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ADAPTION OF DESIGN FOR T SHIRT INSPIRED FROM APIAN PAINTING

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ABSTARCT

Aipan painting, a traditional painting form from kumaon, India, is characterized by intricate geometric patterns created with red ochre and white rice paste. Practiced predominantly by women, these ritualistic paintings adorn floors and walls during religious and auspicious occasions, depicting deities, symbols and elements of nature to invoke good fortune and protection. This project explores translating the unique aesthetic of Apian paintings on to T Shrits, merging traditional art with contemporary fashion to create visually appealing and culturally rich clothing. Motifs are digitally reproduced, thoughtfully adapted for T Shirt while preserving essence of the original artwork. By interplay of composition, color and CAD techniques, the project aims to create wearable art seamlessly blends the beauty of Aipan painting with modern design. The T Shirts serves as canvas for celebrating the artistic legacy, offering a unique way individual to connect and carry this rich cultural heritage forward in their everyday lives.

Key Words: *Traditional Painting, Aipan motifs, Contemporary designs, T Shirt, CAD*

1 INTRODUCTION

Aipan, a traditional art form, is a beautiful and intricate design that showcasesa complex yet balanced combination of geometric, abstract and stylized patterns unique to the Kumaon region of Uttarakhand. The term "Aipan" is derived from the Sanskrit word "Arpan," which means "offering." The essence of Apian, however, lies in its meaning of "Likhai," which translates to "writing" though it is in reality a pattern created with the fingers, suggest Markuna (2013). Traditionally and Apian is made with a base of 'Geru' or red vermilion paste over which intricate patterns are drawn using rice paste, describe Sen (2012). The striking contrast between the pristine white rice paste and the deep red base enhances the beauty of the designs. The rice paste is prepared by soaking rice for about sixteen hours and grinding it into a fine, runny consistency. The rice finger of the right hand is used to draw these elaborate patterns, often with the aid of cotton balls or cloth.

Women in the region pass down these patterns to these patterns to their daughter-in-law, ensuring the continuity of this art form across generations. Some patterns hold religious significance and are especially created during ceremonies such as marriages, thread ceremonies and naming rituals. Agrawals and Shrama (2021) conveys Aipan motifs are traditionally drawn on the floor of rooms where rituals are performed in courtyards on the steps of the main door, on thresholds, around mortars, on wooden seats, on pots containing tulsi plants and at temples. Each Aipan design carries a particular meaning and is created with a specific purpose in mind. Presently, three forms of this art are observed in the Kumaon region- Siddha, Daiva and Laukika- referred to as Aipan, patta and Bar Boond respectively. Folk painting drawn on the ground and walls represt the siddha form astrological motifs, almanac designs and dwar-patia exemplify the Daiva form, while the Laukika form encompasses the asthetic creations of artists.

In the past, natural dyes were used to create these coloring agents. However, today to enhance durability both poster and oil paints are employed. The growing demand for traditional art has created opportunities in the fashion and textile industries particularly in design, color and techniques in response to evolving fashion trends. Bhandari et al (2019) suggests Aipan designs serve as a rich source of folk motifs for textile products and these patterns are increasingly used on various textile items through different surface enrichment techniques such as screen printing, block printing, batik and embroidery.

1.1 CLASSIFICATION OF AIPAN PAINTING MOTIFS

There are three styles of apian namely Siddhu, Davia and Loukika. Siddhu is a style which drawn on floor and chaukies Daviathe form of patta according to Chattopadhay (1981) and Sah (2006). It has astrological motifs, manual design and draw pattas and Loukikait is a style of bar bond which is drawing on walls. The Aipan painting are classified based on the places where painting are drawn different forms and shapes of apian on the basis of different occasions. They areas follow:

1.1.1 BASED ON THE PLACES WHERE AIPAN PAINTINGS ARE DRAWN

The painting can be seen in floor walls cloths and Woodenchaukies denote Sen (2012)

- Floor painting are drawn on floor. These are further divided into two categories: Aipan drawn at door steps (creepers and filler design) and at place of worships (Shivpeeth, Laxmipeeth, Asan).

- Wall paintings are drawn on the wall. There are two traditional forms of wall painting one for the kitchen (Nata and Laxmi Narayana) and other for the place where ritual ceremonisare performed (Patas).

- On cloth some Aipan design are also drawn on cloth. For example khodiachauki in pichhora and shiv peeth in yellow color cloth used in rituals.

