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Virtual Reality Based Home Appliances

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Abstract: *Virtual Reality (VR), sometimes referred to as immersive multimedia, is a computer-simulated environment that can simulate physical presence in places in real world or imagined world. Most current virtual reality environments are primarily empirical experiences, displayed either on a computer screen or with special stereoscopic displays, and some regulated simulations include additional sensory information and emphasize real sound through speakers or headphones targeted towards witnesses. Some advanced, haptic systems now include tactile information Virtual Projection can turn almost any surface into a dynamic video display. A projection device is a form of input device whereby the image of a virtual key is projected onto a surface. It involves the use of a laser interference, diffraction light intensity recording and suitable illumination of the recording. In a proposed system we are using virtual based display images. Light traces a human where we need and then projected through light source. Key is pressed and then picture is captured by wireless camera, Image is processed in matlab and perform a corresponding task.*

Keywords: *Ips,Keil C,Matlab,Proteous, Projection,Virtual Reality.*

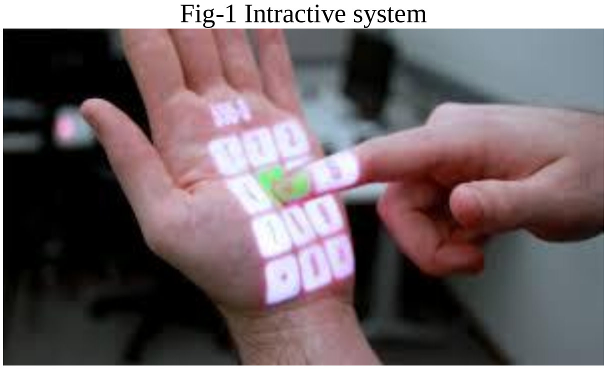
I. INTRODUCTION

Image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it.Image processing usually refers to digital image processing, but optical and analog image processing also are possible. This article is about general techniques that apply to all of them. The acquisition of images (producing the input image in the first place) is referred to as imaging.An interactive whiteboard (IWB), is a large interactive display that connects to a computer. A projector projects the computer's desktop onto the board's surface where users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand. They are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work groups, in training rooms for professional sports coaching, in broadcasting studios, and others

II. INTERACTIVE SYSTEM

An interactive whiteboard (IWB),(fig-1) is a large interactive display that connects to a computer. A projector projects the computer's desktop onto the board's surface where users control the computer using a pen, finger, stylus, or other device. The board is typically mounted to a wall or floor stand. They are used in a variety of settings, including classrooms at all levels of education, in corporate board rooms and work groups, in training rooms for professional sports coaching, in broadcasting studios, and others.

Fig-1 Intractive system



III. RELATED WORKS

Shadow Puppets: Supporting Collocated Interaction with Mobile Projector Phones Using Hand Shadows, Lisa G. Cowan, Kevin A. Li,Pico projectors attached to mobile phones allow users to view phone content using a large display. However, to provide input to projector phones, users have to look at the device, diverting their attention from the projected image. Additionally, other collocated users have no way of interacting with the device. Sharing information displayed on a mobile device's small screen with collocated people can be difficult. Pico projectors make it easier for mobile phone users to share visual information with those around them using a projected image, which can be much larger than the device's screen. However, current commodity projector phones only support input via the handset's user interface. As a result, users must look at the handset to interact with the phone's buttons or touch screen, dividing attention between the handset and the projected display. This context switching can distract presenters and viewers from ongoing conversations taking place around the projected display. Additionally, viewers may find it difficult to interpret what the presenter is doing as he interacts with the handset, and they have no way of interacting with the system themselves.

High-Accuracy Stereo Depth Maps Using Structured Light, Daniel Scharstein, Richard SzeliskiThe Recent progress in stereo algorithm performance is quickly outpacing the ability of existing stereo data sets to discriminate among the best-performing algorithms, motivating the need for more challenging scenes with accurate ground truth information. This paper describes a method for acquiring high-complexity stereo image pairs with pixel-accurate correspondence information using structured light. Unlike traditional range-sensing approaches, our method does not require the calibration of the light sources and yields registered disparity maps between all pairs of cameras and illumination projectors. We present new stereo data sets acquired with our method and demonstrate their suitability for stereo algorithm evaluation. We use structured light to uniquely label each pixel in a set of acquired images, so that correspondence becomes (mostly) trivial, and dense pixel-accurate correspondences can be automatically produced to act as ground-truth data. Structured-light techniques rely on projecting one or more special light patterns onto a scene, usually in order to directly acquire a range map of the scene, typically using a single camera and a single projector. Random light patterns have sometimes been used to provide artificial texture to stereo-based range sensing systems. Another approach is to register range data with stereo image pairs, but the range data is usually of lower resolution than the images, and the fields of view may not correspond exactly, leading to areas of the image for which no range data is available.

