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Overview of Blue Eyes Technology

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ABSTRACT: Imagine a beautiful world, where humans interact with computers. The computer can talk and listen. With the help of a facial recognition systems and speech recognition, computers collect the information from the user and it starts to communicate with them according to their mood variations.

Computer can recognize your emotional levels by a simple touch on the mouse and it can interact with us as an intimate partner. The machine can feel your presence, verify identity and starts to interact. In any urgent situations it will dial and call to our home. If we add these perceptual abilities of human to computers would enable computers to work together with human being [1].It seems to be a fiction, but it will be a life lead by “BLUE EYES” in the very near future to make work easy.

KEYWORDS: Magic Pointing, Emotion Mouse, Data Acquisition Unit, Central System Unit.

I. INTRODUCTION

Blue eyes technology is conducted at its Almaden Research centre (ARC) in its San Jose by the research team of IBM. The aim of the blue eyes technology is to give human power to a computer; so that the machine can communicate naturally with the human beings as we communicate with each other. Blue is normally referred to as Bluetooth, which enables reliable wireless communication eyes. The basic idea behind this technology is to give the computer the human power. Blue eye uses sensing technology to identify a user’s action and to extract key information from it. Pod cars, Pong robots, I pad and smart phones are blue eyes enabled devices.



Fig.1: Blue Eyes

II. METHODS OF ACCOMPLISHING EFFECTIVE COMPUTING

A. Process of giving sensing capacity

Many sensor mechanisms such as ears, eyes and other sensory organs which used blue eyes for human beings to recognize each other and express emotions. It uses voice recognition software, cameras and biometric sensors to understand and respond to the emotional level of a human being. The voice recognition software perceives not only

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what is being spoken but also the tone how it is said. High resolution cameras are used to track the minute facial expression and eye movements. Biometric sensors are used for measuring the body temperature and blood pressure.

B. Detecting human emotions

In blue eyes technology, the machines have the ability to identify them in or variations in the moods of humans. Say a person may strike the mouse hastily or softly depends on the persons mood like whether he is happy or in angry mood. Minor emotional variations of human beings by a single touch on the mouse or keyboard was identified by the machines and the machines started to react with the users according to the emotional levels. This is done with the help of intelligent devices like “emotion mouse”. Along with the simple user interact tracker (SUITOR); emotion mouse and artificial intelligent speech recognition were equipped with these technologies to identify the people’s interest and to understand their speech.

III. PARTS OF BLUE EYES TECHNOLOGY

A. Hardware

The major parts of blue eye system are data acquisition unit and central system unit. Bluetooth connections are maintained by data acquisition unit, by getting the information from the sensor and it is sent over the wireless connection, for handling personalized ID cards and to deliver the alarm messages sent from the central system unit to the operator. The other side of the Bluetooth connection is maintained by central system unit, by performing online data analysis, buffers incoming sensor data.

1. Overview of Blue Eyes System.

The Bluetooth module, which is integrated with the mobile device (DAU), provides a wireless interface between the central system unit and the users having the sensors. PIN codes and ID cards are used for authentication purpose. The device uses a 5-key keyboard, beeper and LCD display for interaction with the operators and if, any unwanted situation occurs, the machine uses these devices to inform the operators. The ‘voice’ information from the user is transferred with the help of a headset, which is interfaced with the DAU using a mini jack plug.

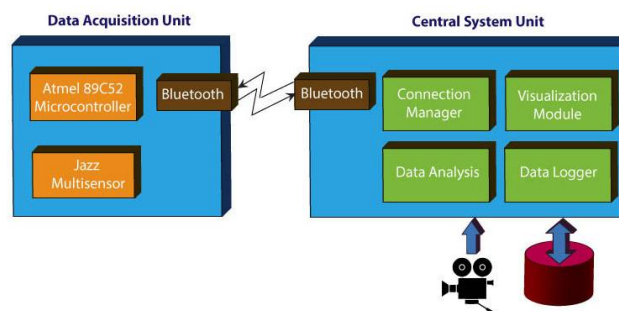


Fig.2: System Overview of DAU-CSU.

