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Wearable Smart Personal Health Care Device

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Abstract: The intention behind this project is to create a wearable consumer friendly health Monitor system. The project enables multiple uses. GSR, heart sensor, EEG, skin temperatures data is taken and processed to give specific output. Electro dermal activity is the skin ‘s response caused by environmental trigger or mental stress. It is measured by GSR sensor (galvanic skin response). Skin temperature and heart beat rate is also measured. Brain activity is measured by EEG. The data is also send to smartphone using internet viaesp8266. The microcontroller used here is atmega328p. RTC module can also be used here to give store time data. This ensures the correct sleep cycle of the user.

I. INTRODUCTION

Currently, people have started becoming more conscious of their health. Due to the change in lifestyles and development in knowledge of the people, they started taking health as a priority. More focus is now being given to their mental health status as well. These can be understood from the growth of fitness industries. Monitoring health (both mental and physical) is a tedious process, especially for patients. Continuous monitoring of health isn’t an affordable or reliable way. So, we are developing a wearable smart health care device which will detect various health parameters of human including brain activity. The data is processed and corresponding output is displayed in the device. This will be useful for patients in the hospitals and also common people can use this device. The device will be useful for patients in hospitals and also common people can use this device. Bystanders can easily monitor the health state, both mental and physical, of their patients with this device. It is can also be useful in detecting earlier signs of meltdown occurring in an autistic person. Numerous health state of a person can be identified using this device. This project uses human computer interaction techniques to assist the people classified as autistic by helping their care givers understand their emotional status via their autonomic data. This open-source project consists of a t-shirt embedded with an electrophoretic (e-ink) display that can display the wearer’s hear rate, skin temperature, and galvanic skin response.

II. LITERATURRE SURVEY

Arduino ATMEGA-328 Microcontroller Hari Sudhan IJIREEICE - Arduino ATMEGA-328 microcontroller has been programmed for various applications. Mainly these Arduino software supports c and c++ programming languages. ATMEGA328 microcontroller, which acts as a processor for the Arduino board. It consists of 6 analog inputs that are shown in the pin diagram. Analog inputs can be represented as PC0 to PC5.

Electronic paper Flexible active-matrix electronic ink display Hill, R. S., Harwood, D. M. & Webb, P.-N. Rev. Palaeobot. Palynol. 94, 11–24 (1996). Ashworth, A. C. & Kuschel, G. Palaeogeogr. Palaeoclimatol. Palaeoecol. 191, 191–202 (2003). Askin, R. A. & Raine, J. J. Terra Antartica 7, 493–501 (2000). Zachos, J. et al. Science 292, 686–693 (2001). .DeConto, R. M. & Pollard, D. Nature 421, 245–249 (2003)-Electronic displays that look like print on paper are of great interest1–4 for application in wearable computer screens, electronic newspapers and smart identity cards. This use of electronic ink technology on such an ultrathin, flexible substrate should greatly extend the range of display applications. Used a 75-mm-thick steel-foil substrate to build the TFT backplane because steel foil is lightweight, mechanically stable and compatible with existing fabrication processes for active-matrix liquid-crystal displays. A typical TFT has a threshold voltage of 4.0 volts and a linear mobility of 0.50 cm2 V11 s.

High wearable EEG based distraction detection in motor rehabilitation Andrea Apicella, Pasquale Arpaia, Mirco Frosolone& Nicola Moccaldi - A method for EEG based distraction detection during motor-rehabilitation tasks is proposed. Different feature extractions from spatial, temporal, and frequency domain and classification strategies were evaluated. The performances of five supervised classifiers in discriminating between attention on pure movement and with distractors were compared. The EEG signal, acquired through eight channels, was filtered through a 12 IIR band-pass Filter Chebyshev type 2 filter bank. Changes in cognitive processes related to attention activate different parts of the brain.

