

Blue Eyes Technology

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Abstract: *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. The Blue Eyes Technology developed is intended to be a complex solution for monitoring and recording the operator's conscious brain involvement as well as his/her physiological condition. This shows yet another development in the field of Brain Computer Interface. 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 one's emotional state by analysing 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 and sensory ability like those of human beings. This paper discusses the concept of blue eyes technology.*

Keywords: Blue eyes technology, Bluetooth, reorganization, emotion, visual reality, human interaction, communication, technology, Information Procurement component

I. INTRODUCTION

The blue eyes technology works on Artificial Intelligence. It aims to give human abilities to a computer. Blue eyes technology aims at creating a computer that has the abilities to understand the perceptual powers of the human being by recognizing their facial expressions and react accordingly to them 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 presence, 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. Human cognition depends primarily on the ability to perceive, interpret, and integrate audio-visuals and censoring 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 with humans, recognize human presents, talk, listen, or even guess their feelings.



Figure 1: Blue Eye

Blue Eyes system consists of a mobile measuring device called Data Acquisition Unit (DAU) and a central analytical system called Central System Unit (CSU) interconnected by Bluetooth. DAU collects information from the sensor and sends it over the Bluetooth and delivers the messages sent from CSU to the operator. CSU buffers incoming sensor data and provides visualization interface. The basic idea behind Blue Eyes Technology is to give computer the human power i.e. 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.

II. TECHNIQUES OF BLUE EYES TECHNOLOGY

Emotional Mouse: It acquires physiological information and passionate state, for example, heartbeat, pressure, temperature and so forth through the pinch of the client on mouse where various sensors, (for example, pressure sensor, heartbeat sensor, GSR sensor, temperature sensor) are sent inside it. At that point, it decides the character of the client.

1. Manual And Gage Input Cascading (Magic Pointing): A webcam is utilized to rapidly decide the gleams and understudies of the client under factor and practical lightning conditions and wrap the cursor to each new object client looks at. At that point, the client assumes responsibility for the objective by hand close to the objective or overlooks it and quest for next one.
2. Artificial Intelligent Speech Recognition: The client addresses the PC through mouthpiece and that discourse get shifted and put away in RAM. The info words are examined and coordinated against the inside put away words. Example coordinating is intended to search for the best fit in view of varieties in tumult, pitch, recurrence distinction, time hole, and so on. The recognizable proof makes some move be made.

III. THE ETYMOLOGY OF THE BLUE EYES

Blue in this term 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. As the idea is to monitor and record operator's basic physiological parameters, the most important physiological activity is the movement of eyes. For a computer to sense the eye movement, wiring between the operator and the system is required. But, this is a serious limitation of the operator's mobility and disables his operations in large control rooms. So utilization of wireless technology becomes essential which can be implemented through Bluetooth technology. Paul Ekman's facial expression work gave the correlation between a person's emotional state and a person's physiological measurements, which described Facial Action Coding System (Ekman and Rosenberg, 1997). His experiment involved participants attached to devices to record certain measurements including pulse, galvanic skin response (GSR), temperature and somatic movement.

IV. EXPERIMENT

The experiment involves devices attached to participants to record certain measurements including pulse, galvanic skin response (GSR), temperature and somatic movement. Six participants were trained to exhibit the facial expressions of the six basic emotions, anger, fear, sadness, disgust, joy and surprise. The physiological changes associated with affect were assessed and analyzed. Because of our need to incorporate these measurements into a small, non-intrusive form, we will explore taking these measurements from the hand, which requires an emotional sensor such as a mouse.

V. RESULTS

The first analysis used multidimensional scaling (MDS) procedure to determine the dimensionality of the data and suggested that the physiological similarities and dissimilarities of the six emotional states fit within a four-dimensional model. In the second analysis, discriminant function analysis was used to determine the mathematic function that would distinguish the six emotional states which suggested that all four physiological variables are sufficient to distinguish the six states.