Skin put: Appropriating the Body as an Input Surface, Chris Harrison, Desney Tan, and Dan Morris,Skin put, a technology that appropriates the human body for acoustic transmission, allowing the skin to be used as an input surface. In particular, we resolve the location of finger taps on the arm and hand by analyzing mechanical vibrations that propagate through the body. We collect these signals using a novel array of sensors worn as an armband. Appropriating the human body as an input device is appealing not only because we have roughly two square meters of external surface area, but also because much of it is easily accessible by our hands (e.g., arms, upper legs, torso). Furthermore, proprioception – our sense of how our body is configured in three-dimensional space – allows us to accurately interact with our bodies in an eyes-free manner. For example, we can readily flick each of our fingers, touch the tip of our nose, and clap our hands together without visual assistance. Few external input devices can claim this accurate, eyes-free input characteristic and provide such a large interaction area. This approach provides an always available, naturally portable, and on-body finger input system. We assess the capabilities, accuracy and limitations of our technique through a two-part, twenty-participant user study. To further illustrate the utility of our approach, we conclude with several proof-of-concept applications we developed.

Bonfire: A Nomadic System for Hybrid Laptop-Tabletop Interaction, S. K. Kane, D. Avrahami, J. O. Wobbrock, B. Harrison, A. D. Rea, M. Philipose, and A. LaMarca.projectors to project an interactive display space to either side of a laptop keyboard. Coupled with each micro-projector is a camera to enable hand gesture tracking, object recognition, and information transfer within the projected space. Thus, Bonfire is neither a pure laptop system nor a pure tabletop system, but an integration of the two into one new nomadic computing platform. This integration (1) enables observing the periphery and responding appropriately, e.g., to the casual placement of objects within its field of view, (2) enables integration between physical and digital objects via computer vision, (3) provides a horizontal surface in tandem with the usual vertical laptop display, allowing direct pointing and gestures, and (4) enlarges the input/output space to enrich existing applications. Bonfire attempts to combine the advantages of the laptop's screen, keyboard, and computing power with the natural input, extended space, and object-awareness of projected and perceived peripheral displays. Bonfire provides a large interaction space without significantly increasing the laptop's size and weight, as with recent multi-display laptops. We describe Bonfire's architecture, and offer scenarios that highlight Bonfire's advantages. We also include lessons learned and insights for further development and use.

PlayAnywhere: A Compact Interactive Tabletop Projection-Vision System, Andrew D. WilsonPlayAnywhere, a front-projected computer vision-based interactive table system which uses a new commercially available projection technology to obtain a compact, self-contained form factor. Play Anywhere's configuration addresses installation, calibration, and portability issues that are typical of most vision-based table systems, and thereby is particularly motivated in consumer applications. PlayAnywhere also makes a number of contributions related to image processing techniques for front-projected vision-based table systems, including a shadow-based touch detection algorithm, a fast, simple visual bar code scheme tailored to projection-vision table systems, the ability to continuously track sheets of paper, and an optical flow-based algorithm for the manipulation of onscreen objects that does not rely on fragile tracking algorithms.

IV. Existing System

USE OF MULTIPLE CAMERAS

In the existing system we are using multiple cameras to obtain the relative position between the fingertip and the projected surface. A pico-projector can be used to significantly increase the limited screen size of the mobile devices. With the development of the projection technology, we believe that embedded projectors in the mobile phones will be very common, and people will enjoy a way of displaying digital contents on everyday surfaces. Meanwhile, the interactions (e.g., touch, gesture) on the projected display are thought to be appealing. To achieve the touch interaction, the biggest challenge lies in how to determine whether the fingers touch the projected surface or not.

