

# The Research about Interactive Intelligent Projection Handwritten System Based on Wiimote

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**Abstract:** On the basis of today's society advocated by the concept of human-machine intelligent interaction, using the Wiimote interactive electronic whiteboard, interactive projection was proposed based on body feeling sensor handwritten system. System by nintendo Wiimote controller, IR pen, bluetooth module, PC and projector. Wiimote is nintendo Wii console generation with controller, can through the Wiimote infrared sensor real-time capture the position of the IR light source, then the location information sent by the bluetooth device is sent to the PC and mapping for the mouse cursor events, in order to realize the function of electronic whiteboard. System structures, simple equipment, with functions of cross-platform, both handwriting smoothing and a variety of teaching AIDS, has stronger practicability and advanced.

## Introduction

While traditional "blackboard with chalk" classroom teaching platform is recognized as a successful model to impart knowledge and ideas, illustrative graphics, blackboard, etc. can not be saved and restored after school and can no longer reproduce or be directly transferred out related teaching data type annotated to explain. "Computer increase the screen" appears to solve the shortcomings of traditional "chalk blackboard plus" classroom teaching platform, the use of computers can always call up the relevant teaching materials with a computer connected to explain, but in time to save a schematic graphic and writing on the blackboard. With the use of computers in teaching the growing popularity of "increasing computer screen" approach has become a major showcase for current classroom teaching [1].

With constantly teaching practice this approach has gradually reflected inadequate. One important issue is to simplify the writing style symbol, schematic form, expression, processes, etc. express the way a computer keyboard entry appeared to be quite slow. For on this issue, it was suggested that the use of screen handwriting input panel instead of a computer keyboard. Obviously, the combination of handwriting screen panel "plus blackboard chalk type," which is able to easily achieve the symbol expressing a schematic form, the expression, the process has become a proven to be effective in imparting knowledge of the electronic computing device. Specifically, the system has the meaning of the following aspects:

(1) Improve the status of School teachers' long standing next to a computer mouse clicking, achieved the scope of the entire classroom projection display easy to operate and expand the teacher's activity area and realize the interaction of teachers and students;

(2) It can facilitate classroom so that the teacher can be very simple to achieve instantaneous transmission of information on the projector;

(3) Intelligent handwriting operation can help to improve the quality of classroom and student interest;

(4) Using infrared laser to achieve the effect of clicking the mouse and can be written directly on the projection screen and help teaching activities carried out smoothly;

(5) In the process of lesson planning it is needless to connect the projection screen, teachers can easily prepare the software on your computer, production, modification, teaching content to be stored;

(6) The teachers can simulate their true teaching in front projection screen process to ensure

courseware real show in the classroom ;

(7) If it can successfully promote the development of such devices, it can reduce dust pollution and safeguard their health.

However, this handwriting screen applications has not been widely used, the current computer keyboard input is still the main entry terms supplemented by handwritten entry screen panels. One important reason is that the existing technology is simply the screen handwriting input information by sampling and digitizing converted into the text the computer can recognize. This waste the time of thinking, and most of the aid of special software is required, it cannot guarantee the contents of the input accuracy and the development of the products are expensive so that it is difficult to promote a wide range of applications [2].

Common multimedia platform unable to provide a wide range of teaching function, the current market interactive whiteboard is expensive, higher prices. Therefore, this paper presents an interactive projection system based on handwriting somatosensory sensor. By Nintendo's Wiimote controller system, IR pen, Bluetooth module [3], PC machine and projector components. Wiimote is the controller that comes with the Nintendo Wii next-generation consoles, to capture the real-time location of IR light through the Wiimote's infrared sensor, and then sends the location information to the PC via its Bluetooth transmitter then mapped to the mouse cursor activities to interact projection handwriting function. System equipment is simple, high practical value. Using Java language to achieve cross-platform on Windows, Linux, Mac OS X and other platforms. From the system architecture, system implementation, and system characteristics of these three aspects, this paper introduce an interactive Wii intelligent projection system based on handwriting in order to provide a reference for the realization of "low-cost, diversified" research teaching platform.

