

The Secret of Tu Embroidery's Heritage

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ABSTRACT

Tuzu pan embroidery has experienced the rise and fall of a thousand years, containing rich national culture and wisdom. With the change of society, fewer and fewer people possesses pan embroidery skills, and plus the complexity of the embroidery technology, young people are more reluctant to learn pan embroidery . Pan embroidery inheritance began to face serious problems.

In this project we let two students to learn pan embroidery from the craft and use the data acquisition device to collect data in the process of embroidery of students and teachers. We have done a Interactive web page to tell a person how to study Pan embroidery and to explore Pan embroidery how to get better inheritance by using data visualization ways.

Keywords: Data collection, Visualization, Tu embroidery, The inheritance of intangible cultural heritage.

1 INTRODUCTION

The protection of intangible cultural heritage refers to various measures to ensure the vitality of intangible cultural heritage, including the recognition, filing, research, preservation, publicity, promotion, inheritance (especially through formal and informal education) and revitalization. As an important content of protecting intangible cultural heritage, inheritance is the core of protection.

For more than one thousand years, the traditional pan embroidery inheritance with mother and daughter oral and personal education, also in the sister, sister-in-law, mother-in-law and daughter-in-law inheritance. Nowadays, the limitation of learning pan embroidery is reduced, but most young people are no longer willing to learn pan embroidery. In the face of this problem, especially in the face of non - genetic heirs to teach the novice of no embroidery experience ,the relationship between teach and learn under the embroidery process is worth our exploration.

2 RELATED WORK

In order to find an effective way to learn pan embroidery and how to better inherit pan embroidery. We designed two experiments: one is to let a student learn from a teacher, and then let them embroider the same pattern.

Through collecting data of 20 patterns to observe the similarities and differences between the novice and the craftsman, so as to find the law of learning pan embroidery; The second is to have a trainee embroider the same pattern every day for 30 days. In the whole project, we analyzed the learning time of the embroidery vertically, and collected the video of the teacher and two students in the embroidery process, the length of the thread used, brain waves, electromyography signals of the right arm, and the number of knots of the finished embroidery.

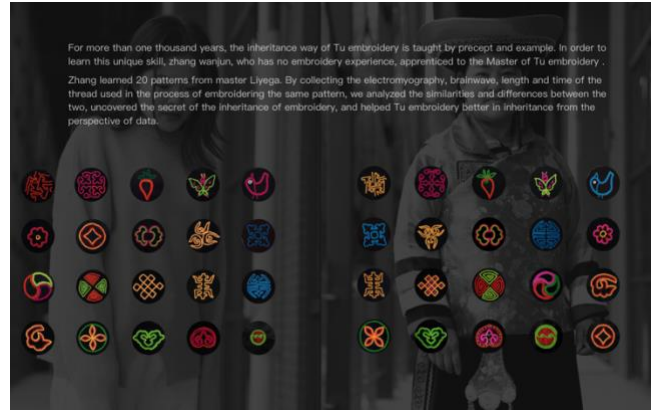


Figure 1: 20 patterns collected by teachers and students

2.1 Brain wave data collection

Modern scientific research shows that spontaneous electrophysiological activity occurs when human brain works, which can be expressed in the form of brain waves by special electroencephalograph. We use Mindwave Mobile device to collect brain waves of teachers and students.

During the acquisition process, the device was worn on the subject's head. Mindwave Mobile used a sensor placed on the forehead and a reference electrode contact placed on the ear to measure brain wave signals. Through this device, we collected data of 8 dimensions and eSense index values.

The eSense index value is calculated by applying eSenseblem algorithm to the processed signal after the ThinkGear amplifies the original brainwave signal and filters the interference caused by environmental noise and muscle tissue movement. It is used to represent concentration and relaxation.

We collected the brainwaves of 20 patterns embroidered by the teacher and a student and the brainwaves of embroidery by another student for 30 days. We can found the rule of embroidery learning by analyzing the changes of concentration and relaxation of students and teachers in embroidery.

