A REVIEW ON BLUE EYES TECHNOLOGY: AN ARTIFICIAL INTELLIGENCE

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Abstract - *Visualize a world where humans interact with computers. It sounds to be a hallucination, but it is possible by "BLUE EYES TECHNOLOGY" in the immediate future. The main reason for making Blue eyes technology successful is to make computers observe and records the user's conscious brain and their physiological condition. This technology can understand our emotion at the touch of sensing gadgets; it authenticates one's identity, feels one's presence, starts interacting with them and extracts key information.*

Key Words: **Blue eyes, Bluetooth, emotion computing, , sensory ability**, **Data Acquisition Unit, Emotion Mouse, artificial intelligence, speech recognition**, **SUITOR, Magic Pointing**

1. INTRODUCTION

A society where humans interact with computers having emotion in it is not distant. The BLUE EYES TECHNOLOGY main aim is to create computational machines that have affective and sensory abilities like those of humans. This technology is nothing but a human motion monitoring and an intelligence sensing system. Human understanding relies mainly on the potential to discern, describe, and incorporate audio-visuals and sensing information. Appending exceptional perceptual abilities to computers would make computers to collaborate with human beings to develop integral partnership.

The Blue Eyes innovation has the ability to collect information about you, verify your identity, feels your presents, and communicates with you with the help of technical methods such as eye movement sensor, facial identification, speech identification, etc. Blue eyes system had aimed to be a result that detects and records the user's conscious brain and their physiological condition.

2. LITERATURE OVERVIEW

Blue eyes technology is one of the most popular studies in computer literature because of devices which can identify human activities. Exploration group of IBM at Almaden Research Center (ARC) in San Jose, California paved a way to an innovation of blue eyes since 1997[6]. The prime motto behind blue eyes is to make emotional computers. "Blue" is a word taken from Bluetooth, a standard for the short-range wireless interconnection of cell phones, Computers, and other electronic gadgets and "Eyes" that gives us the vision to acquire vital and virtual information, which have high influence on human.

To identify and comprehend the voice of the user as well as user's interest, one can use artificial intelligent, speech recognition and simple user interest tracker. The machines have to respond with respect to person's emotional status. Technical input device like Emotion Mouse is used to achieve this by taking the inputs respectively. At the point when a computerized reasoning is consolidated to a machine, it does a considerable measure of things and made a work simpler to human. In upcoming days it is predicted to decrease the space between computers and the real world.

3. SYSTEM OVERVIEW

Blue eyes technology framework is a mix of an arrangement of equipment and programming frameworks. In other terms, it is integrated with both hardware and software technology in which the both play vital role.

3.1 Hardware

The two units of Blue eyes System are:
1. Data Acquisition Unit (DAU)
2. Central System Unit (CSU)

A wireless interface is established between sensors worn by the operator and CSU with the help of Bluetooth. Required data personalization is provided by the ID cards that are provided to every operator and by the enough user profiles on the central unit side. The connection between DAU and CSU is established using wireless Bluetooth (Fig.1)
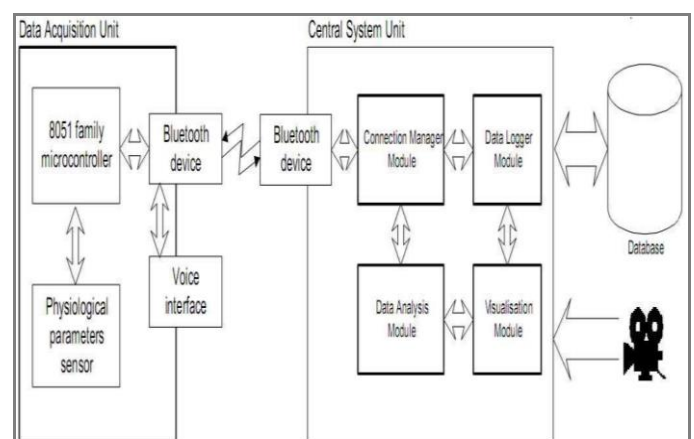

Fig.1 System Overview

3.1.1 Data Acquisition Unit

The Data Acquisition Unit is the movable part of the Blue Eyes system. Its principle work is to get the physiological data through the sensor and to sent to the central system.

The device should administer Bluetooth connections, authentication, and termination to complete the action. Operator's authorization is provided by personal ID cards and PIN codes. Communication with the operator is carried out by using a 5-key keyboard, a LCD display and a beeper. The device utilizes them to alert the operator from the central system when an unusual circumstance is observed. Standard mini-jack plugs are interfaced to the DAU to transfer the voice data with the help of small headset. Various hardware modules present in Data Acquisition Unit are as shown in the Fig.2.
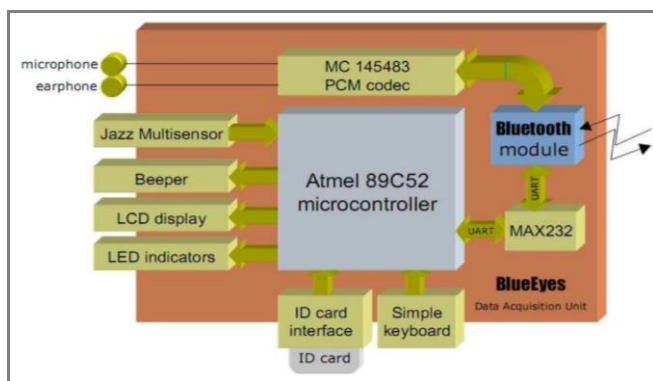

