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Interaction Design of Rural Brand IP Image Based on Processing Algorithmic Art

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Abstract. Processing-based programming interactive art has gradually become a research hotspot. To improve users' immersion and experience, this paper proposes a rural brand IP interactive design method based on a Processing algorithm. While solving the contradiction between the graphical perceptual thinking of rural brand IP and the logic of computer language architecture, it also interconnects with Arduino, Kinect, Leap Motion, and other devices. It further provides ideas for multi-sensing interactive rural brand IP design.

Keywords: Processing; Algorithmic art; Interaction art of new media，Rural brand IP Image

1. Introduction

In recent years, with the development of digital technology and mobile network, the media has expanded from traditional media to new media, and the demand for immersive new media interaction experiences has become increasingly prominent. The innovation of programming tools such as Processing provides a new way of expression for the interactive art of new media [1] (Fig.1).

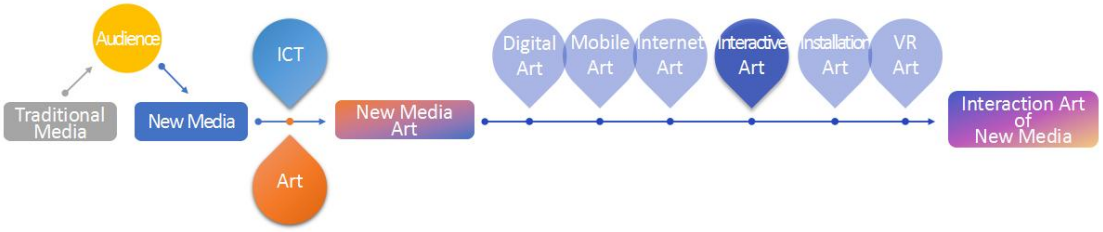

Fig. 1. Interaction Art of New Media

Processing was born in the Aesthetics and Computing research group of MIT Media Lab. It was founded by Casey Reas and Ben Fry. It is different from Flash, which is based on interactive vector graphics and WEB animation. Processing programming language has the advantages of open source and free, data visualization, humanized operation, and fast interaction. As an open-source project, Processing is based on a graphics library encapsulated in Java and provides a Processing Development Environment (PDE) separately. Through PDE, graphics programs and interactive programs can be constructed easily and quickly. PDE programming mechanism, on the one hand, provides data visualization mapping function, data through the function such as a mapping relation into a visual image, the error code in a timely manner, according to facilitate change, and quickly will be static images and dynamic animation simulation data, provide excellent interaction on the other hand, not only supports traditional procedure-oriented programming mode, also supports object-oriented programming. Can a perfect combination of programming technology, SCM technology, and electronic technology, achieve the interaction between physical devices? Although Processing does not have the visual interface of Flash, it has a certain "technical threshold" for artists and designers, that is, the contradiction between the logic of computer language architecture and the graphic perceptual thinking of artists. However, Processing, open Processing, and other websites open developers' application codes free of charge, and code sharing provides rich learning resources and practical libraries for creators. Therefore, Processing relies on open source, easy operation, cross-platform, cross-media, physical device linkage, and other features. With the gene of integrating art and science, it has gradually become a creative tool and general development

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platform for digital artists and designers, providing a more interactive, timely, interesting, and immersive experience for interactive rural brand IP design.

In today's new media background, the realization of new media interaction behavior based on the Processing generation algorithm has become a research and application hotspot. The Processing generation algorithm designs certain rules, parameters, restrictions, and rules through computer languages such as code and function, endooms the computer with autonomy, and freely simulates biological rules in nature, thus obtaining unreproducible and beautiful results. However, at present, the dominant behaviors of Processing generation algorithms are mainly designed with Generative Art and Particle Systems, Patterns, Brushes, Games, Shaders, 3D, Data viz, Physics Math, and other graphical data visualizations, such as the Open Processing case (Fig.2), and interphasic device linkage applications with multiple sensory interactions. Such as processing and device technology interconnection applications. Interactive IP country brand image design, need to design IP country brand image, and interactive media process and behavior, but in the actual transmission of IP country brand image design and research process, involved in the media is still mainly on traditional media, new media spread social platform is complementary, and immersive interactive IP country brand image design direction is less.