Evaluation of physical health status beyond daily step count usingawearableactivity sensor Zheng Xu 1,2, Nicole Zahradka1,2, Seyvonne Ip1,2, Amir Koneshloo 1,2, Ryan T. Roemmich3,4, Sameep Sehgal5, Kristin B. Highland5 and Peter C. Searson - Wearable activity sensors enable remote monitoring of an individual's physical activity. Comparison of 23 Fit bit-derived metrics (Fig. 8a) revealed that relatively few of the heart rate parameters were strongly correlated with other parameters, suggesting that they measure diverse aspects of health status. Step count, and particularly daily step count, remains the most common metric for remote assessment of physical activity. Using a thresholding approach, we show that many Fit bit metrics result in statistically significant differences in clinical parameters between subgroups, including those associated with physical status, cardiovascular function, pulmonary function, as well as biomarkers from blood tests. These results highlight the fact that daily step count is only one of many metrics that can be derived from activity monitors.

Brain computer interface based smart home control using EEG signal M.H. Masood, Masood Ahmad*, M. Ali Kathia, R.Z.Zafar, A.N. Zahid Department of Electrical Engineering, COMSATS Institute of Information Technology (CIIT), 1.5 km Defence Road, Of Raiwind Road, Lahore – PakistanThe proposed system is used to facilitate the handicapped and needy persons. Neurosky headset isused to detect Electroencephalogram (EEG) signal from brain activity. EEG signals are very low power signals. Pre- processing and signal conditioning on EEG signal are performed in order to improve the signal quality. Using eye blinking feature, user can select and control the desired home appliances like turn on light. BCI based systems can facilitate the disabled person and can take the drastic change in their lives.

III. OBJECTIVE

Main objectives of this work can be illustrated as:

- The intention behind this project is to create a wearable consumer friendly health Monitor system.
- The project enables multiple uses as well. GSR, heart sensor, EEG, skin temperatures data is taken and processed to give specific output.
- To detect Electro dermal activity is the skin's response caused by environmental trigger or mental stress which is measured by GSR sensor (galvanic skin response).
- Skin temperature and heart beat rate is also measured. Brain activity is measured by EEG. The data is also send to smartphone using internet via esp8266.
- The microcontroller used here is atmega328p. With EEG data the amount of time a person sleep can be evaluated.

4.The functional system block diagram is provided in figure

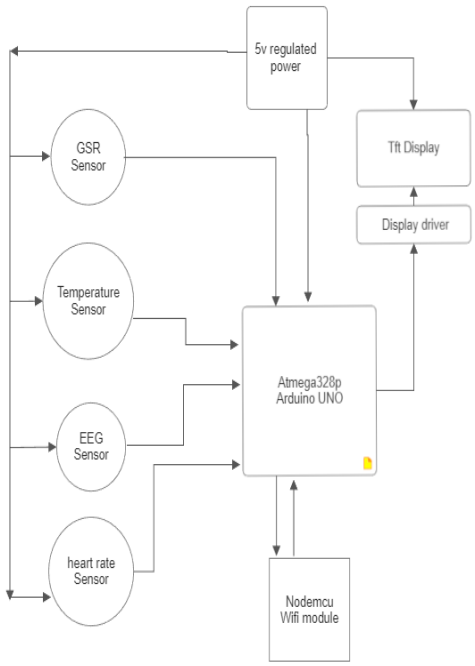

Figure 1: Block Diagram

IV. ADVANTAGES

- Convenient and User friendly as it is a wearable device • Various health state can be identified with this device
- Certain Emotional State of a person can be sensed using this device
- It is a user-friendly device so it can be made to a product
- It doesn't require complex experimental procedures to evaluate the health parameters. Just like plug and play mode.
- Can be used for anyone

V. DISADVANTAGES

- The parameters measured in this device won't provide accurate data as compare to measurement in medical test in lab
- Under certain situations the device might give you false values for example :- During exercise or heavy workout the device might show the health condition as critical or false• Continuous working of these devices for several hours may not be possible due to limitations in battery capacity .
- There will be certain delay in change of the values of the reading.

VI. SCOPE OF THE PROJECT

The demand for wearable technology is growing rapidly. This device can be made as a product and release in markets as the trend for fitness devices are increasing rapidly. ECG sensors can be added in this project. Using Artificial Intelligence and Machine Learning technology this project can be improved in accuracy and precision in monitoring of healthstatus. It can be made more user friendly by using an AI chat bot which frequently chat about the health condition to the user. Using nano sensors instead of this conventional sensor this device can be made more compact as a wearable device.

VII. REFERENCES

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3. https://www.instructables.com/Smart-Cap-1/
4. Electroencephalography Wave patterns