and visually appealing. Successfully integrating these designs into online retail represents a promising strategy for traditional artisans, as visually enriched products can increase online sales by making cultural craft items more visually competitive on e-commerce platforms.

Conclusion

In conclusion, this study illustrates how culturally inspired color patterns, applied digitally as surface decoration on Ringaal craft product images, significantly enhance the aesthetic and market value of these items in both online and offline spaces. The innovative approach of using image editing software to overlay culturally significant color patterns on product photographs bridges traditional craft with modern consumer preferences, especially within

the e-commerce domain. This visual enhancement supports the saleability of Ringaal crafts by appealing to online consumers' appreciation for aesthetic beauty and cultural depth.

As the demand for unique, culturally resonant products grows in online marketplaces, these visual design techniques offer artisans and marketers a powerful tool to capture consumer interest and foster a connection with the cultural narrative embedded in each craft. Future research could explore consumer purchasing behaviors in response to these pattern-enhanced designs, particularly within e-commerce settings. Expanding this approach to include diverse cultural elements and advanced digital techniques could further elevate the global appeal of Ringaal crafts, reinforcing their value in both digital and traditional retail environments.

References

- Ball, P. (2016). *Patterns in nature: Why the natural world looks the way it does*. University of Chicago Press.
- Benyus, J. M. (1997). *Biomimicry: Innovation inspired by nature*. Harper Perennial.
- Davis, W., & Simon, H. (1992). *Visual culture in rituals and ceremonies*. University of California Press.
- Goodman, D., & Jennings, H. (2004). *Architectural inspirations in contemporary art*. Architectural Press.
- He, T., Isenberg, P., Dachsel, R., & Isenberg, T. (2022). BeauVis: A validated scale for measuring the aesthetic pleasure of visual representations. *IEEE Transactions on Visualization and Computer Graphics*, 29(1), 363-373.
- Jones, M., & Smith, R. (2013). *The role of cultural heritage in contemporary craft*. Routledge.
- Mallik, A., & Das, D. (2018). Nature as a source of inspiration for textile design. *Journal of Textile Science & Fashion Technology*, 4(1), 15-22.
- Meyer, J. (2001). *Minimalism: Art and architecture*. Thames & Hudson.
- Panofsky, E. (1979). *Gothic architecture and scholasticism*. New Directions.
- Turner, V. (1969). *The ritual process: Structure and anti-structure*. Aldine Publishing.

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