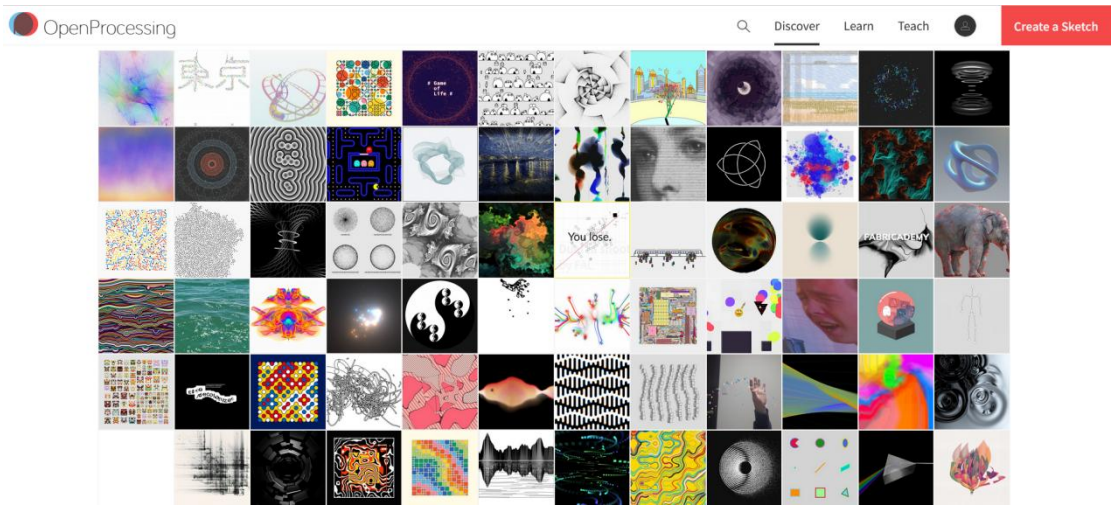

Fig. 2. Excellent Examples of Open Processing

2. Methods of Experiment and Method

Taking the IP image of A village as an example, the Processing generation algorithm is used to provide A new media interaction design method and technology for the IP image of A village. Solve the contradiction between the logic of computer language architecture generated by processing and the graphical perceptual thinking of rural brand IP image and generate the IP image of Village A by processing algorithm. In addition, the interactivity of Arduino, Touch OSC, Kinect, Camera Motion, Eye Tracker, Leap Motion, and other physical devices is conducive to realizing the multi-sensing interactive application of IP design in A village.

2.1 Basic graphics drawing of rural brand IP

Processing adopts the thinking of digital graph description to realize graph rendering, determines the specific coordinate value (x, y) of each part of the graph on the canvas, and carries out basic drawing with functions such as Ellipse (), Reet () and Vertex () (Fig.3). However, combined with excellent cases at home and abroad, It is found that the dynamic graphics works based on Processing are more likely to form very creative dynamic graphics and patterns through parametric difference Settings of simple graphics and combination of random numbers and trigonometric functions, such as dynamic patterns interacting with the mouse and nested circular dynamic patterns.

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The IP image of Village A incorporates elements such as Hong Fist, Hong Xiguan, bamboo, and yellow flower wind chimes, presenting anthropomorphic and animation characteristics. It belongs to the drawing of complex graphics. Begin Shape () and end Shape () commands can be used to connect multiple points to draw the contour of custom graphics. However, it is more about reading the load Shape () command, stroke (), and fill () functions to modify the SVG style for graph rendering (Fig.4).

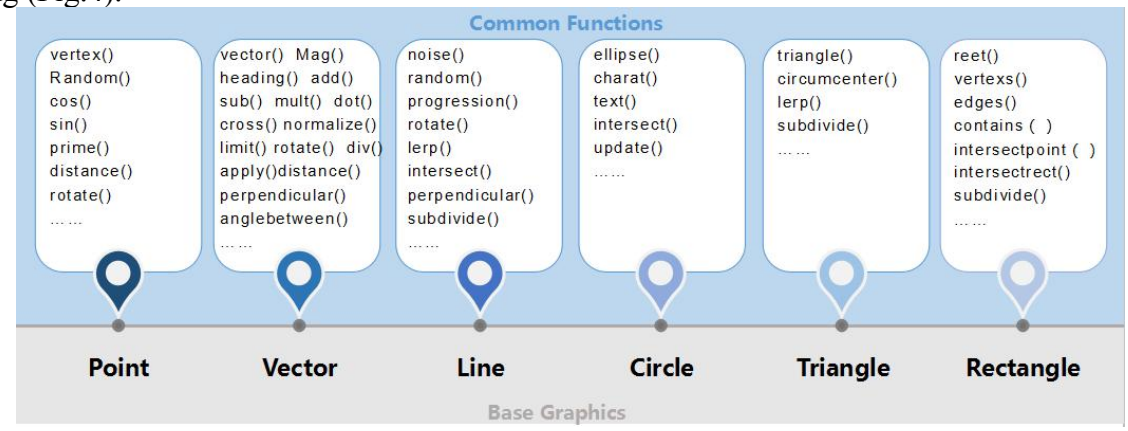

Fig. 3. Using Common Functions to Realize Basic Graphics with Processing

Fig. 4. Load and display the Rural Brand IP Image

2.2 Experiment of connecting Processing with other devices

Processing can not only communicate with many programs (such as Pure Data and CCV) but also combine with much hardware (FTIR, Arduino, Kinect, Eye Tracker, Leap Motion, etc.) according to project requirements and application environment. Choose the appropriate interactive installation to create.