- Wooden chaukies- These are worship seats of th deities prepared through aipan and used on different occasion like worship ceremonial occasion or on festivals.

1.1.2 BASED ON THE DIFFERENT FORMS AND SHAPES OF AIPAN

The paintings are classified on the different forms and shapes of aipan suggest Chattopadhay (1981). Nav DurgaChauki is used for Devi pujas. A simpler version is made by drawing three horizontal and vertical lines with a swatik in the centre. The main points in this Chauki are nine dots representing the NavDurgas.

- Asan Chauki is a decorated seat for the devotee and his wife for a ritual puja.

- Chamunda Hast Chauki this Chauki is made for "havans" or "yoga". Two triangles interspersed with two diagonal lines running across both with a 5 pointed star in between, enclosed in a circle make the center piece of this Chauki. The gaps are filled up with floral designs or lakshmi's feet. The circle itself is decorated with 8 petals of the lotus.

- Saraswati Chauki being the Goddess of learning when a child begins formal education. The main feature of this Chauki is five pointed star with a swastika flower or a diya in the center.

- Janeu Chauki ismade especially for the sacred thread ceremony. Seven stars within a six-sides drawing from the main section. It represent the Sapt Rishis. Around this floral design with dots are drawn.

- Shiv or Shivarchan Peet- Shiv is worshiped especially in the month of savan or magh. Shiv is the reigning god of the people of the Himalayas. He is worshipped especially in the months of savan or Magh. This is an eight cornered design with 12 dots joined by 12 lines.

1.1.3 BASED ON THE USE OF AIPAN AT DIFFERENT OCCASION.

The occasion types are the birth, marriage and festival mention Shukla (2010)

1.1.3.1 Brith-Special types of chaukies are prepared for performing ceremonies related child birth.

- The Surya Dharshan Chauki- it is connected with the naming ceremony of a newborn child. For eleven days the baby is kept indoors, on the eleventh day the child is brought outside for Surya Darshan. This Chauki is made on the floor where the priest sits reciting mantras.

- Syo Aipan is a geometric pattern drawn toward evil spirit on eleventh day of child birth.

1.1.3.2 Marriage- Three types of chaukies are used to perform ceremonies of marriage.

- Acharya Chauki the groom is always accompanied among others by his own Pandit or Achaya. The pandit is given more prominence than even the father of the groom. So a special Chauki is made for him. A Swastik is made on it with red color. The lotus and other auspicious symbols such as a bell, a conch sheel and sometimes even 2 parrots are painted around the Swastik.

- Vivah Chauki the seat is specially prepared for the occasion of marriage. The wooden set is provided by the groom's side and the background color is yellow. A hundred petalled lotus is drawn over the surface with two parrots on the top left side-symbolic of an advance information of the arrival of the beloved.

- Dhuli Arghya Chauki this Chauki is mainly mad to welcome bridegroom. In the olden days bridgegroom usaually arrived during the evening or "Godhuli" at the time of sunset or Twilight. Since the groom represent "Narayan". So he is generally greeted with devotion. His dusty feet are carefully washed before the puja as he stands on a small stool or chaukil.

- Jypti patta in the hills of kumaon, among the Brahmin and Sah families there is a practice of drawing a "Jyoonti" at a wedding or a sacred thread ceremony.in earlier times, "Jyoontis" were murals painted on the walls of rooms where religious ceremonies took place "Jyoonti" is the local word used for the Jeev Matrikas-Mahalaxmi, Maha Saraswati and Maha Kali.

1.1.3.3 Festivals

- Durga Thapa is painted on paper by women of Kumaon for Durga pujas. This Thapa or painting is highly complex. This thapa depicts several local deities along with the many armed Durga who rides the lion.

- Lakshmi Yantra in the hills of Kumaon as in other parts of India, the goddess of wealth, Lakshmi is worshippedduring the festival of Diwali Kali Puja. The idol is placed on the spot where the Puja will take place.

- Janmasthmi Patta this is specially prepared for the worship of lord Krishna on the occasion of his Birthday. The art is associated with a great degree of social, cultural as well as religious significance. Conventionally Aipan are not durable and erase over the time. It is essential to preserve this art in any of numerous creative art forms to save it for next generation.

2 MATERIAL AND METHOD

The study was focused to create designs for Apparel, by the adaption of Aipan design of Uttarakhand region for textile designing through CAD.

