



## Digital Embroidery: An Imagination

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### ABSTRACT

*Embroidery is decoration worked on the surface of the fabric using thread. Selection of design, embroidery stitches and colours and a very striking effect can be created. Old clothes can get a new lease of life by adding just a dash of embroidery. All basic embroidery stitches are easy. Several basic stitches can be combined to produce rich embroidered pieces. It can be beautifully described as a painting with needle and thread. Now, embroidery is largely produced on computer controlled embroidery machines. They are specially engineered machines that have a multi-needle fixed 'embroidery head' and a frame holder that moves the framed product in either of two directions so that the embroidery design can be sewn. The design is created within a grid (known as a 'field') with x being the horizontal axis and y the vertical axis. The embroidery machine reads these co-ordinates from the design data file and moves its pantograph into position to receive each new stitch from the machines' stationary needle head. The embroidery design is created on a computer using specialized 'digitizing' software. The computerized embroidery process can be broken down into six functional activities: Interpret artwork and digitize the design using specialized software, Save the design as a stitch file that can be understood by the embroidery machine, Read the stitch data file into the embroidery machine, Teach the machine how to embroider the design, Frame or hoop the fabric you wish to embroider on and slot into the machine arms. Start the machine stitching and run until embroidery design is complete and finished. This paper showed how designs can be created with embroidery software. With the help of software which benefited the experimenting with a number of colours, textures, patterns and sketch backgrounds for producing a playful, distinct and animated design, without physically making articles.*

*Keywords: embroidery, stitches, computerized, process, creation, designs.*

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### INTRODUCTION

India is the land of rich culture and diverse traditions. Almost every region of India has a distinct style of embroidery based on cultural history of the region. Embroidery is the art of using stitches as a decorative feature in their own right by embellishing fabric or other material with design stitches in strands of threads or yarns using a needle. Each part of India has contributed much to the style of embroidery for e.g. *Phulkari* from Punjab, *kutch* & *Kathiawar* from Gujrat, *kasuti*, *Kashidakari* and *chikankari* etc. embroidery used for decoration in our homes, our places of work and on the high street. Widely used on clothing, accessories and textiles for interiors it has become an integral part of our visual world. When compared with print, embroidery is more three dimensional; offering high luster and/or textured effects. It is associated with quality, adding value to a product in both the visual and tactile fields of consumer appreciation. All traditional embroideries are easily transformation into digital form. Digital embroidery means produced embroidery on computer controlled machines (Figure 1). Digital embroidery machines for sewing and stitching with various designs and patterns seems to be gradually replacing the hand embroidery methods it is controlled by the accurate computer instruction to create high quality and standardized embroidery design. Various styles of embroidery easily produced with embroidery digitizing software. Embroidery software's are available in different product models. They are designed to fulfill the needs of specific embroidery business and digitizing requirements of professional digitizers for e.g. Deco Studio e3- Deco Studio e3 is an all-in-one graphics and embroidery software solution for creating brilliant multi decoration designs, visualizing them on screen and automating the design digitizing process to effortlessly reproduce our concepts on real-world objects. ii) Visualize designs on

actual garments- In this software can choose from more than 50 product templates to help preview and share vision of how designs will appear on different garments. iii) Auto Appliqué By using this software can create the striking appliqué designs with Deco Studio. iv) Powerful digitizing -In this software use for powerful digitizing tools plus the flexibility to create reliable, quality embroidery designs. v) By creative digitizing software can advance stitching effects such as Florentine effect, 3D warp, trapunto and stipple stitch bring our embroidery to life. All stitches used to produce different effect like Satin, zigzag, tatami fill, program split, jagged edge, run stitch types, standard run, manual run, triple run, manual triple run, stem stitch and back stitch etc [1-9]. Designing for the traditional embroidery are very time consumable because to trace motifs each time when required but in digitalized software there are so many designs are already saved in memory and can be choose them according to their requirement. Change the designs and save the designs for long time period. So the study has planned with these objective : to assess the working process of digital embroidery and to provide sustainability to traditional designs.



Figure-1

## MATERIAL AND METHODS

This study based on primary and secondary data. Primary data collected from industry through observation method and secondary data taken from books, journals, articles and internet. The methods used for data collection -descriptive and analytical. The aim of study to promote sustainability and preserve traditional creativity.

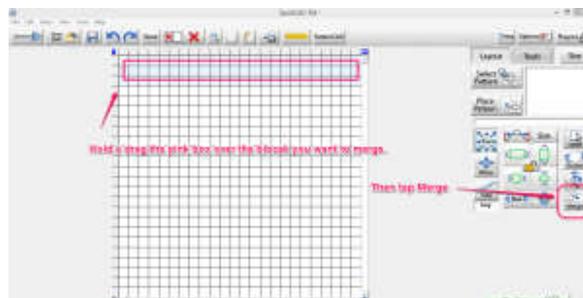


Figure-2

## RESULT AND DISCUSSION

The result showed that process of making embroidery through digital embroidery machine. Digital embroidery machines are specially engineered machines that have a multi-needle fixed 'embroidery head' and a frame holder that moves the framed product in either of two directions so that the embroidery design can be sewn. The design is created within a grid (known as a 'field') with x being the horizontal axis and y the vertical axis (Figure-2) . Therefore any point on the design can be identified in values of x and y, a co-ordinate in this field would be written, for example, as x245,y785, x245,y,315 etc. The embroidery machine reads these co-ordinates from the design data file and moves its pantograph into position to receive each new stitch from the machines' stationary needle head.

