Cerulean Blue Eyes Application
for Determining the Human Sensors

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Abstract- **Blue stands for Bluetooth, which enables reliable wireless communication and the Eyes because the eye movement enables us to obtain a lot of interesting and important information. Is it possible to create a computer, which can interact with us as we interact each other? For example imagine in a fine morning you walk on to your computer room and switch on your computer, and then it tells you "Hey friend, good morning you seem to be a bad mood today. And then it opens your mail box and shows you some of the mails and tries to cheer you. It seems to be a fiction, but it will be the life lead by "BLUE EYES" in the very near future. The basic idea behind this technology is to give the computer the human power. We all have some perceptual abilities. That is we can understand each other's feelings. For example we can understand ones emotional state by analyzing his facial expression. If we add these perceptual abilities of human to computers would enable computers to work together with human beings as intimate partners. The "BLUE EYES" technology aims at creating computational machines that have perceptual hand sensory ability like those of human beings.**
Blue Eyes system consists of a mobile measuring device and a central analytical system. The mobile device is integrated with Bluetooth module providing wireless interface between sensors worn by the operator and the central unit. Human cognition depends primarily on the ability to perceive, interpret, and integrate audio-visuals and sensoring information.

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 asks 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. Human cognition depends primarily on the ability to perceive, interpret, and integrate audio-visuals and sensoring information. Adding extraordinary perceptual abilities to computers would enable computers to work together with human beings as intimate partners. Researchers are attempting to add more capabilities to computers that will allow them to interact like humans, recognize human presents, talk, listen, or even guess their feelings.

The BLUE EYES technology aims at creating computational machines that have perceptual and sensory ability like those of human beings. It uses non-obtrusive sensing method, employing most modern video cameras and microphones to identify the user's actions 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.

DESIGNING

Blue eyes system monitors the status of the operator's visual attention through measurement of saccadic activity. The system checks parameters like heart beat rate and blood oxygenation against abnormal and triggers user defined alarms.

Blue Eyes system consists of a mobile measuring device and a central analytical system. The mobile device is integrated with Bluetooth module providing wireless interface between sensors worn by the operator and the central unit. ID cards assigned to each of the operators and adequate user profiles on the central unit side provide necessary data personalization so the system consists of

➢ Mobile measuring device (DAU)
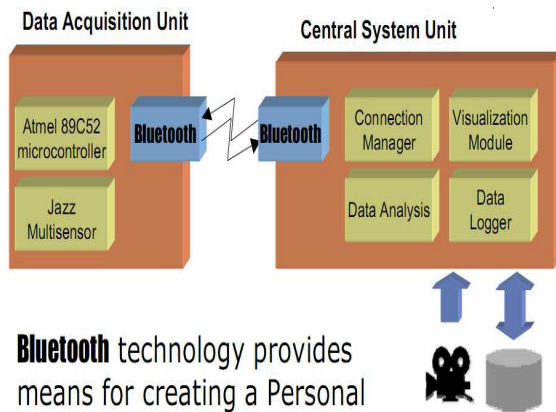➢ Central System Unit (CSU)

SYSTEM DIAGRAM

The overall System diagram is as follows:-
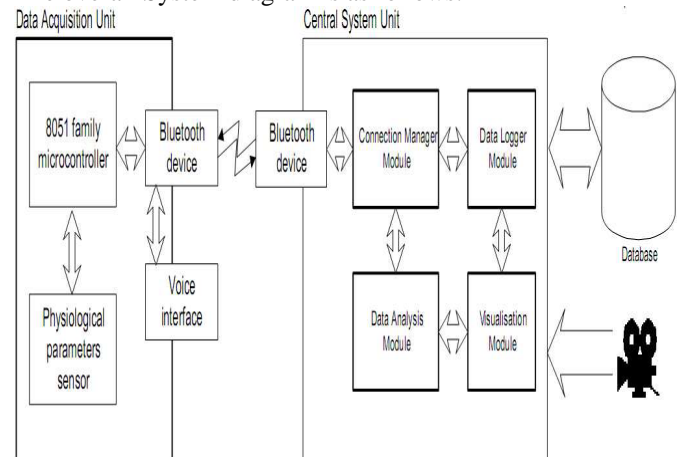
THE HARDWARE
Data Acquisition Unit
Data Acquisition Unit is a mobile part of the Blue eyes system. Its main task is to fetch the physiological data from the sensor and to send it to the central system to be processed. To accomplish the task the device must manage wireless Bluetooth connections (connection establishment, authentication and termination). Personal ID cards and PIN codes provide operator's authorization. Communication with the operator is carried on using a simple 5-key keyboard, a small LCD display and a beeper. When an exceptional situation is detected the device uses them to notify the operator. Voice data is transferred using a small headset, interfaced to the DAU with standard mini-jack plugs.

