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BLUE EYES SENSOR TECHNOLOGY

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Abstract: - The world of science cannot be measured in terms of development and progress. It shows how far human mind can work and think. It has now reached to the technology known as "Blue eyes sensor technology" that can sense and control human emotions and feelings through gadgets. The eyes, fingers, speech are the elements which help to sense the emotion level of human body. This paper implements a new technique known as Emotion Sensory World of Blue eyes technology which identifies human emotions (sad. happy. Excited or surprised) using image processing techniques by extracting eye portion from the captured image which is then compared with stored images of data base. After identifying mood the songs will be played to make human emotion level normal.

Keywords: Blue eyes sensor technology, human emotions, human body, Emotion Sensory World, image processing.

1. INTRODUCTION

Imagine yourself in a world where humans interact with computers. You are sitting in front of your personal computer that can listen, talk, or even scream aloud. It has the ability to gather information about you and interact with you through special techniques like facial recognition, speech recognition, etc. It can even understand your emotions at the touch of the mouse. It verifies your identity, feels your presents, and starts interacting with you. You ask the computer to dial to your friend at his office. It realizes the urgency of the situation through the mouse, dials your friend at his office, and establishes a connection. The BLUE EYES sensor technology aims at creating computational machines that have perceptual and sensory ability like those of human beings. Employing most modern video cameras and microphones to identify the user' sanctions through the use of imparted sensory abilities. The machine can understand what a user wants, where he is looking at, and even realize his physical or emotional states. The U.S. computer giant, IBM has been conducting research on the Blue Eyes technology at its Alma den Research Center (ARC) in San Jose, Cal if, since 1997. The ARC is IBMs main laboratory for basic research. The primary objective of the research is to give a computer the ability of the human being to assess a situation by using the senses of sight, hearing and touch. Animal survival depends on highly developed sensory abilities. Likewise, human cognition depends on highly developed abilities to perceive, integrate, and interpret visual, auditory, and touch information. Without a doubt, computers would be much more powerful if they had even a small fraction of the perceptual ability of animals or humans. Adding such perceptual abilities to computers would enable computers and humans to work together more as partners. Toward this end, the Blue Eyes project aims at creating computational devices with the sort of perceptual abilities that people take for granted. Thus Blue eyes are the technology to make computers sense and understand human behavior and feelings and react in the proper ways.

Figure 1: Blue Eyes Sensor Technology

2. TECHNOLOGIES USED

1. Emotion Mouse

This is the mouse embedded with sensors that can sense the physiological attributes such as temperature, Body pressure, pulse rate, and touching style, etc. The computer can determine the user's emotional states by a single touch. IBM is still Performing research on this mouse and will be available in the market within the next two or three years. The expected accuracy is 75%. One goal of human computer interaction (HCI) is to make an adaptive, smart computer system.

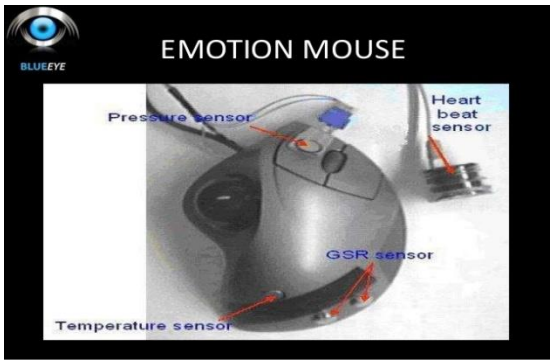

Figure 2: Emotion mouse

2. Magic Pointing

We programmed the two MAGIC pointing techniques on a Windows NT system. The techniques work independently from the applications. The MAGIC pointing program takes data from both the manual input device (of any type, such as a mouse) and the eye tracking system running either on the same machine or on another machine connected via serial port. Raw data from an eye tracker cannot be directly used for gaze based interaction, due to noise from image processing, eye movement jitters, and samples taken during saccade (ballistic eye movement) periods. We experimented with various filtering techniques and found the most effective filter in our case is similar to that .The goal of filter design in general is to make the best compromise between preserving signal bandwidth and eliminating unwanted noise. In the case of eye tracking, as Jacob argued, eye information relevant to interaction lies in the fixations. The key is to select fixation points with minimal delay. Samples collected during a saccade are unwanted and should be avoided. In designing our algorithm for picking points of fixation, we considered our tracking system speed (30 Hz), and that the MAGIC pointing techniques utilize gaze information only once for each new target, probably immediately after a saccade. Our filtering algorithm was designed to pick a fixation with minimum delay by means of selecting two adjacent points over two
Samples.

