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Blue Eyes -A Human Operator

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Abstract: The world of science cannot be measured in terms of development and technology. It has now reached to the technology known as "Blue eyestechnology". Imagine yourself in a world where humans interact with computers. You are sitting in frontof 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 verifies your identity, feels your present and starts interacting with you. For example, the camera would immediately "sense" your presence andautomatically turn on room lights, television or radio while popping up your favourite internet website on display.

Keywords: *Blue Eyes, Monitoring System*

I. INTRODUCTION

The "BLUE EYES TECHNOLOGY" aims at creating computational machines that have perceptual and sensory ability like those of human beings. This paper aims at specifying the viewing system of blue eyes and also implements the technique known as Emotion Sensory World of Blue Eyes technology which identifies human emotions (ecstatic, depressed, anxious or surprised etc…) using image processing techniques by extracting eye portion from the captured image which is then compared with the stored images ofdata base.

A. What is A Blue Eye?

"Blue" is a term stands for Bluetooth which enablereliable wireless communication and the eyes becauseof the eye movement enables us to obtain a lot of interesting and important information. This required designing a Personal Area Network linking all the operators and the supervising system.

The key features of the system are:

- Visual attention monitoring (eye motility analysis)
- Physiological condition monitoring(pulse rate,blood oxygenation)
- Operators position detection(standing, lying)
- Wireless data acquisition using Bluetoothtechnology
- Real time user-defined alarm triggering
- Physiological data, operators voice and view if thecontrol room recording
- Recorded data playback.

For example, a computer can, on itself, play funny flashanimation feature to entertain "its "master if it notices a sad look on his/her face.

IBM's Alma den Research Centre says...

Blue Eyes seeks attentive computation by integrating perceptual abilities to computers wherein non-obstructive sensing technology such as video cameras and microphones, are used to identify and observe your action. The machine can understand what a user wants, where he is looking at and even realize his physical or emotional states.

B. Why Blue Eyes?

For a long time emotions have been kept out of thedeliberate tools of science; scientists have expressedemotion, but no tools could sense and respond to their affective information. Today human contribution to the overall performance of the system is left unsupervised. Since the system is made to perform automatically, an operator becomes a passive observer of

supervised system which cause drop to awareness. It is possible to measure indirectly the level of the operator's conscious brain involving using eye movement analysis. The wireless link between the sensor worn by the operator and the supervising system offers new way to system overall reliability and safety.

II. SYSTEM OVERVIEW

The "Blue Eyes "system provides technical means for monitoring and recording the operator's basic physiological parameters. The most importantparameter is saccadic activity (saccades are rapid eye jumps to new locations within a visual environmentassigned predominantly by the conscious attention process), which enables the system to monitor the statusof the operator's visual attention along with head acceleration, which accompanies large displacement of the visual axis (saccades larger than 15 degrees).Complex industrial environment can create a danger of exposing the operator to the toxic substances, which can affect his cardiac, circulatory and pulmonary systems. Thus, on the grounds of lethysmographic signal taken from the forehead skin surface, the system computes heart beat rate and blood oxygenation.

fig 1.1

fig 1.2

The BLUE EYES system checks above parameters against abnormal (e.g. a low level of blood oxygenationor a high pulse rate) or undesirable (e.g. a longer periodof lowered visual attention) values and triggers user- defined alarms when necessary. Recording facility seems helpful to reconstruct the course of operator's work and provides data for long-term analysis. The mobile device is integrated with Bluetooth module providing wireless interface between sensors worn by the operator and central init.ID cards assigned to eachof the operators and adequate user profiles on the central unit side provide necessary data personalization so different people can use a single mobile device.

The task of the mobile DAU is to maintain Bluetooth connections, to get information from the sensor andsending it over the wireless connection to deliver the alarm messages from the Central System Unit (CSU) tothe operator and handle personalized ID cards. Central System Unit maintains the other side of the Bluetooth connection, buffers incoming sensor data, performs online data-analysis, records the conclusion for the further exploration ant provides visualization interface.

A. Data Acquisition Unit (DAU):

Data Acquisition Unit is a mobile part of the Blue Eyes System. Its main task is to field physiological data fromthe sensor and to send it to the central system to be processed.to accomplish the task the devices must manage wireless Bluetooth connections (connection establishment, authentication and termination).PersonalID cards and PINCODE provide operators authentication.