VI. NEED FOR THE BLUE EYES TECHNOLOGY

- Human error is still one of the most frequent causes of catastrophes (calamity) and ecological disasters because the human contribution to the overall performance of the system is left unsupervised.
- The control instruments within the machine have automated it to large extent, thus Human operator becomes a passive observer of the supervised system, resulting in weariness and vigilance drop, but the user needs to be active.
- The user may not notice important changes of indications causing financial or ecological consequences, which is a threat to human life. Thus, it is crucial that operators brain is involved in an active system supervising over the whole work time period.

VII. BENEFITS OF THE BLUE EYES TECHNOLOGY

Blue Eyes system provides technical means for monitoring and recording human operators physiological condition

1. Visual attention monitoring (eye motility analysis)
2. Physiological condition monitoring (pulse rate, blood oxygenation), operator's position detection (standing, lying)
3. 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:

1. At power plant control rooms
2. Flight control centers
3. Professional drivers

VIII. PARTS IN BLUE EYES TECHNOLOGY

Blue eyes technology consists of-

1. Mobile measuring device (or) Information Procurement component (IPC).
2. Vital Scheme Component (VSC).

8.1 System Overview

"BLUE EYES" system provides technical means for monitoring and recording the operator's basic physiological parameters. The most important parameter is saccadic activity¹, which enables the system to monitor the status of 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 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. The BLUE EYES system checks above parameters against abnormal (e.g. a low level of blood oxygenation or a high pulse rate) or undesirable (e.g. a longer period of lowered visual attention) values and triggers user-defined alarms when necessary. Quite often in an emergency situation operators speak to themselves expressing their surprise or stating verbally the problem. Therefore, the operator's voice, physiological parameters and an overall view of the operating room are recorded. This helps to reconstruct the course of operators' work and provides data for long-term analysis. This 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.

8.2 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.

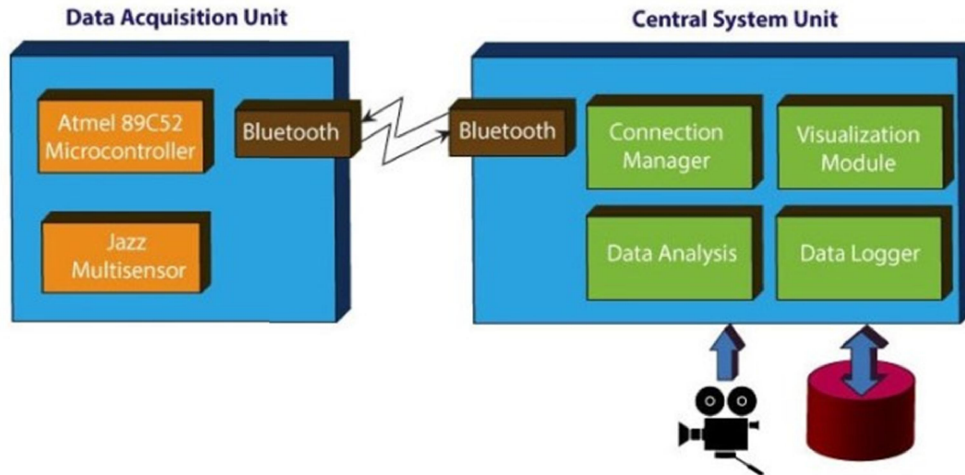


Figure 2: Block Diagram of Blue Eye Technology

- 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-producermulti-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 customer. Connection Manager is responsible for managing the wireless communication between the mobile Data Acquisition Units and the central system. The Connection Manager handles communication with the CSU hardware searching for new devices in the covered range establishing Bluetooth connections connection authentication incoming data buffering sending alerts. Data analysis module performs the analysis of the raw sensor data in order to obtain information about the operator's physiological condition. The separately running Data Analysis module supervises each of the working operators. The module consists of a number of smaller analyzers extracting different types of information. Each of the analyzers registers at the appropriate Operator Manager or another analyzer as a data consumer and, acting as a producer, provides the results of the analysis.