3. Artificial Intelligence Speech Recognition

It is important to consider the environment in which the speech recognition system has to work. The grammar used by the speaker and accepted by the system, noise level, noise type, position of the microphone, and speed and manner of the user's speech are some factors that may affect the quality of speech recognition. When you dial the telephone number of a big company, you are likely to hear the sonorous voice of a cultured lady who responds to

your call with great courtesy saying "Welcome to company X. Please give me the extension number you want". You pronounce the extension number, your name, and the name of person you want to contact. If the called person accepts the call, the connection is given quickly. This is artificial intelligence where an automatic call-handling system is used without employing any telephone operator.

4. Suitor

The Simple User Interest Tracker (SUITOR) is a revolutionary approach in this direction. By observing the Webpage at bedizen is browsing, the SUITOR can help by fetching more information at his desktop. By simply noticing where the user's eyes focus on the computer screen, the SUITOR can be more precise in determining his topic of interest. The Alma den cognitive scientist who invented SUITOR, "the system presents the latest stock price or business news stories that could affect IBM. If I read the headline off the ticker, it pops up the story in a browser window. If I start to read the story, it adds related stories to the ticker. That the whole idea of an attentive system—one that attends to what you are doing, typing, reading, so that it can attend to your information needs.

5. Eye Movement Sensor

Since the goal of this work is to explore MAGIC pointing as a user interface technique, we started out by purchasing a commercial eye tracker (ASL Model 5000) after a market survey. In comparison to the system reported in early studies. This system is much more compact and reliable. However, we felt that it was still not robust enough for a variety of people with different eye characteristics, such as pupil brightness and correction glasses. We hence chose to develop and use our own eye tracking system [10]. Available commercial systems, such as those made by ISCAN Incorporated, LC Technologies, and Applied Science Laboratories (ASL), rely on a single light source that is positioned either off the camera axis in the case of the ISCANETL-400 systems, or on-axis in the case of the LCT and the ASL E504 systems. Illumination from an off-axis source (or ambient illumination) generates a dark pupil image.

When the light source is placed on-axis with the camera optical axis, the camera is able to detect the light reflected from the interior of the eye, and the image of the pupil appears bright.

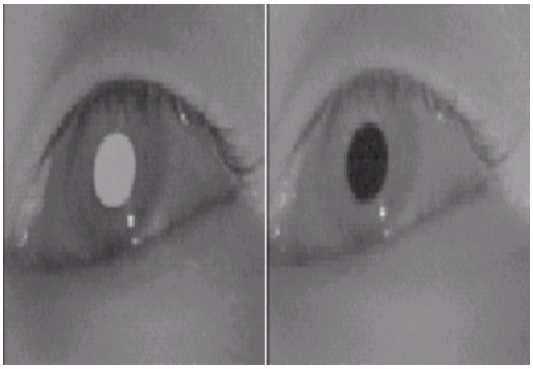

Figure 3: Eye Movement Sensor

Bright (left) and dark (right) pupil images resulting from on- and off-axis illumination. The glints, or corneal reflections, from the on- and off-axis light sources can be easily identified as the bright points in the iris. The Alma den system uses two near infrared (IR) time multiplexed light sources, composed of two sets of IR LED's, which were synchronized with the camera frame rate. One light source is placed very close to the camera's optical axis and is synchronized with the even frames. Odd frames are synchronized with the second light source, positioned off axis. The two light sources are calibrated to provide approximately equivalent whole-scene illumination. Pupil detection is realized by means of subtracting the dark pupil image from the bright pupil image. After thresholding the difference, the largest connected component is identified as the pupil. This technique significantly increases the robustness and reliability of the eye tracking system. After implementing our system with satisfactory results, we Discovered that similar pupil detection schemes had been independently developed by Tomonoetal and Ebisawa and Satoh.

It is unfortunate that such a method has not been used in the commercial systems. We recommend that future eye tracking product designers consider such an approach. Once the pupil has been detected, the corneal reflection (the glint reflected from the surface of the cornea due to one of the light sources) is determined from the dark pupil image. The reflection is then used to estimate the user's point of gaze in terms of the screen coordinates where the user is looking at. The estimation of the user's gaze requires an initial calibration procedure, similar to that required by commercial eye trackers. Our system operates at 30 frames per second on a Pentium II 333 MHz machine running Windows NT. It can work with any PCI frame grabber compatible with Video for Windows.