2.1 COLLECTION OF AIPAN DESIGNS

Traditional designs of Aipan painting of the Uttarakhand region werecollected for the study from various secondary sources like books, cards, internet and library.

2.2 SELECTION OF GARMENTS

The T Shirt, a ubiquitous and versatile garment, has become a cultural icon that transcends its functional role as a piece of clothing. The T Shirt has evolved from a practical garment to a platform for self-expression, social status and even political messaging. Denny (2020) convey the T Shirt has become a textile for designs, logos and messages that reflects the wearer's personality, interests or political beliefs making it a powerful medium for social and cultural expression. So the investigator has selected T Shirt as a garment for the study.

2.3 SELECTION OF CAD SOFTWARE

Corel Draw is widely used in textile design for its versatile features and user-friendly interface. It enables designers to create symmetrical, seamless patterns complex repeats and motifs. The program excels at producing scalable vector graphics ideal for detailed designs, logos and icons. Its sophisticated color management ensures accurate and consistent color color usage for fabric printing. Coral Draw also offers various text tools and effects for incorporating typography into designs, such as labels and ornamental elements. Additionally, the software supports multiple file formats ensuring designs are print ready for digital textile printing. It features bitmap editing tools for motifs integration even though it is mostly vector based. In order to assist clients see their designs and visualize real world applications designers can

provide mockups of theirs designs on a variety of items. Studd (2002) mention designers may share work in many formats with Corel Draw, which makes it easier to collaborate with clients, manufacturers and other teams members. Customize the work space, add colors and textures make patterns and motifs export the design in the necessary format and get it ready for printing making sure that the format and resolution are correct in need to make use of Coral Draw effectively. So the investigator has selected the Corel Draw software for designing the motif and simulation.

2.4 AIPAN DESIGNS FOR JACQUARD KNITTING

Twenty five Aipan motifs as shown in Plate 1 in different categories were adapted to make them suitable for jacquard knitting. The design were developed keeping in mind their suitability for jacquard knitting T Shirt.

Plate 1: ORIGINAL AIPAN MOTIFS

2.5 SELECTION OF AIPAN DESIGN FOR JACQUARD KNITTING

The collection designs for textile apparel was followed by the preferences of respondents for identifying the best design for preparing each T Shirt inspired from Apian painting. The 25 collected Aipan motifs in Plate 1 were shown to 100 respondents in the age group of 20-35 years selected randomly which included faculty members and the boys of Chikkanna Government Arts College, Tiruppur, Tamil Nadu, India. The respondents evaluated the showcased design for T Shirt apparel. Average mean were calculated and ranks were assigned to the designs. The designs

of all which obtained five highest ranks were considered best for future CAD preparing the apparel. The selected motifs are shown in Plate 2.

SELECTED MOTIF NO. FOR THE STUDY	3	8	12	19	24
ORIGINAL AIPAN MOTIFS					
Plate 2: SELECTED ORIGINAL AIPAN MOTIFS					

2.6 DEVELOPMENT OF SELECTED AIPAN MOTIF IN CORAL DRAW

Selected motifs from the Plate 2 are developed future motif designing begins by opening Corel Drawn and starting a new document naming it first. The body of the swan motif is drawn, using the ellipse tool to drawn horizontally aligned oval, forming the body and then create a smaller oval forming the body and then create a smaller oval above it for the head. Connect the head and the body with a shape made using the rectangle tool refining the neck's curves with the Bezier tool for a smooth natural flow. Next add facial details by drawing a small traiangle for the beak with the polygon tool positioning it on the head and creating small circle for the eyes with the ellipse tool duplicating them for symmetry. For the majestic feathers start by using the Bezier tool to draw a long curved line as the central stem. At the top of this stem arrange ovals in a fan like pattern to form the "eye" of the feather. Enhance the feathers further by adding curves and shapes with the bezier and shape tools experimenting with thickness and curvature to mimic the natural flow of the swan feathers. Within the ovals draw smaller circle to represent the intricate "eyes" found on real peacock feathers and add wavy lines along the sides of each feather for texture. To bring your motif to life use fill tool to apply vibrant colors to the swan body, beak and feathers and utilize the gradient fills to add depth and dimension. Apply solid or gradient fills to the body and head in shades of blue or teal for a harmonies look. Finally refine the design by ensuring seamless transitions between different parts using shape tool zooming in to fine tune details such as the beak shape or feather alignment. Once satisfied group all elements together and save your motif design. The designing of the other four motifs in the Plate 2 motif number 8, 12, 19 and 24 are designed on the same process with the different in the arrangement and placement of lines and curves. The recreated motifs are shown in Plate 3 and the numbers of the Aipan motifs are renamed for the convenience from 1 to 5 in such a way Swan(AMS), Thilagam(AMT), Peacock(AMP), Flower(AMF) and Bird(AMB).