Visualization Module provides a user interface for the supervisors. It enables them to watch each of the working operator's physiological condition along with a preview of selected video source and related sound stream. All the incoming alarm messages are instantly signaled to the supervisor. The Visualization module can be set in an offline mode, where all the data is fetched from the database. Watching all the recorded physiological parameters, alarms, video and audio data the supervisor is able to reconstruct the course of the selected operator's duty.

IX: METHODOLOGY

There are different measures of centrality used in Emotional Sensor:

1. Hand Emotional Sensors
2. Eyes Emotional Sensors
3. Voice Emotional Sensors

9.1 Hand Emotional Sensors

There Are Two Types of Hand Emotional Sensors i.e. Emotional Mouse and Sentic Mouse. Emotional mouse is like common mouse that we use in our normal computers but they have many components that are useful to detect the feeling of the user. These types of mouse include the features like recognising face, gesture, eye tracking etc. It has an adopting mechanism to adapt to different mood to users wish. Comparing to other device in blue eyes technique this emotional mouse has highest performance. It has Brain Computer Interface (BCI). This BCI is useful in making the system smart and adoptive. This emotional mouse can even identify user's fear, happiness, anger, surprise, tired, hate, etc. This can gather information by simple touch by the user, its sense the whole emotion and deliver information according to that users wish. The emotional mouse can also be defined as tracking emotions of the user by simple touch on the mouse and it is an input device to track the emotions of the user. **Sentic mouse** is modified mouse comparing to normal computer and it is also different from emotional mouse. It has some components different from emotional mouse. Its work is also to identify the user's information.

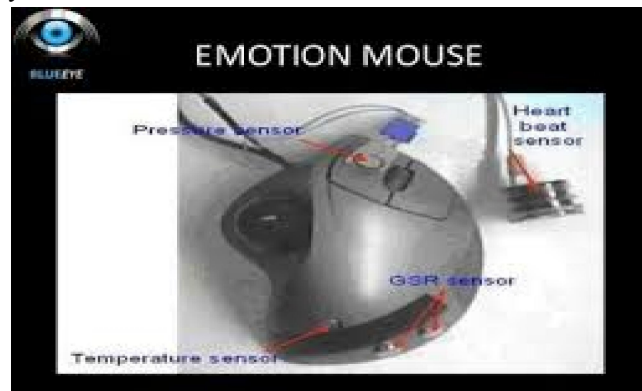


Figure 3: Emotional mouse



Figure 4: Sentic Mouse



9.2 Eyes Emotional Sensors

There are three types in eyes emotional sensors:

1. Expression Glass
 2. Magic Pointing
 3. Eye Tracking
- **Expression Glass:** It is an easy wearable and comfortable device. Any user can try this glass. It will feel like virtual reality glass. The glass will sense the user's interest level and give the information. By sensing the user's expression, information will be given to the user.
 - **Magic Pointing:** Magic pointer deals with the eyes glaze pointing method. This method gives excellent mouse pointing method to the computer. Selecting and controlling the cursor can be manually maintained by glaze tracking mechanism it's also called as magic pointing. Its advantage is it has good accuracy and it has good speed in operations.
 - **Eye Tracking:** When light source hit the eyes that rays from the eyes that reflect to that device, this is called eye tracking.

9.3 Voice Emotional Sensors

For artificial intelligence speech recognition technology is very important. Microphone is considered as input to collect our voice. While using microphone our voice tone, noise level, grammar is very important. Microphone is important of influence the speech recognition system. The manner we speak is very important in this recognition system. It delivers the output based on the users input level. Artificial intelligence has two basic ideas that are: I) the first process involves in the study of human beings. II) Second it deals with collecting that process and representing to machines (E.g.: Robots). Artificial intelligence means machines that perform human's actions or behaviour. It has Natural Language Processing (NLP). It refers to communication with computer with natural language. The main use of Natural Language Processing program is to understand the input and performs action based on that input. The words which are given as input by us are scanned by the computer that matches the information in the system which is internally stored in the system that is called words. In this way a user can communicate with the computer with his language.

X: BLUE EYES APPLICATIONS, CHALLENGES & ADVANTAGES IN REAL LIFE

The Technology can be used in automobiles for simple touch computer device. Electric power stations for sensing the measures of current. Generic control rooms use this technology for sensing.