TRACKING HANDS AND FINGERTIPS

Real time hand recognition and fingertip tracking is achieved by a vision-based method, which is summarized as follows. It is assumed that hands are the only naked skin regions in the view of a camera (we require that users wear long sleeve shirts, and the camera is adjusted so that a user's face is not in the view). Hands are segmented from the remainder of a scene using a method proposed. In an environment of frequently changing luminance (as in our lab), instead of RGB color space, the color space is used and histograms of skin and non-skin color distribution are built upon plane.

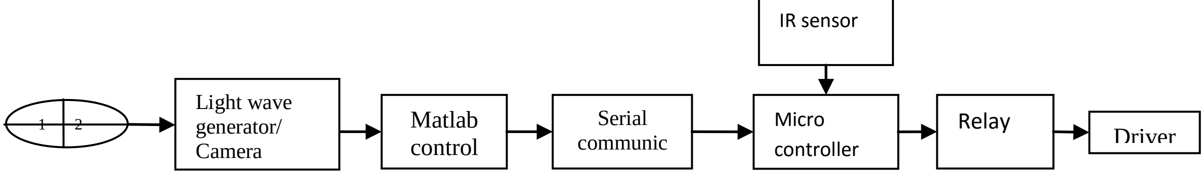
CAMERA MODEL

Camera calibration has been extensively studied over the years. A camera is often described by a pinhole model, with intrinsic parameters including focal length, principle point, pixel skew factor, and pixel size; and extrinsic parameters including rotation and translation from a world coordinate system to a camera coordinate system.

V. Proposed System

One projector and one camera make up a 3-D measurement system. In this field, structured light, which achieves 3-D reconstruction by analyzing a feedback image of a certain pattern projected on the object, is one of the most promising techniques but the computational complexity of 3-D reconstruction is high, which will greatly influence the real-time capability of the system. Therefore, we propose a novel approach that takes advantage of the buttons' distortions caused by the fingers to detect the touch operation on the screen. For example, if a button is clicked by the finger, then the shape of the button will change in the camera's image plane (CIP). Furthermore, we explore the model of the buttons' deformation caused by the finger, which shows that there is a positive relation between the button's distortion and the finger's height to the projected surface. Then the touch information of the finger can be extracted from the button's distortion. Instead of tracking the hand's 2-D position, which is also recognized as a challenging work in computer vision, we focus on detecting the deformation of the buttons to determine the touch action on the projected surface.

VI. Block Diagram



IR SENSOR

An infrared sensor is an electronic device that emits and/or detects infrared radiation in order to sense some aspect of its surroundings. Infrared sensors can measure the heat of an object, as well as detect motion. Many of these types of sensors only measure infrared radiation, rather than emitting it, and thus are known as passive infrared (PIR) sensors.

ATMEL89C51 MICROCONTROLLER:

AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. **ATMEL 89C51** has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times.

SERIAL COMMUNICATION

Serial communication is the process of sending data one bit at a time, sequentially, over a communication channel or computer bus. This is in contrast to parallel communication, where several bits are sent as a whole, on a link with several parallel channels. Many serial communication systems were originally designed to transfer data over relatively large distances through some sort of data cable.The term "serial" most often refers to the RS232 port on the back of the original IBM PC, often called "the" serial port, and "the" serial cable designed to plug into it, and the many devices designed to be compatible with it. Practically all long-distance communication transmits data one bit at a time, rather than in parallel, because it reduces the cost of the cable. The cables that carry this data (other than "the" serial cable) and the computer ports they plug into are usually referred to with a more specific name, to reduce confusion

RELAY

A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".

VII. Conclusion

IPS, an interactive projective system, was proposed that was merely composed of a projector and a mono-camera. Touch interaction on a flat surface was supported by the system. To achieve this goal, we explored the finger's influence on the button's distortion and built a model to describe the button's distortion. We found that there was a significant positive correlation between the button's distortion and the height of a bare finger. Then a novel, fast, and robust approach was proposed to detect the touch action on the surface. It was performed in three stages: 1) mapping by homography and extracting region of interest, 2) distortion detection, and 3) touch judgment. Meanwhile, the button's distortion detection, which was similar to canny edge detection, was robust to the shadows and finger's edge, by comparing the detected edge direction with the button edge's direction. Additionally, the touch detection algorithm was processed on the ROI, so the computation complexity was low, which ensured the real time property of the touch detection.

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