3. ARCHITECTURE

Blue Eyes - the system developed intended to be the complex solution for monitoring and recording the operator's conscious brain involvement as well as his physiological condition. This required designing a Personal Area Network linking all the operators and the supervising system. As the operator using his sight and hearing senses the state of the controlled system, the supervising system will look after his physiological condition.

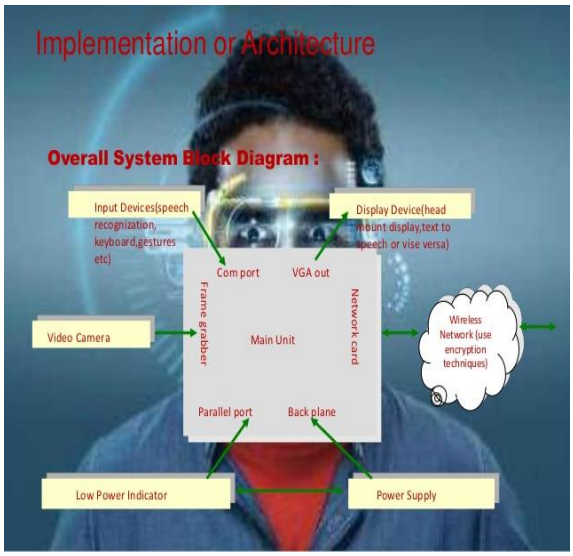

Figure 4: Implementation of Blue Eyes Technology

4. ADVANTAGES

- Prevention from dangerous incidents
- Human-operators physiological condition.

The key features of the system are:

- visual attention monitoring (eye motility analysis)
- physiological condition monitoring (pulse rate, blood oxygenation)
- operator's position detection (standing, lying)
- wireless data acquisition using Bluetooth technology
- real-time user-defined alarm triggering
- physiological data, operator's voice and
- overall view of the control
- room recording
- recorded data playback

Blue Eyes system can be applied in every working environment requiring permanent operator's attention:

- at power plant control rooms

- at captain bridges
- at flight control centers

Data security - This system implies data security which is require in the modern network system.

- Only registered mobile devices can connect to the system
- Bluetooth connection authentication & encryption
- Access rights restrictions
- Personal and physiological data encryption

5. APPLICATIONS

1. One of the main benefits of speech recognition system is that it lets user do other works simultaneously. The user can concentrate on observation and manual operations, and still control the machinery by voice input commands.

2. Engineers at IBM's office: smart tags Research Center in San Jose, CA, report that a number of large retailers have implemented surveillance systems that record and interpret customer movements, using software from Alma den's Blue Eyes research project. Blue Eyes is developing ways for computers to anticipate users' wants by gathering video data on eye movement and facial expression. Your gaze might rest on a Web site heading, for example, and that would prompt your computer to find similar links and to call them up in a new window. But the first practical use for the research turns out to be snooping on shoppers.

3. It can be used in the field of security & controlling, where the contribution of human operator required in whole time.

Figure 5: Mobile Applications

4. Another application would be in the automobile industry. By simply touching a computer input device such as a mouse, the computer system is designed to be able to determine a person's emotional state.

Figure 6: Automobile Industry

5. Another major application of speech processing is in military operations. Voice control of weapons is an example. With reliable speech recognition equipment, pilots can give commands and information to the computers by simply speaking into their microphones—they don't have to use their hands for this purpose.

6. Another good example is a radiologist scanning hundreds of X-rays, ultra sonograms, CT scans and simultaneously dictating conclusions to a speech recognition system connected to word processors. The radiologist can focus his attention on the images rather than writing the text.

7. Voice recognition could also be used on computers for making airline and hotel reservations. A user requires simply stating his needs, to make reservation, cancel a reservation, or making enquiries about schedule.

6. CONCLUSION

The nineties witnessed quantum leaps interface designing for improved man machine interactions. The BLUE EYES SENSOR technology ensures a convenient way of simplifying the life by providing more delicate and user friendly facilities in computing devices. Now that we have proven the method, the next step is to improve the hardware. Instead of using cumbersome modules to gather information about the user, it will be better to use smaller and less intrusive units. The day is not far when this technology will push its way into your house hold, making you more lazy. It may even reach your hand held mobile device. Any way this is only a technological forecast. In future it is possible to create a computer which can interact with us as we interact each other with the use of blue eye technology. It seems to be a fiction, but it will be the life lead by "BLUE EYES" in the very near future. Ordinary household device such as televisions, refrigerators, and ovens -- may be able to do their jobs when we look at them and speak to them.

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