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2. Components of Data Acquisition Unit (DAU)

Data acquisition unit is a major part of a blue eyes system. Its main function is to get the physiological data from the sensor and to forward it to the central system unit to be processed. For accomplishing the task the device must have wireless connections like connection establishment, authentication and termination. Personal ID cards and PIN codes are used for operator's authorization. It comprises several hardware modules like Atmel 89c52 microcontroller-system core, Bluetooth module (based on ROK101008), HD44780-small LCD display, 24C16-12CCEEPROM (on a movable ID card), beeper, voltage level monitors and 6AA batteries.

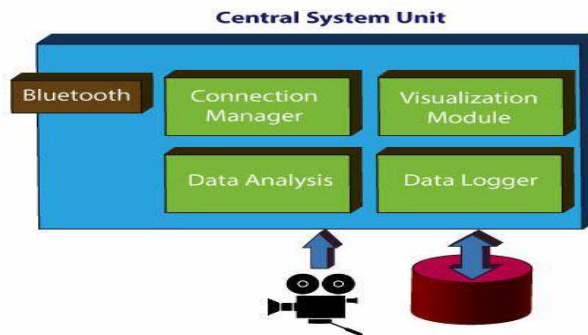


Fig.3: Data Acquisition Unit (DAU).

3. Components of a central System Unit (CSU)

CSU is the next major part of a wireless-network connection in blue eyes technology. It mainly contains a wireless Bluetooth module and a PCM codec which is commonly used for voice information transmission. It is interfaced to a PC using a USB, serial and parallel cable. Audio data is accessed through mini jack socket. The micro controller (Atmel-89C2051) inside the unit handles the 12CCEEPROM-programming and UART transmission.

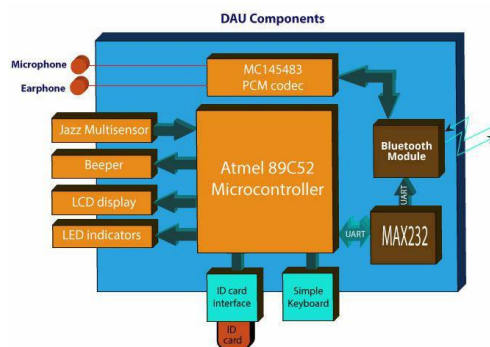


Fig.4: Central System Unit (CSU).

B. Software

The blue eyes software comprises several functional modules. System core facilitates the transfers flow between other system modules. Connection manager is responsible for managing the wireless communication between the data acquisition unit and the central system unit. The connection manager handles sending alerts, connection authentication, establishing Bluetooth connections. Data analysis module analyses the raw sensor data in order to obtain the information related to operator's physiological condition. The module consists of a number of smaller analysers to extract different types of information. The most important analysers are saccade detector, pulse rate

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analyser, custom analysers. User interface for the supervisors is provided by visualization module. It enables a preview of selected video source and related sound stream. The visualization module can be sent in an offline mode, where all the data is fetched from the database.

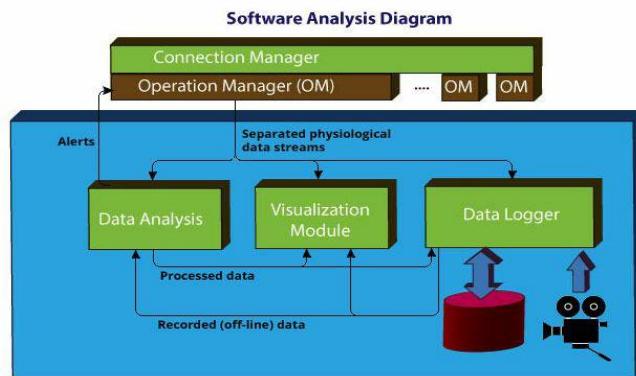


Fig.5: Software Analysis Diagram.

C. Types of Emotional Sensors

1. For Hand-emotion mouse

Emotion mouse is an input device which is used for tracking the emotions of a user by a simple touch on it. Emotion mouse is used to gather the physical information of users by a simple touch. It was designed to evaluate and for identifying the emotions such as surprise, anger, fear etc. People spend approximately 1/3 of their total computer time touching input device. Physiological data is obtained and emotional state is determined. A user model will be built that reflects the personality of user.



Fig.6: Emotion Mouse.