Bluetooth technology provides means for creating a Personal Area Network linking the operators and the central system.

Central System Unit
Central System Unit hardware is the second peer of the wireless connection. The box contains a Bluetooth module (based on ROK101008) and a PCM codec for voice data transmission. The module is interfaced to a PC using a parallel, serial and USB cable. The audio data is accessible through standard mini-jack sockets. To program operator's personal ID cards we developed a simple programming device. The programmer is interfaced to a PC using serial and PS/2 (power source) ports. Inside, there is Atmel 89C2051 microcontroller, which handles UART transmission and I2C EEPROM (ID card) programming.

THE SOFTWARE
Blue Eyes software's main task is to look after working operators' physiological condition. To assure instant reaction on the operators' condition change the software performs real time buffering of the incoming data, real-time physiological data analysis and alarm triggering.

The Blue Eyes software comprises several functional modules System core facilitates the transfers flow between other system modules (e.g. transfers raw data from the Connection Manager to data analyzers, processed data from the data analyzers to GUI controls, other data analyzers, data logger etc.). The System Core fundamental are single-producer-multi-consumer thread safe queues. Any number of consumers can register to receive the data supplied by a producer. Every single consumer can register at any number of producers, receiving therefore different types of data. Naturally, every consumer may be a producer for other consumers. This approach enables high system scalability – new data processing modules (i.e. filters, data analyzers and loggers) can be easily added by simply registering as a costumer.

TYPES OF EMOTION SENSORS
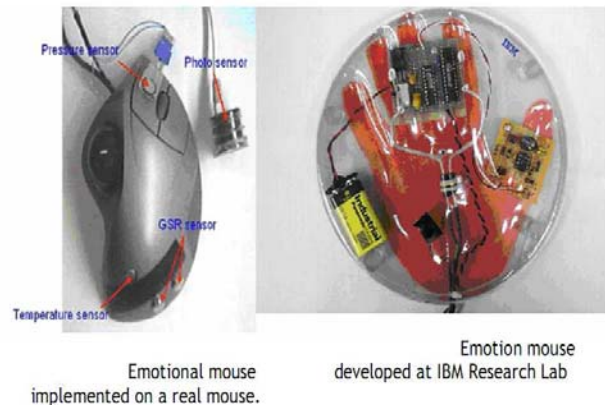
For Hand:
- Emotion Mouse
- Sentic Mouse

For Eyes:
- Expression Glasses
- Magic Pointing
- Eye Tracking

For Voice:
- Artificial Intelligence Speech Recognition.

HAND
Emotion Mouse:

Emotional mouse implemented on a real mouse.

Emotion mouse developed at IBM Research Lab

One proposed, non—invasive method for gaining user information through touch is via a computer input device, the mouse. This then allows the user to relate the cardiac rhythm, the body temperature, electrical conductivity of the skin and other physiological attributes with the mood. This has led to the creation of the "Emotion Mouse".

The device can measure heart rate, temperature, galvanic skin response and minute bodily movements and matches them with six emotional states: happiness, surprise, anger, fear, sadness and disgust. The mouse includes a set of sensors, including infrared detectors and temperature-sensitive chips. These components, User researchers' stress, will also be crafted into other commonly used items such as the office chair, the steering wheel, the keyboard and the phone handle. Integrating the system into the steering wheel, for instance, could allow an alert to be sounded when a driver becomes drowsy.

EYE
Expression Glasses

A wearable device which allows any viewer to visualize the confusion and interest levels of the wearer. Other recent developments in related technology are the attempt to learn the needs of the user just by following the interaction between the user and the computer in order to know what he/she is interested in at any given moment. For example, by remembering the type of websites that the user links to according to the mood and time of the day, the computer could search on related sites and suggest the results the user.

VOICE
Artificial Intelligent 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.

BENEFITS

➢ 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 can verify your identity, feel your presence, and start interacting with you.
➢ The machine can understand what a user wants, where he is looking at, and even realize his physical or emotional states.
➢ It realizes the urgency of the situation through the mouse.
➢ For instance if you ask the computer to dial to your friend at his office, it understands the situation and establishes a connection.

CONCLUSION

Blue Eyes need for a real-time monitoring system for a human operator. The approach is innovative since it helps supervise the operator not the process, as it is in presently available solutions. This system in its commercial release will help avoid potential threats resulting from human errors, such as weariness, oversight, tiredness or temporal indisposition. 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 devices -- 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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