DESIGNED RENAMED AIPAN	1	2	3	4	5
CONTEMPORARY AIPAN MOTIFS					
NAMES	SWAN (AMS)	THILAGAM(AMT)	PEACOCK (AMP)	FLOWER(AMF)	BIRD (AMB)
KEY: A-AIPAN, M-MOTIF, S-SWAN, T-TILAGAM, P-PEACOCK, F-FISH, B-BIRD					
Plate 3: REDESIGNED CONTEMPORARY AIPAN MOTIFS					

2.7 DESIGNING T SHIRT USING CONTEMPORARY SELECTED AIPAN MOTIF FOR JACQUARD KNITTING

To fit the motif into the T Shirt[T] first the vector image of the T Shirt is drawn and the motif shown is Plate 3 is placed on the garment and adjustment is made in the shape, size and angle. The repetition of the motif was done by copy and paste key, the color of the T Shirt was change based on the taste and the simulation of the design was created by adding lines and other vector angle on the top and the bottom of motif to the create a design shown in Figure 1. The same steps are been followed for the other four selected motifs and the final out of the T Shirt design are given in Figure 2 to Figure 6.
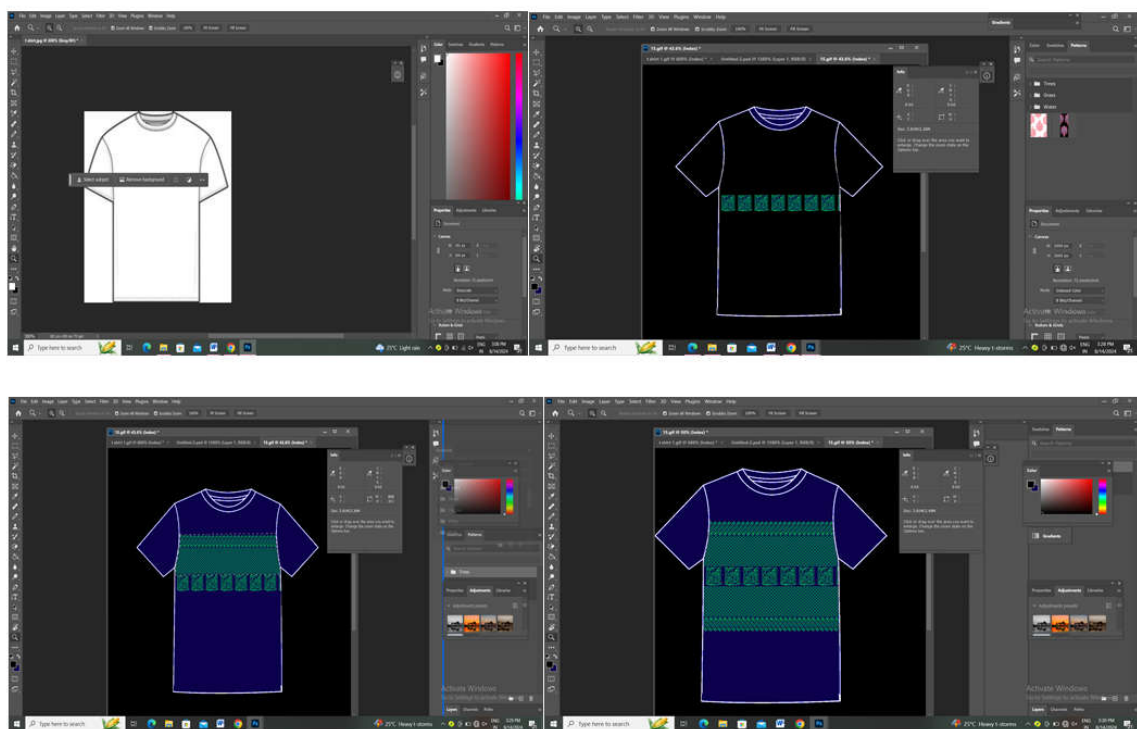