2.2 Brain wave data collection

In this project, we used myo bracelets to collect surface myoelectric signals from the right arm of the teacher and two students. Myo is mainly composed of eight different thickness of the block size of bioelectricity sensor units, each sensor is divided into three electrodes, the wearer can be detected gestures change when the muscle of bioelectricity, in addition to the eight sensors, myo built-in three-axis accelerator, three-axis gyroscope, so can collect emg, acceleration and direction of the gyroscope and four dimensions of the data. I want to analyze the embroidery differences between the novice and the craftsman through the collected data.

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Because both myo bracelet and Mindwave Mobile are connected via Bluetooth. We collect them by two computers to avoid interference with each other. If the device is interrupted, we will ask the collector to stop the embroidery, and then do the embroidery after the device is connected, so as to ensure the accuracy of the data.

2.3 Other data collection

Besides brain waves and electromyography collection, We also collected the length of thread used by teachers and students during the embroidery process. The specific method is that we must do a series of preparatory work before the embroidery. Because of the unique skill of pan embroidery, we should measure the length of the line before they ready for embroidering. The record of the line length is divided into single-strand and 3-strand. And when they need to change the line, we should subtract the length of the remaining line. With the embroidery beginning, we start to time and record the video. We recorded the process of embroidery as video data and recorded the length of each person's embroidery. The number of knots will also be counted manually when the embroidery is finished.

3 DATA VISUALIZATION DESIGN

After the data collection, we got the embroidery data of two students and the teacher for 30 days.

We processed and visualized the data, and then made a data visualization page about the transmission of embroidery.

3.1 Visual analysis of brain wave data

The two data, focus and relaxation, were analyzed in the form of a broken line graph and visualized in polar coordinates. In order to further compare their overall relaxation and concentration, we compared the data with five interval values of brain waves. ESense index values of 1-20 are "low value zone"; 20-40 is the "lower value area"; 40-60 in the general range; 60-80 is the "higher value area"; 80-100 is the "high value zone".

Through electroencephalogram and zonal graph we can see the teacher's embroider experience is rich and more relaxed in embroider process, and if the student wants to embroider better, she must improve concentration higher and after having certain experience embroider process she just can be more relaxed.

In the same situation of having problem, the teacher and the student are more focused, but the student will be more focused.



Figure 2: Visualization of brain wave data

3.2 Visual analysis of emg data

When processing the huge emg data, we first used the variance formula to calculate the variance value of 8 sets of data, which was used to represent the intensity of muscle activity at this time point. In order to facilitate the observation of changes in emg data, we processed the original density data into 50 seconds by sampling the average method, and finally obtained a smoother emg curve in the process of embroidery between the student and the teacher. We could clearly see the difficulty of each pattern and the difference between the student and the teacher.

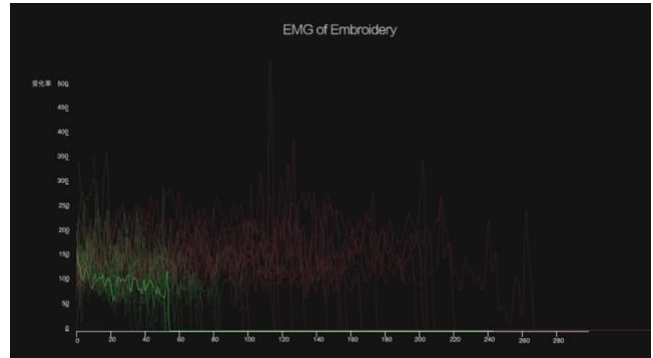


Figure 3: Electromyogram of teacher and student

4 CONCLUSION

Our practice has proved that it is feasible and effective to collect data in the process of embroidery by equipment. Comparing the data of the non-genetic inheritor with the data of the novice, we can get the learning method of the embroidery and the problems to be paid attention to in the process of embroidery. In the current experiment, we only obtained the data of a professional pan embroidery craftsman and two novices, which may have some deviation in the data comparison. In the future, we need to collect more data for analysis and comparison, hoping to help pan embroidery find a new inheritance method through the similarities and differences of these data.

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