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A PATH FOR HORIZING YOUR INNOVATIVE WORK

BLUE EYES TECHNOLOGY

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Abstract: 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. [5]. 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 emotional state by analyzing his facial expression. If we add the 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.

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INTRODUCTION

Blue Eyes technology was developed and successfully testedimplementedby one group of Poznan University of Technology (Poland) recently. It is not commercially applied.[6] 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.[2] The machine can understand what a user wants, where he is looking at, and even realize his physical or emotional states. 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.[5]

IBM Says…

Blue eyes use sensing technologies, such as video cameras and microphones to identify and observe user actions and to extract key information either verbally or gesturely.

2. SYSTEM OVERVIEW

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. [6] 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)

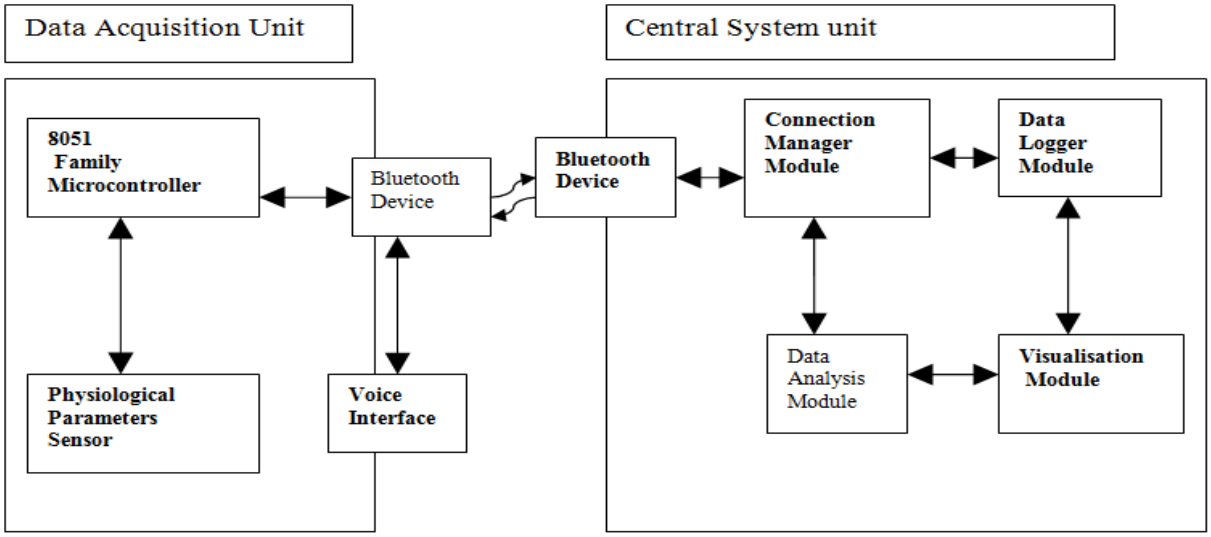

Fig 1. Overall System Diagram

2.1. THE HARDWARE

2.1.1. DATA ACQUISITION UNIT

A. Physiological data sensor

An off-shelf eye movement sensor-JAZZ multi-sensor was used as physiologic data regarding eye position, the level of blood oxygenation. [6]

B. Hardware specification of DAU

Atmel 8952 microcontroller to be the core of the Data Acquisition Unit since it is a well-established industrial standard and provides necessary functionality (i.e. high speed serial port) at a low price. Bluetooth module used in this project supports synchronous voice data transmission (SCO link).

Developers had decided to use hardware PCM codec to transmit operator's voice and central system sound feedback. Codec employed reduces the microcontroller's tasks and lessens the amount of data being sent over the UART.

2.3 CENTRAL SYSTEM UNIT (CSU)

There are four main CSU modules (see fig: system overview): Connection Manager, Data Analysis, Data Logger &Visualization.

2.3.1 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 order to support roaming. Additionally, Connection Manager authorizes operators, manages their sessions demultiplexes and buffers raw physiological data. Unit side provide necessary data personalization so different people can use a single mobile device (DAU – Data Acquisition Unit).The tasks of the mobile Data Acquisition Unit are to maintain Bluetooth connections, to get information from the sensor and sending it over the wireless connection, to deliver the alarm messages sent from the Central System Unit to the 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 conclusions for further exploration and provides visualization interface. The priority of the central unit is to provide real-time buffering of incoming sensor signals and semi-real-time processing of the data, which requires speed optimized filtering and reasoning algorithms. Acceleration along horizontal and vertical axes and ambient light intensity. The eye movement is sampled at 1 kHz, the other parameters at 250 Hz. The sensor sends approximately 5,2kBof data per second. The Bluetooth module performs voice data compression, which results in smaller bandwidth utilization and better sound quality. Communication between the Bluetooth module and the microcontroller is carried on using standard UART interface. MAX232 Level Shifter does the RS232←→TTL voltage level conversion. The alphanumeric LCD display (two 8-character lines) gives more information of incoming events and helps the operator enter PIN code. The LED indicators show the results of built-in self-test, power level and the state of wireless connection. The 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.

2.3.3Data 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 operator's voice are stored. The raw data is supplied by the

related Operator Manager module, whereas the Data Analysis module delivers the processed data. The voice data is delivered by a Voice Data Acquisition module.

2.3.4Visualization Module

The module provides 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 his related sound stream. 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 the recorded physiological parameters, alarms, video and audio data the supervisor is able to reconstruct the course of the selected operator's duty.[2]

3. LIMITATIONS AND FUTURE ASPECTS

The prototype has several limitations, which are not the result of the project deficiency but are rather caused by the constraints imposed by the Project Kit and small budget.

The unique feature of system relies on the possibility of monitoring the operator's higher brain functions involved in the acquisition of the information from the visual environment. The new possibilities can cover such areas as industry, transportation (by air, by road and by sea), military command centers or operating theaters (anesthesiologists). It is intended that the system in its commercial release will help avoid potential threats resulting from human errors, such as weariness, oversight, tiredness.

4. APPLICATIONS

1. Generic control rooms

2. Power station

3. Flight control centers

4. Operating theatres anesthesiologists

5. Common application

6. A simpler system version for drivers

5. CONCLUSION

Human has tremendous expectations from human being's future and present. This tends to research new and helpful technologies which can make the life more comfortable and reliable. This technology is one of them that can make so. Artificial disasters due to consciousness of human brain can be overcome from those accidents.

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