Fig.2 DAU Hardware Components

3.1.2 Central System Unit
The other extreme of the Bluetooth installation is the hardware of Central System Unit. CSU includes a bluetooth module and a PCM codec in a box to transmit the voice data. With the help of serial, parallel and USB cable CSU module is connected. Audio data is accessible by the means of mini-jack sockets. To program operator's personal ID cards a programming device is used. The programmer is connected to a PC using serial and PS/2 (power source) ports. Atmel 89C2051 microcontroller deals with the UART transmission and I2C EEPROM programming.
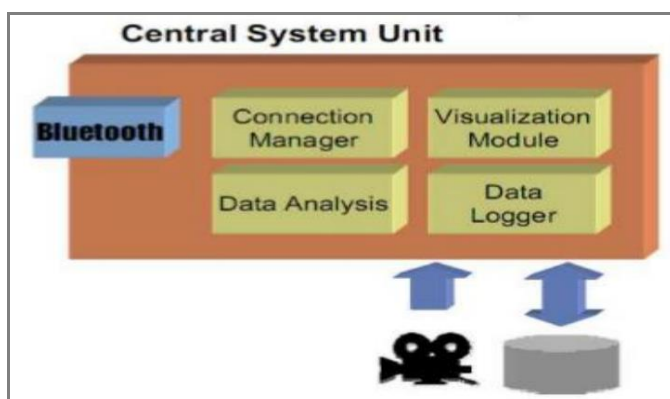

Fig.4 CSU of Blue Eyes

3.2 Software
The blue eyes technology software continuously supervises the physiological condition of the operator. Individual component in the central unit is having its own objective. To maintain the wireless communication with the data acquisition unit, Connection manager is used. It provides the authentication, buffering of data and the alertness among the operators. Data analysis module is used to carry out the analysis of the physiological data from the users to that of the data stored in the database. They are three different analyzers employed in the data analysis module, saccade detector, pulse rate analyzer, and custom analyzers. At last, the data visualization module facilitates user supervisor interface module. The role of this data visualization module is to fetch the data from the databases and also all other data including physiological data. The Visualization module can be set in an off-line mode. All the analyzed data is stored for further processing in the Data logger.

4. EMOTION COMPUTING

4.1 Theory
Detecting an emotion is the major step to make a computer system adaptive. In 1997, Rosalind Picard explained the reasons why emotions are essential for computing. The two main features of emotion computing: providing the computer the capability to identify emotions and providing the computer the capability to express emotions. According to Paul Ekman's facial expression work users connected to devices to record certain measurements such as physiological information and emotional status such as pressure, pulse, heart rate, skin temperature, etc by the touch of user on mouse where various sensors like GSR sensor, heart rate sensor, pressure sensor, temperature sensor are embedded inside it. Thereafter the personality of the participant is computed. Based on Ekman's conclusions during:

- Surprise : The eyebrows are up lifted and curved
- Happiness: The eyes are observed to be unstrained and relaxed.
- Sadness : The eyebrows come together with the inner corners raised and the outer corners lowered ; the eyes look glossy;
- Anger :   The forehead is pulled down and inward; the sclera is not seen in the eyes

4.2 Emotional Sensors

4.2.1 For Hand- Emotion Mouse:
In Blue Eyes, the computer poses the potential to recognize the minute changes in the emotional state of human. For suppose, a user may use the keyboard briskly or gently based on his mental status like in angry, sadness or in happiness. This Blue Eyes technology makes the computers to identify these minimal emotional changes of human beings just through a touch on the key board or mouse. The computers starts to respond to the users based on these emotional states. Smart devices like "Emotion Mouse" can be utilized to accomplish this.

The Emotion Mouse is built to evaluate and interpret the user's emotions like disgust, surprise, fear, anger, happiness, sadness, etc. whenever the user interacts with the computer. The primary purpose of the Emotion Mouse is to collect the user's physical and physiological data with a single touch.
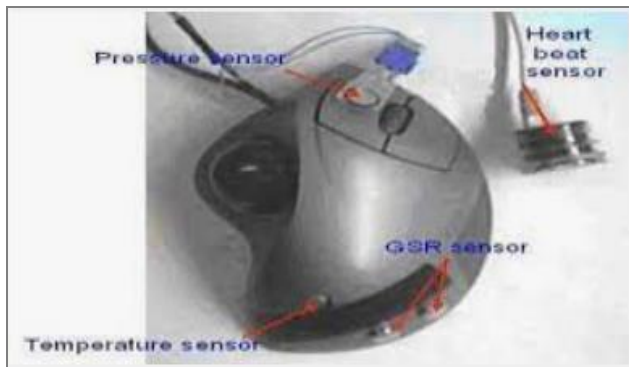

Fig.4 Emotion Mouse

4.2.2 For Eyes- Expression Glasses:

Expression Glasses provides a wearable "appliance-based" which can be used in face recognition systems. These glasses identify facial muscle motions, and use pattern recognition to recognize relevant expressions like interest or confusion. A model of such glasses have been developed and examined. The model makes use of piezoelectric sensors masked in a visor extension, allowing for anonymity, compactness, and user control.