Communication with the operator is carried on using simple 5-key keyboard, asmall LCD display and a beeper .When an exceptional situation is detected the device uses them to notify the operation.

Hardware modules of Data Acquisition Unit:

- Atmel 89C52 microcontroller- system core
- Bluetooth module (based on ROK101008)
- HD44780-small LCD display
- 24C16- I2C EEPROM(on a removable ID card)
- MC145483 – 13 bit PCM codec
- Jazz multisensory interface
- Beeper and LCD indicators
- 6 AA batteries and voltage level monitor

Eye movement is measured using direct infraredoculographic transducers. The eye movement is sampledat 1 kHz, the other parameters at 250 Hz. The sensor sends approximately 5, 2 kb of data per second.

ID card interface helps connect the operator's personal identification card to the DAU. After inserting the card,authorization procedure starts. Each ID card is programmed to contain: operator's unique identifier,device access PIN code, the operator enters on insertinghis/her ID card and system access PIN code that is usedon connection authentication. The operator's unique identifier enables the supervising system to distinguish different operators.

B. Central System Unit (CSU):

Central System Unit software is located on the delivered system. In case of larger resource demands; the processing can be distributed among a number of nodes. There are four main CSU modules. They are Connection manager, Data Analysis, Data Logger and Visualization.

C. Connection Manager

Connection manager's main task is to perform low-level Bluetooth communication using host controller interface commands. it is designed to cooperate with all available Bluetooth devices in o0rder to support roaming. Additionally, connection manager authorizes operators, manages their sessions, DE multiplexes and buffers raw physiological data.

The connection manager handles:

- Communication with the CSU hardware
- Searching for the new devices in the coveredrange
- Establishing Bluetooth connections
- Connection authentication
- Incoming data buffering
- Sending alerts

D. Data Analysis Module

The module performs the analysis of the raw sensordata in order to obtain information about the operator's physiological condition. The separately running dataanalysis module supervises each of the working operators. The module consists of a number of smaller analyzers extracting different types of information. Each of the analyser's registers at the approximate operator manager or other analyzers as a data consumer and acting as a producer, provides the results of the analyzers.

E. Data Logger Module

The module provides support for storing the monitored data in order to enable the supervisor to reconstruct and analyze the course of the operator's duty. The module registers as a consumer of the data to be stored in the database. Apart from the raw or processed physiological data, alerts and operators voice are stored.Theraw data is supplied by the related operator manager module; whereas the data analysis module delivers the processed data analysis module delivers theprocessed data. The voice data is delivered by a voice data acquisition module.

F. Visualization Module

It provides user interface for the supervisors. it enable them to watch each of the working operator's physiological condition along with a preview of selected video source and his related sound streams. All the incoming alarm messages are instantly signaled to the supervisor. Moreover, the visualization module can be set in the off-line mode, where all the data is fetched from the database. Watching all recorded physiological parameters, alarms, video and audio data the supervisor is able to reconstruct the course of the selected operator's duty to be set in the off-line mode, where all the data is fetched from the database. Watching all recorded physiological parameters, alarms, video and audio data the supervisor is able to reconstruct the course of the selected operator's duty**.**

APPLICATION

- At power control rooms
- At captain bridges
- At flight control centers
- Professional drivers

CONCLUSION

The BLUE EYES technology ensures a convenient way of simplifying the life by providing more delicate and user friendly facilities in computing devices. The system is developed because of the 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. Instead of using cumbersome module to gather information about the user, it will be better to use smaller and less intrusive units. The ability of our system is to track user head pose over multiple cameras in indoor settings is demonstrated. Several users may be able to perform the tracking under varying lightening conditions very robustly .in addition, present a framework is presented to seamlessly integrate vision- base system with application prototypes to make higher-level inferences about the behaviour.

FUTURE WORKS

At IBM's lab, researches are tackling the lofty goal of designing smarter devices. Following the moment of your eyes, the "gaze-tackling" technology uses MAGIC (Manual Acquisition with Gaze-Initiated Cursor) to control your mouse with MAGIC, the cursor follows your eyes as you look around the screen. When your eyes spots on the object, you click on the mouse to select it.

Researchers found that the hand is quicker than the eye, or at least more accurate, says Morris the research centre director. Also, current versions of the gaze tracking technology only come within an inch or so of its target.

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