## The Structure of the System

**Systematic Research Objectives and Main Content.** The research objectives and main contents are as follows [4]:

- (1) Projection has powerful operating software features to ensure that the teachers and the teaching contents on the screen were clearly written and free annotation;
- (2) Teacher's guide and student sentiment interactive can achieve wisdom interactive on the platform of projection screen;
- (3) Real-time software can complete the process of recording a classroom blackboard and networking sharing platform through the mail, etc.;
- (4) After the lesson, the students can select to download and can selectively reproduce the classroom on the relevant software interface;
- (5) Achieve a real sense of teaching low-cost, actionable "home-school exchange."

**The Hardware of the System.** Fig. 1 is the picture of the hardware of this system.

- (1) In front of the Wii remote has an infrared light to capture a high-performance infrared camera and can capture a position outside the LED light, then it transmit location information into a computer via Bluetooth;
- (2) The design of graphical user interface positioning program that will locate the position of the infrared pen to simulate a mouse or pen corresponding function on a computer, to realize interactive through whiteboard structures;
- (3) Since the Wii's infrared camera supports multiple infrared light to capture this whiteboard so it can also be achieved multi-touch functionality.

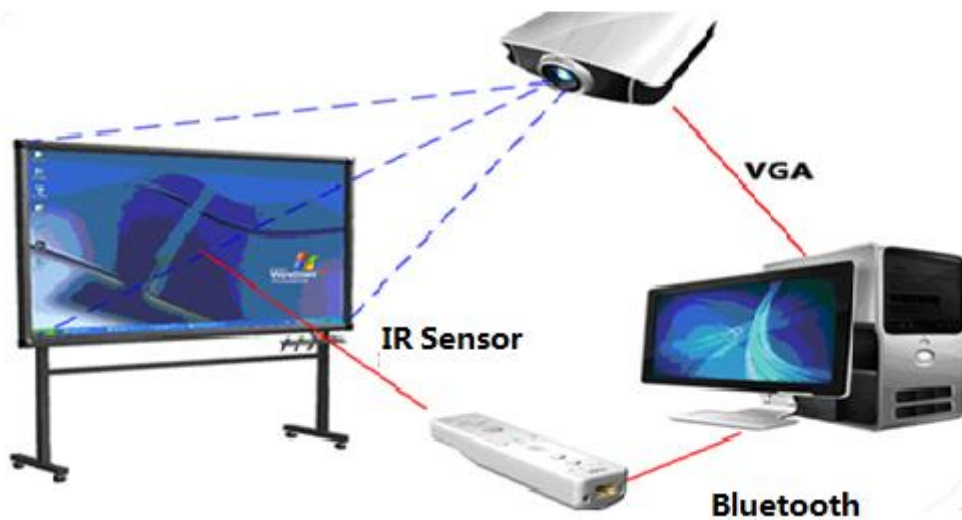


Fig. 1 The hardware of the system

**The Software of the system.** This system use Java language development for Windows, Linux and Mac OS X and other operating systems [5]. Fig. 2 is the control process of the system.