2. For eye-expression glass

It is an alternative for the available machine vision face or eye recognition methods. A wearable device which allows any viewer to visualize the confusion and interest level of the wearer. The prototype used for this glass is piezoelectric sensors.

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Fig.7: Eye-Expression Glass.

3. Simple User Interest Tracker (SUITOR).

It is a revolutionary approach towards the design of machine having the ability to maintain an intimate relationship between the humans and the computers. It has the ability to determine the topic of interest of the users. Help by fetching more information at desktop. It notices where the user's eyes focus on the screen. Fills a scrolling ticker on a computer screen with information related to user's task. For ex: if reading headline, pops up the story in the browser window.

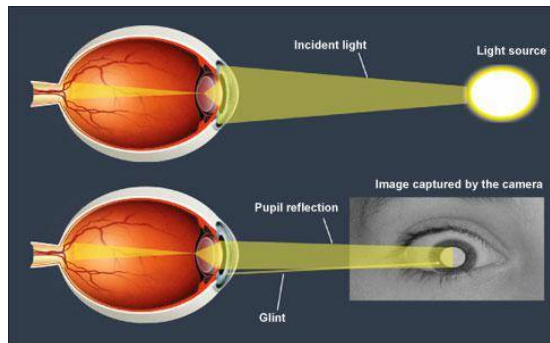


Fig.8: Simple User Interest Tracker (SUITOR).

4. Magic pointing

MAGIC stands for manual and gaze input cascaded. It is the technique of tracking eye movement of the user and to perform the desired operation. The selection and pointing of the cursor is controlled by manual means but also guided by a gaze tracking mechanism and is commonly known as magic pointing. Reduce the cursor movement needed for the target selection. Click on the target with a regular manual input device. Webcam is used to quickly determine the pupils of the user and the glints under variable and realistic lightning conditions. Two magic pointing techniques are liberal and conservative. Advantages are greater accuracy, faster speed of operation [4]

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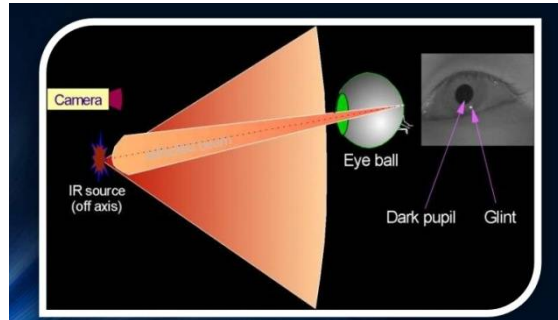


Fig.9: Magic Pointing.

IV. BLUE EYES APPLICATIONS

Blue eyes system provides technical means for monitoring and recording human-operators physiological condition. The key features of the system are:

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

It slows down the fatigue, perfect accuracy every time, large speed, prevention from dangerous incidents. Blue eyes system can be applied in every working, environment requiring permanent operator's attention:

1. At power plant control rooms
2. At captain bridges
3. At flight control centre

❖ Some of the Blue eyes enabled devices are as follows:

1. POD

The first blue eye enabled mass production device was POD, the car manufactured by TOYOTA. It could keep the driver alert and active. It could tell the driver to go slow if he is driving too fast and it could pull over the driver when he feels drowsy. Also it could hear the driver some sort of interesting music when he is getting bored.

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Fig.10: POD

2. PONG

IBM released a robot designed for demonstrating the new technology. The Blue Eyes robot is equipped with a computer capable of analyzing a person's glances and other forms of expressions of feelings, before automatically determining the next type of action. IBM has released a robot called PONG, which is equipped with the Blue Eyes Technology. PONG is capable of perceiving the person standing in front of it, smiles when the person calls his name, and expresses loneliness when it loses sight of the person.



Fig.11: PONG

V. CONCLUSION

As we interact with each other, in future it is possible to create a computer which can interact with us by 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 washing machine, television, ovens and refrigerators may be able to do their jobs when we look at them and speak to them. BLUE EYES technological approach assure a convenient technique, that simplifies the life by supporting more elegant and user friendly provision in computing devices. The day is not so far, that this Blue Eyes technology will be implemented in household devices and makes human being lazier. In future, even this Blue Eyes will reach as your hand held mobile device.



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