Project of advanced interaction system

Multiple user drawing application

1. Introduction

This project is realized in pair and is included in the UE of Advanced interaction system of first semester of second year of Master of Human computer interaction(HCI) at the University of Paris Saclay.

The main objective of this project is the realization of different interaction technology. The project goal is to achieve a **multiple user drawing application** (canvas). With a collection of widgets and the implantation of communicate system, two users can finish the drawing by using two different platforms by sharing the selected objects (mainly refers to the control from two PCs).

The programming is achieved in Java with the implantation of Swing State library and the TCP/IP communication Protocol as well.

The topic of our project complies with the topic of the course, because a drawing application use many of interaction techniques, more over wo use the network communication technology to draw.

2. Main functions

The main function of our application mainly contains two parts: the drawing and the user's interaction communication. Besides the basic drawing functions, many different interaction technologies like “crossing”, “drag and drop” and “gesture recognition” will also provide to users in order that users can finish their drawing in a way faster and easier.

- **Drawing function**

The main part of our application is a canvas which allow users to draw simple graph. Users can select the form of graph, the color of graph and the stroke size by using the tool bar.

The form of graph contains the basic form like rectangle, path, line, square. Users can select a form, the color of the form and the size of the stroke at the same time by using the “Crossing” technology. When the

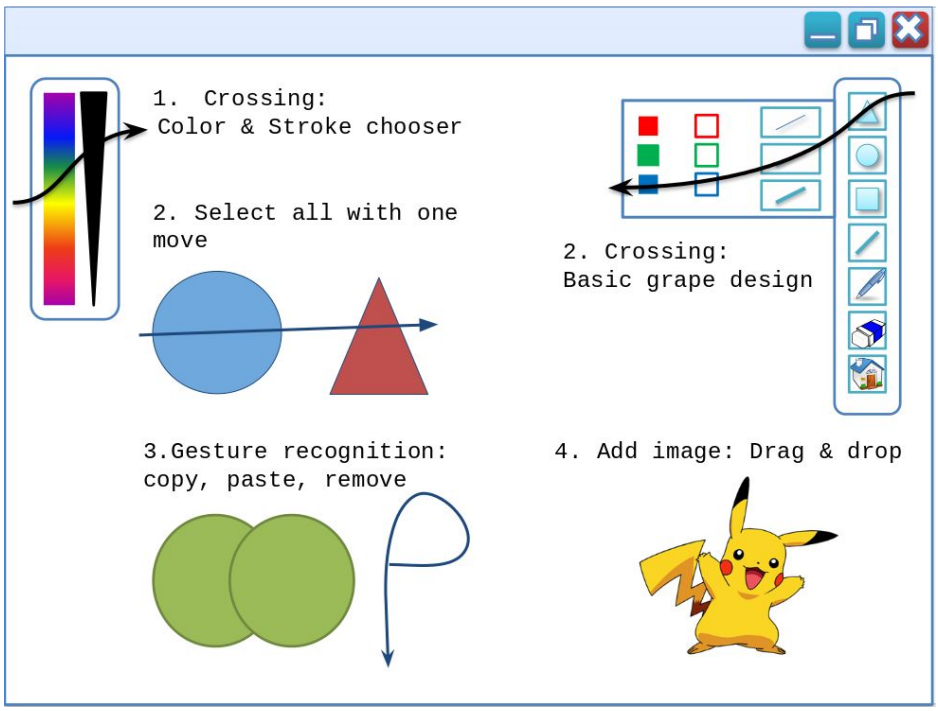
user's press the mouse and cursor slip on a form of the tool bar, a sub-menu will appear so that users can choose the color of the form and the stroke size of the form without releasing the mouse.

A color bar and a stroke size bar are also implemented in order that users can choose more colors and stroke size at the same time.

The "remove" button on the toolbar provide users to remove the item which are selected on the canvas. For selecting an item, we use also the "Crossing" technology. By slipping the cursor from one item to another, all the covered items will be selected and be removed from the canvas when user release the mouse.

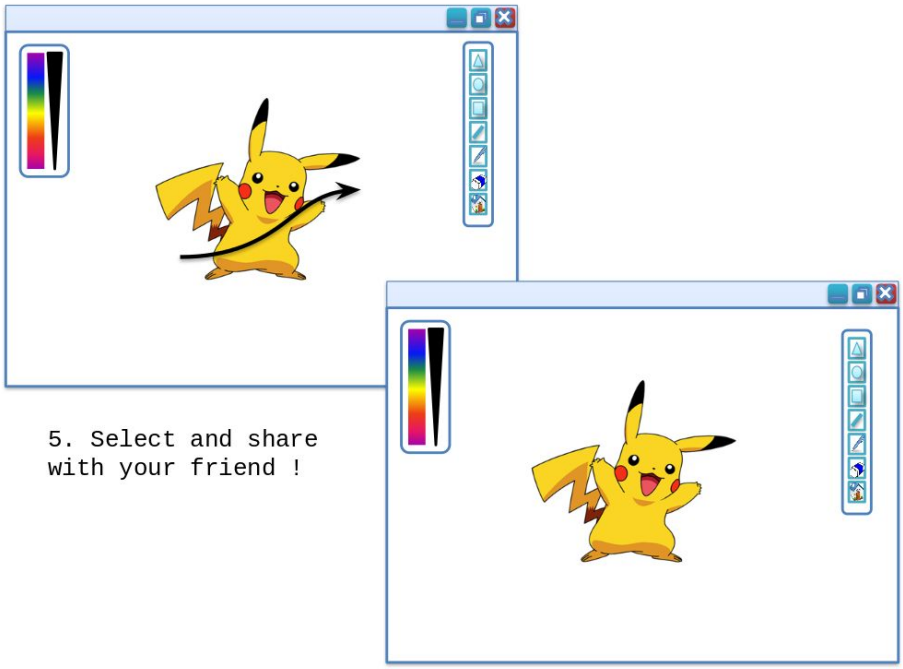
When the "gesture recognition" is on, users can copy a selected item by drawing a "C" on canvas, paste an item by drawing a "P" on canvas and remove the selected items by drawing a line on canvas. The training of the gesture should be done before the launch of the application to ensure the reliability of the function of the gesture recognition.

Adding an image to canvas can be finished by simply using "drag and drop" technology. To add an image, users can choose an image from a file by pressing the mouse, drag it close to the interface of the application and drop it on the canvas.



- **Users' interaction communication**

The canvas control can be realized by multiple users by using multiple platform. The communication between two devices is realized by the socket programming in Java. One PC will play the role of server and another act as client. The communication between two PCs will be established by the TCP/IP protocol. Therefore, the selected objects can be sent to the target user.



3. The main challenges to be solved

1. To establish communication between two devices.
2. Conflict detection and control between two devices.
3. Attach the gestures to different functions

4.Programming toolkits and hardware

1. Java Swing, Socket Programming
2. Two computers.
3. SwingStates library.