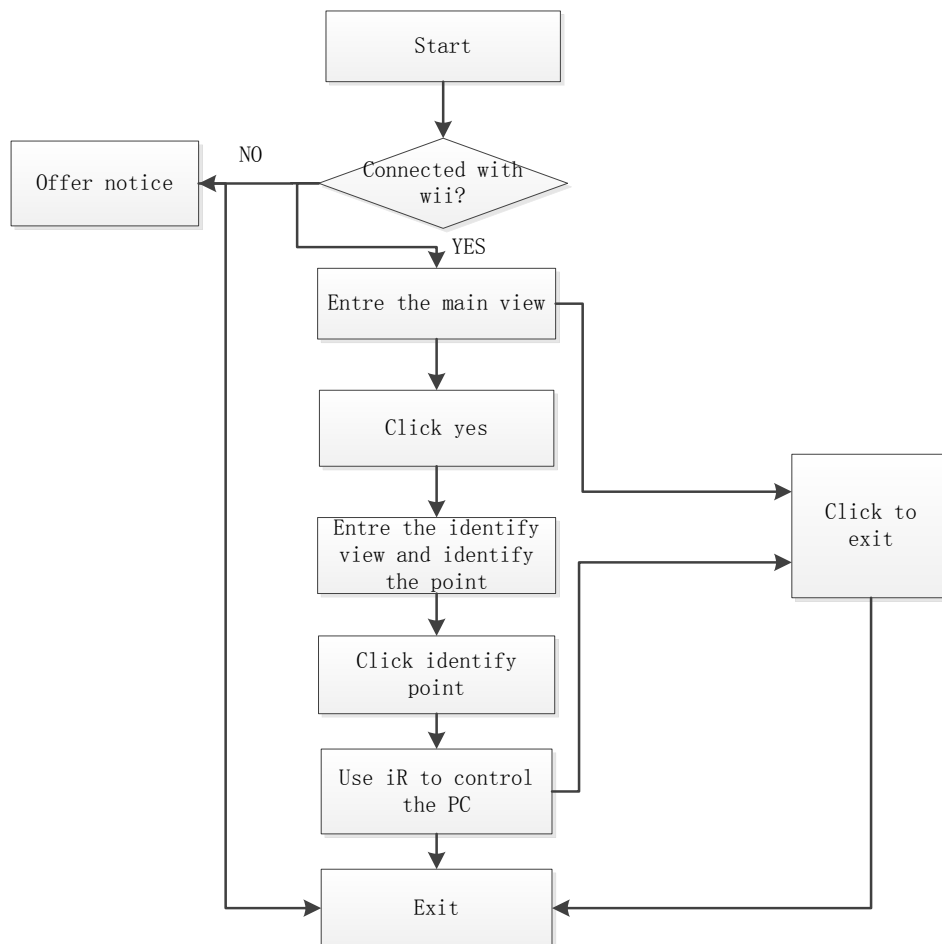


Fig. 2 The control process of the system

**The Realize of the System.** The system is realized by following ways:

(1) We can use infrared transmitter via infrared pen, projected onto the screen, to achieve

positioning, and then output the coordinates, and then implement tag. The general workflow: infrared light irradiation of the screen-the screen orientation sensor to the control system are wireless module-USB to a computer via Bluetooth wireless transmission-software to read and write - passed projector projected.

(2) SCM control system that combined wireless module can be used in pressure sensors, sensor touch projection screen finger out and communicate with the computer through software screen content changes [6].

(3) IR pen handle and combination of features can be integrally formed three-dimensional space mouse, to achieve control of movement in space of the infrared light by the three-dimensional computer mouse to move the cursor, thus free to write on the projection screen.

The operation notices are as follows:

- (1) Start wiimote whiteboard;
- (2) 1,2 button are holding down in the same time so that it can be connected with the Wiimote connected PC;
- (3) Click the "Screen Calibration button" to start screen calibration;
- (4) When calibration is successful, the PC can be manipulated using the IR pen computer.

## Conclusions

By Nintendo's Wiimote Interactive Whiteboard Wiimote controller, IR pen, Bluetooth module, PC machine and projector components. Wiimote is the controller that comes with the Nintendo Wii next-generation consoles, to capture the real-time location of IR light through the Wiimote's infrared sensor, and then sends the location information to the PC via its Bluetooth transmitter then mapped to the mouse cursor activities to achieve electronic whiteboard function. System equipment is simple, practical value, the total cost of only three hundred dollars or so, but it can be realized with hundreds of thousands of the main functions whiteboard. Specifically, based on the handwriting Wii interactive projection system has the characteristics of intelligence following aspects:

(1) Cross-platform. The whiteboard uses Java language development for Windows, Linux and Mac OS X;

(2) Interactivity. On the basis of Johnny Lee's whiteboard program added a timeout on the right-click event trigger function can be mapped to the mouse to move the light source, left-click, double left click, drag and other events. All of those greatly enhanced interactivity;

(3) Handwriting smoothing. Johnny Lee whiteboard program handwriting smoothing algorithm is improved so that it can spot IR light smoothing the moving speed IR pen, writing more smooth and natural;

(4) Aids. Provide intimate and practical multifunctional screen blackboard, on-screen keyboard, Wiimote remote control and other functions so that the teacher can control the cursor directly on the screen blackboard, enter text, etc., the screen comes with a variety of drawing tools in Blackboard.

(5) Build a simple system equipment, the total cost of only three hundred dollars or so, but the price can be achieved with hundreds of thousands of existing primary function whiteboard. Compared with existing systems abroad, with a strong cross-platform functionality, its' versatility is good, and mouse activity mapping and smoothing aspects of writing a good improvement. In contrast, the price of interactive whiteboard is now generally high, and low cost of the system can be widely used in teaching, meeting, exhibition halls and other occasions. As for the domestic Wiimote research matures, this projection handwriting based on Wii interactive intelligent systems will become the mainstream of the show teaching model.

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