FIG 1 STEPS IN FITTING THE AIPAN MOTIFS INTO THE T SHIRT VECTOR IMAGE

FIG 2: AMS[T] DESIGNED KNIT T SHIRT

FIG 3: AMT[T] DESIGNED KNIT T SHIRT

FIG 4: AMP[T] DESIGNED KNIT T SHIRT

FIG 5: AMF^T DESIGNED KNIT T SHIRT

FIG 6: AMB^T DESIGNED KNIT T SHIRT

2.8 ACTUAL T SHIRT JACQUARD KNITTING

A jacquard circular knitting machine, featuring a needle cylinder driving mechanism that provide precise control over the cylinders rotation based on the knitting pattern. The needle cylinder is driven by a motor, which operates according to a pre-programmed rotation procedure stored in a magnetic memory medium. Needle actuator follows a pattern formation procedure with signals provided by a sensor that detects the needle cylinder's rotation. Selection is managed by a magnet which controls the strikers position when energized it engages the raising cam moving the needle into the working position. Ray (2012) says without energization the spring retracts the striker placing the needle in a rest position. This "needle-by-needle" selection allows for complex pattern creation as each needle can be independently set to knit, tuck or miss. While electronic selection is common for cylinder needles, dial needles on double-bed machines often use mechanical cams. For tuck loops the first ENS is not energized keeping the needle down while the second ENS allows partial needle movement for loop formation. Using multiple colored yarns enhances the design enabling horizontal or vertical stripes checks or special effects based on needle selection and yarn arrangement. The AMS$^{(T)}$, AMT$^{(T)}$, AMP$^{(T)}$, AMF$^{(T)}$ and AMB$^{(T)}$T Shirts designed knit as shown in figure 2-6 were fabricated through the jacquard knitting and the evaluation were done future.

3 RESULTS AND DISCUSSION

The results obtained for the selection of the motif and the evaluation of the knitted T Shirts with apian motifs designed is discussed below:

3.1 EVALUTION OF THE SELECTED AIPAN PAINTING MOTIFS

The 25 Aipan motifs which were randomly selected by the investigator were evaluated by the respondent and the preference given by expert for the motif of Aipan painting is given in Table I.

TABLE I: AVERAGE MEAN OF AIPAN MOTIFS

AIPAN PAINTING MOTIFS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Average Mean (AM)	0.95	0.59	1	0.6	0.76	0.88	0.85	0.99	0.92	0.65	0.74	0.98	0.72	0.9
Rank Order	VI	XXII	I	XXI	XIV	X	XI	II	VIII	XIX	XV	III	XVI	IX

AIPAN PAINTING MOTIFS	15	16	17	18	19	20	21	22	23	24	25
Average Mean (AM)	0.57	0.94	0.8	0.7	0.97	0.55	0.79	0.68	0.61	0.96	0.53
Rank Order	XXIII	VII	XII	XVII	IV	XIV	XIII	XVIII	XX	V	XV

The data pertaining to preferences of experts depicted in Table 1 reveal that motif number 3 as ranked Ist (AM 1) followed by motif number 8 (AM 0.99) ranked IInd, motif number 12 (AM 0.98) ranked IIIrd, motif number 19 (AM 0.98) ranked IVth and motif number 24 (AM 0.97) ranked Vth. From the collected 25 Aipan motifs, the motif numbers 3, 8, 12, 19, 24 which were rated as the highest rank order as per the average mean. The highest ranked 5 motifs were undertaken for further study

3.2 ANALYSIS OF CONSUMER ACCEPTANCE OF JACQUARD KNITTED T SHIRTS WITH AIPAN MOTIFS

TABLE 2: EVALUATION OF JACQUARD KNITTED T SHIRT ON THE BASIS OF DIFFERENT DESIGN PARAMETERS. N=100

AM DESIGNINED T SHIRTS	Uniqueness of Design		Colour Combination		Motif Combination		Knitting Quality		Appearance of Design	
	WMS	RANK	WMS	RANK	WMS	RANK	WMS	RANK	WMS	RANK
AMS^T	4.1	V	4.2	V	4.3	V	4.5	III	4.6	III
AMT^T	4.5	III	4.3	IV	4.8	I	4.3	V	4.8	I
AMP^T	4.3	IV	4.5	II	4.7	II	4.8	I	4.7	II
AMF^T	4.8	I	4.4	III	4.5	III	4.4	IV	4.5	IV
AMB^T	4.6	II	4.7	I	4.4	IV	4.7	II	4.3	V