### Working process of digital embroidery machine

Digital machines exist from single home use to small independent professional to mass production. Embroidery Digitizing is an art of processing and conversion of analog information into digital information. The computerized embroidery process can be broken down into six functional activities:

- A. Interpret artwork and digitize the design using specialized software
- B. Save the design as a stitch file that can be understood by the embroidery machine
- C. Read the stitch data file into the embroidery machine

- D. Teach the machine how to embroider the design
- E. Frame or hoop the fabric you wish to embroider on and slot into the machine arms.
- F. Start the machine stitching and run until embroidery design is complete and finished.

#### Collection of traditional motifs:

Total thirty motifs collected from traditional embroideries and ten design created from collected motif with the help of corelDRAW X<sup>3</sup> software. Created design showed in Table-1 :

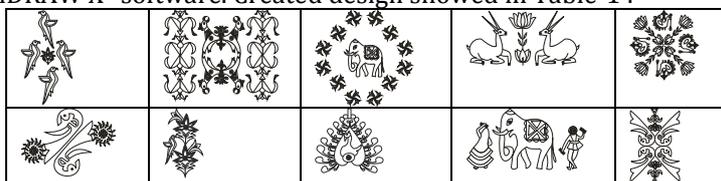


Table-:1 Created designs with Corel DRAW X<sup>3</sup>

#### Transform the created designs into digital form:

##### A . Interpret artwork and digitize the design using specialized software

First of all the design was converted into bitmap file. The design either scanned or opened into the specialized digitizing software and displayed on screen. The operator can zoom in and use the pointer of the mouse to define the design in stitches. The processes of interpreting the artwork in stitches are both a technical and creative process. Each block of stitches is essentially a grouping of x and y values these numbers are hidden from the digitizer and the interface with the software involves working with shapes. The software automatically fills in the x and y values in the background. Early systems required the operator to plot every stitch movement and needle penetration; stitch types were pre-programmed and can be used to create stitch blocks or objects (areas of the design) that are filled with a certain stitch type. Solid objects may be filled typically with 'satin or fill stitch', whilst an outline may use a 'run stitch' The digitizer create blocks using different stitch types, different angles of stitching and changes of colour. The stitches in the design normally be created in the order in which they embroidered on the machine. So, for example, if the design has a background fill with detail on top, the background would be created first and then the detail added [14, 15]. The digitizer constructs the design as a series of stitching actions punctuated by colour changes e.g. the background fill followed by the surface detail ,followed by additional detail etc.

##### B. Save the design as a stitch file (understood by the embroidery machine)

Once the embroidery design is complete the design is saved in the internal file format of the specialist embroidery software. This is important if the design needs to be changed or edited later as working with a native file makes this easier.

##### C. Read the stitch data file into the embroidery machine

The DSB or DST file needs to be transferred into the memory of the embroidery machine, this might be done via a cable from the PC running specialist software, or via a flash card or USB stick.

##### D. Teach the machine how to embroider the design

Once the design is in the memory of the embroidery machine the machine operator needs to teach the machine how to sew the design i.e. which needles and what orientation to use. The needles are numbered and each is threaded with a different colour. Each threaded needle stitched its colour block or blocks until a colour change is required then tie off its thread and park and the next relevant needle moved into position to begin sewing.

##### E. Frame the fabric into the machine arms

The frame or hoop was based on a traditional embroidery ring; the fabric to be embroidered is secured in the frame. Framing also serves to stabilize the fabric, to avoid the movement of the design whilst being stitched.

##### F. Start the machine stitching, run until embroidery design is complete and finished

Embroidery machines use the conventional 'lock stitch' mechanism, using a top thread and a bottom 'bobbin' thread to create a stitch. The bobbin, located beneath the material being stitched, catches the thread of the penetrating needle and carries it in a circular direction creating a loop through which the bobbin thread passes locking the stitch to the back of the material.

A well maintained embroidery machine, using good quality threads and stitching a professionally digitized design can complete an embroidery design independently without stopping and requiring operator intervention.

#### Availability/structure of digital embroidery machines

Embroidery machines are available with single or multiple heads; small and medium enterprises normally operate machines with 1, 2, 4 or 8 heads whilst large companies may use machines with up to 38 heads. Each head produces one embroidery design and all the heads are normally working at the same

time. Each head has a specific number of needles up to 15, machines with either 9 or 15 needles being the norm. Each needle represents an individual colour in the design. If the head has 15 needles and the design requires 16 colours the operator be required to rethread one of the existing needles with the 16<sup>th</sup> thread colour. The key to good quality embroidery production is understanding and controlling the variables [10-13].

## CONCLUSION

The embroidery process is quite complex, from design interpretation, to the production requirements of embroidery machines but the results can be very satisfying, can add significant value, and cannot be achieved in any other way. Hand embroidery is expensive in markets because of its time consuming factor, intricacy and hard work. However, retain easily the age old embroidery tradition of India by using digital embroidery machines. Embroidery software is very user friendly and much easier to use than some of the other program. Digitizing tool are built for demanding production and flexibility with intelligent workflow to streamline repetitive tasks and built robust design files that stitch flawlessly. The designer less experience was picking it up pretty easy as well. Embroidery designing technology reduced the embroidery cost and time. So it's a new opportunity for textile designer. This would also provide employment opportunities to many rural women in underprivileged.

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