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Smart Touch Computers: A Novel Idea

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Abstract: Trends in computing technology need that the computing devices in future should focus on achieving high performance, higher efficiency and low cost. In order to achieve these performance parameters, we propose a novel idea with a virtual display which does not require any physical object for displaying, it uses air as a medium and projects on the air Instead of using alphanumeric keyboard, a motion sensor is used instead of a keyboard. When the motion sensor is on it generates a hemisphere of 1m around it, having two regions touch region and active region. When the finger touches the layer, the touched area will have change in voltage, this change is sent to the controller, the installed software in the controller converters the change in voltage to an understandable language to perform the required operation. This will be displayed on the projector, the projector uses air as medium for displaying instead of using some physical medium.

Keywords: Computing; keyboard; projector; hemisphere; physical medium

I. INTRODUCTION

The Computer has become one of the most advanced electronic devices in the world, the laptop is the next version of computer which is thin, less weight and portable. A laptop is a small, portable computer which has a thin LCD or LED computer screen on the upper part which is used for displaying, it is opened up to use the computer keyboard .Laptops are folded shut for transportation. Personal multimedia, in playing games, in education, Internet surfing, and general home computer use are the some of the applications of laptop. But the cost of the laptop is high and it is having limited display size, it is not suitable for playing games, graphic designing.

II. PROPOSED SYSTEM

The proposed system has three fundamental blocks:

1. Motion controller
2. Motherboard
3. Projector

A. Motion Controller

The Motion controller is a peripheral device ,for functioning it should be placed facing upward. It consist of two monochromatic IR cameras and three infrared LEDs, the device observes a roughly distance of about 1 meter hemispherical area. Pattern-less IR light is generated by the LED and the cameras generate almost 200 frames per second of reflected data. This is then transferred to the host computer through a USB cable, where it is monitored by the software for motion control using "complex maths", which in some way leads to the 2D frames generated by the two cameras by synthesizing 3D position of the data. The accuracy of the motion controller is 0.7 millimetres.

B. Motherboard

Motherboard, also referred to as the the main board or a mobo is the heart of the general purpose microcomputers available in the form of a printed circuit board (PCB) . It consists of provides a channel for communication between many of the important components of a system, such as the central processing unit (CPU) and memory, and also provides connectors for other peripherals to interact. Unlike a backplane, a motherboard also has important sub-systems such as the central processor, memory controllers ,the chipset's I/O and, interface connectors, and other integrated components for general purpose application.

a) Design of motherboard

Modern motherboards include:

- Slots for the insertion of one or more microprocessors . For CPUs in ball grid array (BGA) packages, such as the VIA C3, the CPU is soldered directly to the motherboard.
- Slots for the inclusion of system's main memory which can usually be in the form of DIMM modules which contain Dynamic RAM chips.
- A chipset that acts as an interface between the CPU's front-side bus, peripheral buses and the system's main memory.
- Non-volatile memory chips which normally contains the firmware of system or BIOS
- A clock generator in order to synchronize the operations of various components of a system.
- Power connectors, in order to receive power from the computer system's supply and channelize it to various peripherals such as the CPU, chipset, main memory, and expansion cards. Graphics card usually require more power than the capacity of the motherboard, and thus customized connectors are being used to attach the card directly to the power supply.

C. *Projector*

A projector is an optical device that projects an image into a surface, commonly a projection screen. Through a small transparent lens most projectors create an image by shining a light, but some newer types of projectors can project the image directly, by using lasers. It uses the air as a medium for projecting the image. The light which comes out of the lens hits the air the air as small molecules, and light gets reflected and it will be visible for human eye.

III. BLOCK DIAGRAM

The block diagram of the proposed system is as shown in figure 1.

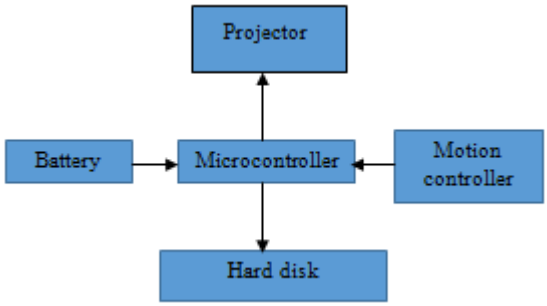

Fig 1. Block diagram of the proposed system

IV. WORKING

The projector and motion sensor will be connected to the motherboard which is the heart of the proposed system.

The power connections will be provided to the motherboard through the SMPS, motion sensor is used instead of keyboard and projector instead of desktop, the motherboard will be installed with the software which is developed to perform high end mathematical operations.

When the motion sensor is on it generates a hemisphere of 1m around it as shown in figure 2, this will be virtual which can't be seen, it will be having two r regions namely touch region and active region. The touch region is the main region where most of the work will be done, it is used for zooming, picking, closing and all the 10 fingers of the hands can be used to operate this region.

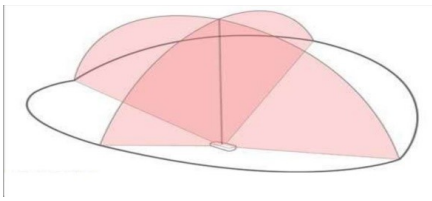

Fig 2. Hemisphere of motion controller

When the finger touches the layer shown in figure 3, the touched area will have change in voltage, this change is sent to the controller, the installed software in the controller converters the change in voltage to an understandable language to perform the required operation. This will be displayed on the projector, the projector uses air as medium for displaying instead of using some physical medium.

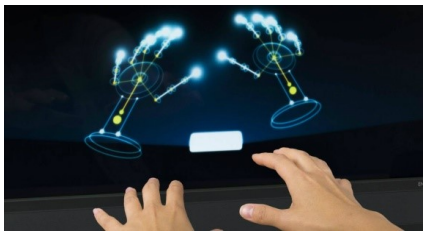

Fig 3. Fingers touching the layer

A. *Advantages*

- Consumes Less space
- Easy to creating and manipulating 3D models
- Value proposition
- More accurate, cheaper and high resolution
- It is portable, and can be used in any situation

V. APPLICATIONS

A. *Gaming*

- More intuitive compared to mouse or even touch screens. Great accuracy and high responsiveness.

B. *Robotics*

- Self-navigate
- Mimic human movement

C. *Music and video*

- Electronic music
- Playing or learning instrument
- Flexible to create and edit videos

D. *Art and design*

- Offers better ergonomics compared to mouse
- More intuitive 3D interface
- Greater accuracy and responsiveness

VI. CONCLUSION

The idea of smart touch computers can be implemented for various applications like Gaming, Robotics, Music and video and art design. This reduces the uses of a separate display screen and provides a more interactive environment in various fields of study such as music, art, robotics and many other applications.

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