From the Table 2, the jacquard knitted T Shirt (Figure 2 to Figure 6) were assessed on the basis of uniqueness of design, colour combination, suitability of combination of motifs, knitting quality, appearance of design, general opinion and suitability of price for the designed T Shirt. Each parameter acceptance is discussed below:

3.2.1 ANALYSIS OF APIAN MOTIS T SHIRT'S ON THE BASIS OF UNIQUENESS OF DESIGN

From Figure 7, which revealed the evaluation of AM jacquard knitted T Shirt's for uniqueness of design focused that AMF^T ranked first with the mean score of 4.8 followed by the AMB^T with a score of 4.6. Other T Shits AMT^T, AMP^T and AMS^T with mean score of 4.5, 4.3 and 4.1 were given third, fourth and fifth.
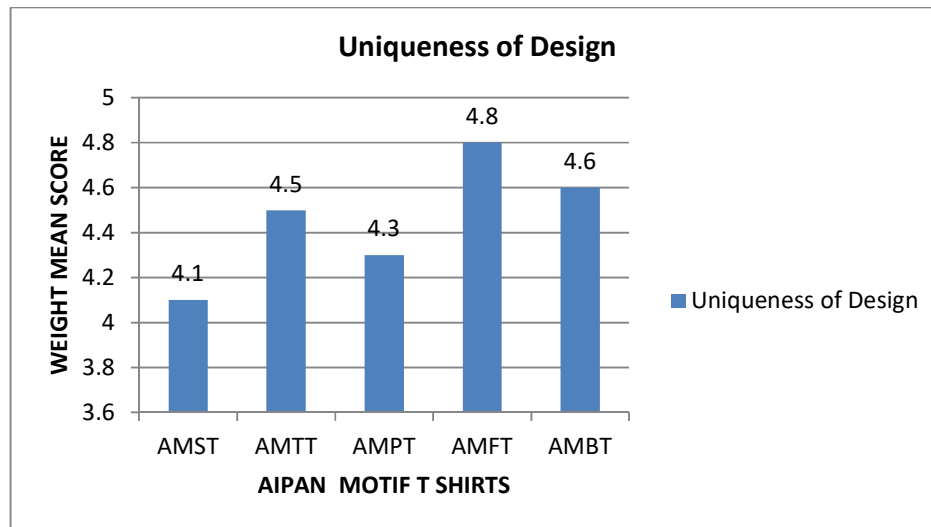
FIG 7: UNIQUENESS OF DESIGN

3.2.2 ANALYSIS ON THE BASIS - COLOUR COMBINATION OF DESIGN

The feedback obtained from the respondent for the color combination of the jacquard knit T Shirt, AMB[T] received first rank with a mean score of 4.7, while AMP[T] got second rank with a mean score of 4.5, followed by AMF[T], AMT[T] and AMS[T] which were ranked third, fourth and fifth with a mean score of 4.4, 4.3 and 4.2 respectively.
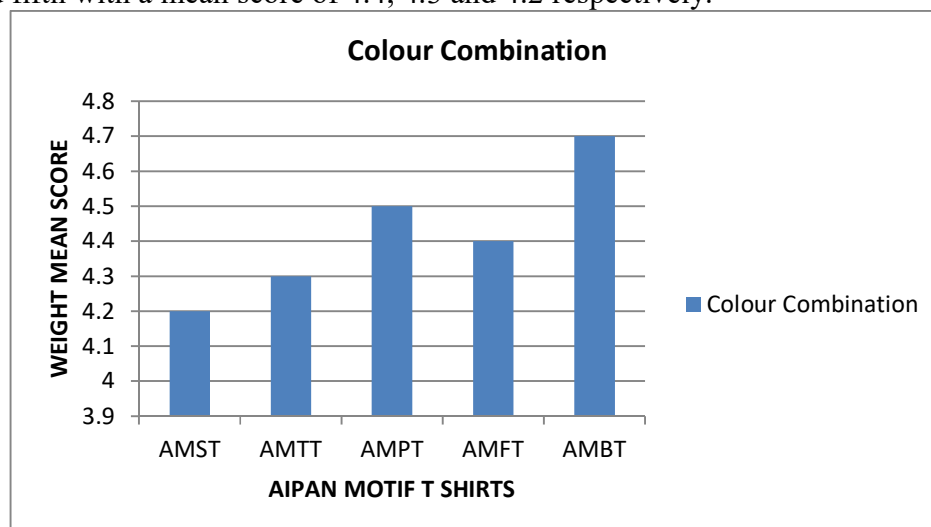