Multi-touch devices are composed of touchable devices (such as computer monitors, desktops, walls) or touch pads. It is one of the most mature forms of interaction to realize multi-touch interaction by identifying the points of simultaneous touch behavior through software and applying Processing+FTIR (CCV&TUIO) system.

Arduino is an open-source electronic prototype platform, divided into hardware (Arduino Uno) and software (Arduino IDE) two parts. Arduino Uno can be abstracted as a C++ class library, which is completely detached from the configuration of registers, and almost all functions can be invoked through the upper library. The combination of processing and Arduino can make the graphical interface interact with the hardware. Programming is written in the IDE and then burned into the microcontroller connected with various sensors to control the transmission of data from Arduino to processing, to participate in the transformation of the IP image of A village. For example, third-party factors such as light sensitivity, temperature, distance, sound value, airflow, pressure, and pulse intensity are added to realize the connection between human interaction behavior and the IP image of A village and add randomness to the interaction results (Fig.5). On this basis, combined with other platforms, more rich interactive effects can be achieved. For example, add the OpenCV library (cross-platform computer vision library), which can realize face recognition and other

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advanced graphics processing functions; Add Kinect library (motion capture, bone tracking) to recognize and interact with body movements; Add Eye Tracker (Eye hotspot, Eye movement track), which can collect the distance data between the location of Pinchin spot and the computer, and conduct Eye tracking interaction; Leap Motion (3D hand model, gesture control) can provide the position information, characteristics and Motion mode of the bound hand, and realize the function of grasping computer graphics.

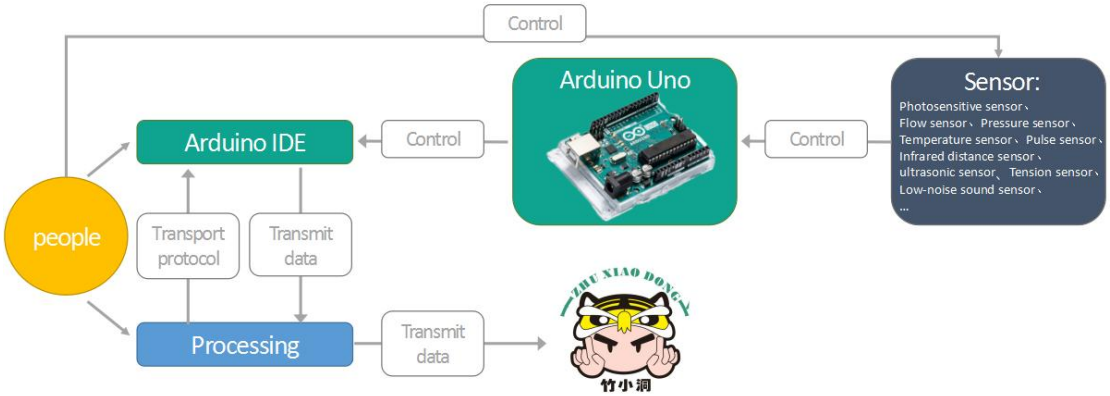

Fig. 5. Processes of Interactive Design for Rural Brand IP Image

3. The results

To sum up, this paper analyzes and studies the computer generation and interaction of rural brand IP and uses visual generation of Processing data and linkage between physical devices to realize the interactive design of rural brand IP. The core of the interactive design of rural brand IP based on processing algorithm lies in the transformation of computer interactive thinking mode with program design first. The pattern, size, position, and color of graphics must be mutually restricted according to established grammar rules to correctly process visual logic. At the same time, through the programming language of the computer, the screen can become a bridge of communication between the body and the computer. The visual interaction of the mouse, the face recognition of the camera, the sound value of the microphone, coupled with the Arduino, Kinect, Eye Tracker, Leap Motion and other external hardware devices, To define behavior interaction components through interesting real-time feedback, and see, hear, touch, increases more influence and diversification, resonate with break traditional IP visual output in one direction at the same time, the user experience engaged, stronger, results show that the proposed design method can change the traditional country brand IP design ideas, enhance rural brand IP human-computer interaction, Improve user immersion and experience.

4. Discussion

With the irreversible integration of the Internet of Things, big data, artificial intelligence, and other technologies into all aspects of people's lives, thinking in the way of computational thinking will be a challenge that all disciplines must face. Rural brand IP, as the core element of the explicit visual vision of rural culture and rural brand, should not only map the unique rural culture but also feedback on the rural culture to form the exclusive and local rural brand IP for sustainable development. Through the integration with the Processing generation algorithm, interactive thinking is used to balance IP design and computer language functions, and attention is paid to the timely feedback of rural brand IP data visualization and the interactive application of physical devices, to achieve the collision between art and technology, to realize the cross-media interaction behavior of new media. To provide more design methods for generating more diversified interactive and immersive rural brand IP images.

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