Figure 5: Application of Blue Eye



Used by flight communication and control purpose for accurate voice transmission. Medical people use this technology for operation. Used in robots and military purpose. Used in household gadgets and control system in our rooms. Used highly in speech recognition. To speak about the blue eyes' technology advantages, it has high accuracy and fast in speed. Compared to other technology there is no need of high physical effort comparing manual level. This technology gives different forms of information. We can make proper and accurate survey in biometrics field. It can recognise figure print and its wheel secured than other technology. It makes less error compared to manual works in technological field. This technology even uses biometrics for accurate results. It's not basically affordable by common people. This technology can assess by well knowledge people. The system and its cost are bulky. There are many health issues in using many devices in blue eyes technology like expression glass and eye tracker. It's really not reliable and makes people addict to this technology.

XI. CONCLUSION

Prevention from dangerous incidents, physiological condition monitoring, operator's position detection and the reconstruction of the course of operator's work are merits of Blue eyes technology. The Blue eyes 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 household, making you lazier. The blue eyes technology meant to be a stress reliever, driven by the advanced technology of studying the facial expressions for judgment of the intensity of stress handled. These new possibilities can cover areas such as industry, transportation, military command centers or operation theaters.

XII. FUTURE ENHANCEMENT

At IBM's lab researchers are tackling the lofty goal of designing smarter devices. Following the movement of your eyes, the "gaze—tracking" 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. In future blue eyes technology helps us to detect our humour easily and can monitor our fitness with the single touch. We can also implement this technology with GPS and it's used to detect our car travelling route. The Technology also support to detect the people condition with reverence to meteorological conditions. We can also implement the technique in house hold electric device, with the help of our vision. It will deeply reduce the space between humans and electronics appliances. We can use in army and security control. In army we can restrict the terrorists by coming in the borders and with the help of biometrics found in the security camera to detect the person at remote spaces. We can provide an advance development plans by using the technique, for this technology the security camera should be connect with the detecting sensors .For security purpose for house we can restrict strangers by entering in our private spaces .When the security camera finds a stranger (mismatch of biometrics) it will give a call to the police and International Journal of Engineering Research & Technology (IJERT) <http://www.ijert.org> ISSN: 2278-0181 IJERTV9IS030048 (This work is licensed under a Creative Commons Attribution 4.0 International License.) Published by : www.ijert.org Vol. 9 Issue 03, March-2020 356 gives an alarm sound to us. While connecting the technique with computer it provides us to work as friend. It can be used in medical field where it detects the patient's physiological mood then giving counselling to them. Using eye movement, we can lock and unlock our details in devices that we use in real time. It has a limitless module involve in this technology where we can find many interesting developments in our real life.

REFERENCES

- [1]. Academia.org. (n.d.). Retrieved from Blue Brain: http://www.academia.edu/23707067/blue_brain.
- [2]. www.wherisdoc.com.
- [3]. www.fixya.com.
- [4]. Y. Matsumoto, T. Ogasawara, and A. Zelinsky. Behavior recognition based on head pose and gaze direction measurement. In IEEE International Conference on Intelligent Robots and Systems, 2000.

- [5]. Ram, S. (2013, January 13th). Retrieved from Blue eye and brain technology: <http://ssivaram.blogspot.co.ke/2013/01/blue-eyetechnology.html?m=1->
- [6]. RenuNagpal, PoojaNagpal, SumeetKaur, "Hybrid Technique for Human Face Emotion Detection", Advanced Computer Science and Applications Vol.1 No6, December 2010.
- [7]. Reddy, K. (2016, June 24). Wise Step. Retrieved from Advantages and Disadvantages of ArtificialIntelligencecontentwisestep.com/advantagesdisadvantages-artificialintelligence.
- [8]. Amir Aly, Adriana Tapus, "Towards an Online Fuzzy Modelling for Human Internal States Detection", 2012, Conference on Control, Automation Robotics and Vision Guangzhou, China ,5- 7th December 2012(ICARCV2012).