FIG 8: COLOUR COMBINATION OF DESIGN

3.2.3 ANALYSIS OF COMBINATION OF MOTIFS

From the Figure 9 which shows the evaluation of jacquard knitted T Shirts for the combination of a motifs, the T Shirt design AMT[T] receives the first rank with mean score of 4.8 followed by design AMP[T] and AMF[T] were given second and third ranks with mean score of 4.7 and 4.5 respectively. The jacquard knit AMF[T] and AMB[T] with a mean score of 4.4 and 4.3 were given fourth and fifth respectively.
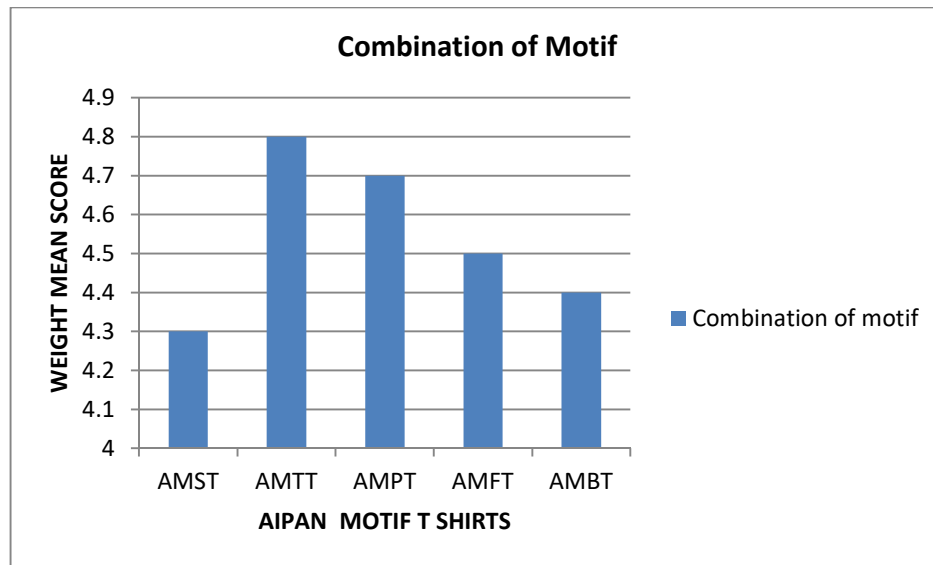
FIG 9: COMBINATION OF MOTIFS

3.2.4 ANALYSIS QUALITY OF JACQUARD KNITTING

The feedback obtained from the respondent for the evaluation of jacquard knitted T Shirt on the basis of quality of jacquard knitting parameters, that design AMP^T was given first rank with a mean score of 4.8 on the basis of quality of knitting. The jacquard knit T Shirt designs AMB^T, AMS^T, AMF^T and AMT^T with a mean score of 4.7, 4.5, 4.4 and 4.3 ranked second, third, fourth and fifth places respectively.
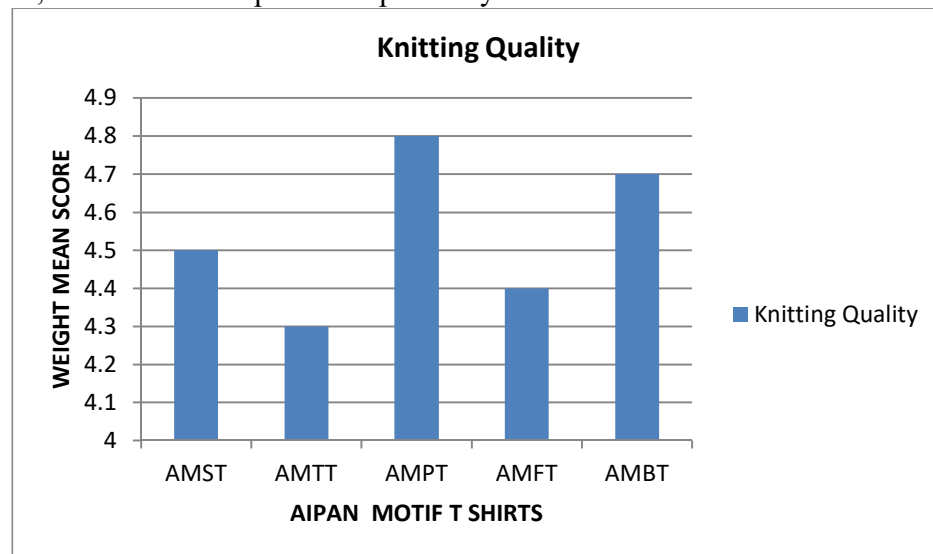