Fig.5 Expression Glasses

4.2.3 Manual and Gaze Input Cascading (Magic Pointing)

The methods of Eye gaze tracking introduce a special approach for controlling "eye gaze" for interfacing man and machine. There are numerous disadvantages associated with the methods of traditional eye gaze tracking. A different approach termed as MAGIC-Manual and Gaze Input Cascaded or Manual Acquisition with Gaze Initiated Cursor pointing is used to avoid such difficult methods. To decrease the amplitude of cursor motion necessary for selecting the target, MAGIC pointing makes use of "eye gaze" to point the previous position of the curser to the locality of the target, especially to the location where the user was focusing at.

Under inconsistent and real lightning conditions a webcam is utilized to immediately interpret the glints and pupils of the user and point the cursor to each new object that the user looks at. Then the users have the ultimate right on the target by moving their hand near the target or they can ignore it and search for new one. The two methods of MAGIC Pointing are conventional and wide ranging regarding cursor placement and target identification. An eye tracker unit is used to outline, analyze and execute them. Various methods involved in MAGIC pointing include continuous looking, eye blinking etc. are used for selecting the target object. Sometime the target will not be selected in case a user does not look at a specific target continuously for a preset threshold value. Therefore there may be a possibility of false selections.

4.2.3 Artificial Intelligent Speech Identification

For speech recognition system to work its surrounding plays a crucial role. Few elements that might vary the quality of speech recognition include position of the microphone, noise type, noise level, speed and manner of the user's speech and the kind of vocabulary used by the user and recognized by the system. The user uses a microphone to interact with the computer which gets filtered. As the number of filters increases, the probability of accurate recognition also increases. The output of the filter is then given to the ADC to convert the analogue signal into digital word and process the words.

Each and every word is translated into its binary equivalent and is placed in RAM. The operation of searching is performed by the computer and then the binary input pattern is compared with the templates. Later the words spelt by the user are scanned and matched with the internally stored words. Because of various changes in pitch, loudness, time gap, frequency difference, etc pattern matching is built to find the best fit. If a best match is found, the word is interpreted and displayed on the screen or other activity is performed.

4.2.4 Simple User Interest Tracker (SUITOR)

According to Myron Flickner, a manager in Almaden's USER group the question "Can we exploit nonverbal cues to create more effective user interfaces?" forms the bases for IBM's Blue Eyes research project. Flickner and his colleagues developed a new technique named Simple User Interest Tracker (SUITOR) for tracking humans' eye movement and the gaze-tracking technology which is a innovative method for computers to interpret perceptual and sensory skills of the human beings.

The SUITOR enables the ease of fetching more data on the desktop by analyzing and interpreting the webpage that the user is browsing. By identifying the focus of user's eyes on the computer screen SUITOR can provide user's topic of interest more precisely. That is the essential concept of a smart system—one that pays attention to what user is doing, reading, typing, so as to respond to the user if he/she needs any kind of information. Blue eye enabled suitor comes into action whenever a user makes an eye contact and then it

continuously identify users area of interest and starts finding it.

5. FUTURE APPLICATIONS

- With the assistance of this technology, security systems can be controlled where human supervision is constantly required.
- Blue Eyes is useful in Medical diagnosis. It can measure the pulse of the human while operating the system and monitor various activities of the specialists and others in a substantial medical office.
- Banks and retailers can make use of user's emotions for intelligent marketing.
- Pilots can give commands to the computer with the help of microphones rather than using their hands.
- Household devices like refrigerators, televisions, ovens can do their works as we speak to them.
- Blue Eyes will be helpful in education programs, allowing computers to identify students' emotional status(anger, sadness, etc) and convey the information accordingly.
- It can be used in lie detector tests to identify thieves by face recognition.
- A car with an smart computing system could detect whenever a driver seems to be sleepy and suggest them to stop by the road, or it might identify when a stressed-out bike rider is about to break out and alert him to decrease the speed.
- Using this technology in the entertainment field would be more exciting especially to play the games which only need your emotions to play.

6. CONCLUSION

As the technology is prospering the society will soon witness the people working with this technology and will be commonly used in daily household activities. Through Blue eyes technology the computers can become smart and intelligent that it acts as a human being. Blue eye technology paves the way for a simplified life and provides user friendly services where the user can be more productive through a more delicate computer device. It is a very advanced system which avoids possible hazards resulting from human errors varying from weariness, oversight, tiredness, etc.

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