FIG 10: KNITTING QUALITY

3.2.5 ANALYSIS OF APPEARANCE OF THE DESIGN

From Figure 11, jacquard knitted T Shirt's which revealed the appearance the design, focused that, design AMT^T with mean score of 4.8 was given first rank on the basis of appearance followed by designs AMP^T, AMS^T, AMF^T and AMB^T which were given second, third, fourth and fifth ranks with mean score of 4.7, 4.6, 4.5 and 4.3 respectively.
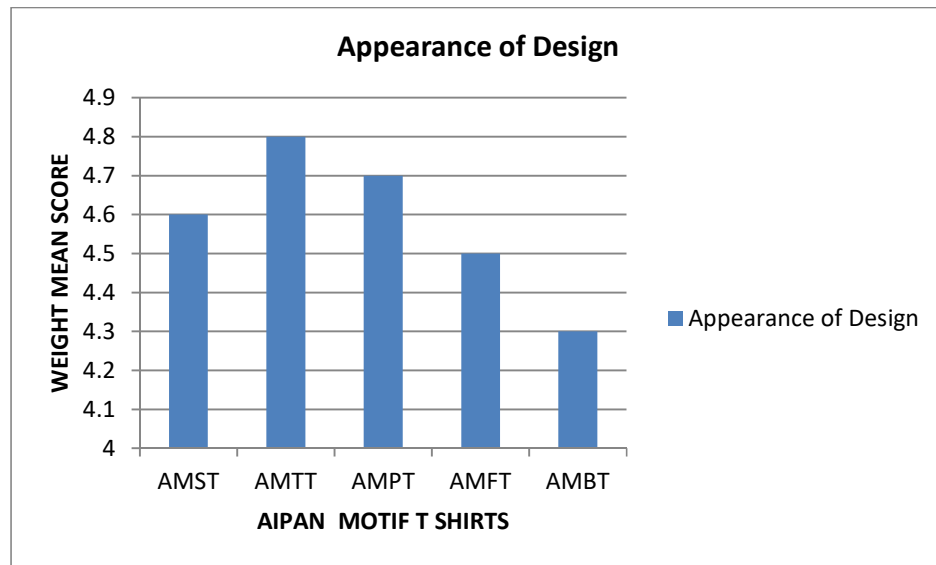
FIG 11: APPEARANCE OF DESIGN

4   CONCLUSION

Aipan of Uttarakhnad is an example of Kumauni folk art having motif inspired from nature and mythology. Women of Uttarakhand can also utilize their skills in experimenting with folk motifs and design to make them suitable for textile in innovative ways. This type of work also motivates people to come up with an ingenious work, which indirectly help in upgrading the art and craft of Uttarakhand. Aipan design shows a blend of ethnic and natural yet stylized designs. Each and every Aipan design has a particular meaning attached to it and is drawn with a specific purpose in mind. The Aipan designs are intricate though simple to create and adapt. In fashion world there is always a demand of something novel and artistic. The blend of Aipan design with jacquard knitting is providing an imaginative and fresh collection to the people who want to adopt their tradition with minute modernization. Adapting and improving the designs refers to modify it such that it will be easier to produce, easier to use, or easier to fix, or easier to maintain so on. With the changing world of fashion the field of textile demands for uniqueness different and fresh design which gives the customer the opportunity to use the adapted traditional motif ofAipan paintins. All the Aipan motif design and the T Shirts prepared were preferred by the consumers. Thus in the textile sector the adapted Aipan designs can be used through the jacquard knitting for product diversification and value addition. This will not only help in the preservation of Aipan painting motifs but also broaden the design base for the textile products.

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