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Recognition of human emotion from body resistance

Ms. Gaikwad Snehal S[1]., Prof.A.B.Jagadale [2]

[1,2] EXTC, SKNSCOE,Pandhapur,Solapur (India)

ABSTRACT

Body resistance is an important parameter. Which is widely used in analysis of mental stress, dehydration detection, total body water content analysis, body composition analysis and lie detection. The various methods like four probe method, two probe methods are used for analysis of body resistance. In this paper body resistance is measured with the help of constant current source method. The proposed system will map human emotions based on variation in body resistance. The proposed system consists of constant current generator, microcontroller based resistance variation detection system and personal computer based graphical user interface. Constant current in terms of few hundreds of micro ampere is allowed to flow through body. The voltage across two test point will be measured. Variation in the body resistance will cause changes in the voltage. This change will measured in different situation and plotted to map human emotions. Graphical user interface will be developed using software programming and analysis tool like MATLAB.

Keywords — ***Body resistance, Heart beat, human emotions.***

I. INTRODUCTION

Human body is conductor of electricity and it has electrical properties similar to other material. Without emotions, life is experienced as having little meaning. Emotionless actions are often related to machines, which execute a sequence of pre-programmed commands. Physical disease may cause mental disorders and mental discomfort may have adverse influence on physical health. EDR(electro dermal responses) is actually the medically preferred term for change of electrical skin resistance due to psychological condition. EDRs are changes in the electrical properties of a person's skin caused by an interaction between environmental events and the individual's psychological state. The change is caused by the degree to which a person's sweat glands are active. Psychological stress tends to make the glands more active and this lowers the skin's resistance. Our physical body and mind are interactive. Physical disease may cause mental disorders and mental discomfort may have adverse influence on physical health.

From the literature survey it has been seen that lot of study is done on physiological pattern and different human emotions. G shivkumar mainly concentrated on the ANS (Autonomous nervous system). Different emotions under some stress are measured by considering the parameter: skin resistance. Jonghawa Kim examine emotions induced by musical clip are recognized via heart rate, musical movement, skin conductivity and respiration changes[1,2].

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II . RELATIVE STUDY OF BODY RESISTANCE AND HUMAN EMOTIONS

2.1 Body resistance

Body resistance is one of important parameter used for psychological and physical analysis of human body. For an instance, men having a lower body resistance than women. The skin resistance is much higher if it is dry. And the skin resistance is much lower if it is wet or burnt. This means that when person is electrocuted in real life, the body resistance is drops as skin is burned. Stress: increased blood flow to skin – low skin resistance-increased conductivity. And for Calm mood : low blood flow to skin - high skin resistance- low conductivity.

2.2 Human emotions

The changes in emotions are measured by considering parameter: Skin resistance ,heart beat ,temperature. For the parameter, we are considering different emotion conditions such as neutral, fear, angry, happy, sad, disgust and surprise. Data is acquired and analyzed separately for adult men, women and child from different ages. Calm mood : low blood flow to skin - high skin resistance- low conductivity. Stress and other emotional states which controlled by the hypothalamus, a region in the brain and the hormones secreted by the Adrenal gland situated on the kidney. Some emotional feelings of human like fear, anxiety etc stimulate hypothalamus which in turn increases adrenaline secretion. That is when resistance decreases, conductivity increases. Normal skin(calm mood) high resistance and low conductivity. When blood flow through skin is increases in skin, blood vessels becomes leaky and water leaks out to form the sweat. When this happen, the resistance of skin decrease to remove water easily[1].

III. TABLE

RESULT FROM OBSERVATION

Video source	Emotion stimulated by movie clip	Theme of the movie clip
Fear files	Fear	Horror film
Snake eat frog	Disgust	Snake eat frog
Funny kids	Happy	cute dancing of kids
Amazing dance	Surprise	Peacock dance
Natsamrat	Sad	Emotional

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IV. METHOD

4.1 Constant current source

To measure body resistance, constant DC current of few microamperes is passed through the body. The voltage drop across the body is measured. The body resistance is obtained from applied constant current and measured voltage across body. In proposed system transistorized constant current source is used to produce current below 1mA as shown in figure.

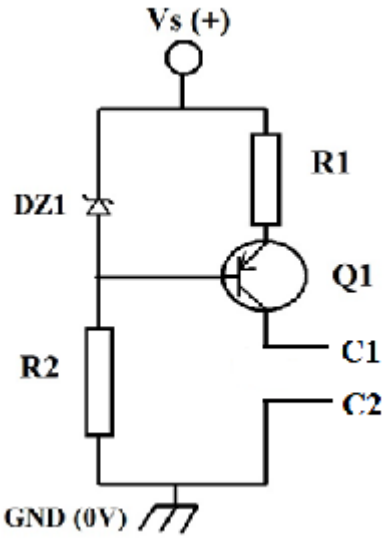

Figure4.1:constant current source generator circuit

The circuit in above figure includes PNP transistor as current amplifier & Zener diode as reference voltage generator. The Zener diode and resister R2 forms Zener as voltage regulator. Even Vcc changes voltage across zener diode remains same. Consider the current loop across zener diode, R_1 and V_{BE} across transistor. In this loop equation Vz and Vbe are constant. Hence the emitter current flowing depends on resistance R1. The value of resistance R1 is adjusted such that emitter current is less than 1mA. As emitter current and collector are same, the current flowing through body will be same as emitter current. Thus the circuit in above figure generates constant current.

$V_Z - I_E R_1 - V_{BE} = 0$

$I_E R_E = V_Z - V_{BE}$

$$I_E = (I_{R2}) = \frac{V_{R1}}{R_1} = \frac{V_Z - V_{BE}}{R_1}$$

4.2 Human body

The constant current from constant current generator is applied to human body under test via current electrodes also called as driving electrodes and voltage across body is measured with the help of voltage electrodes or sensing electrodes.

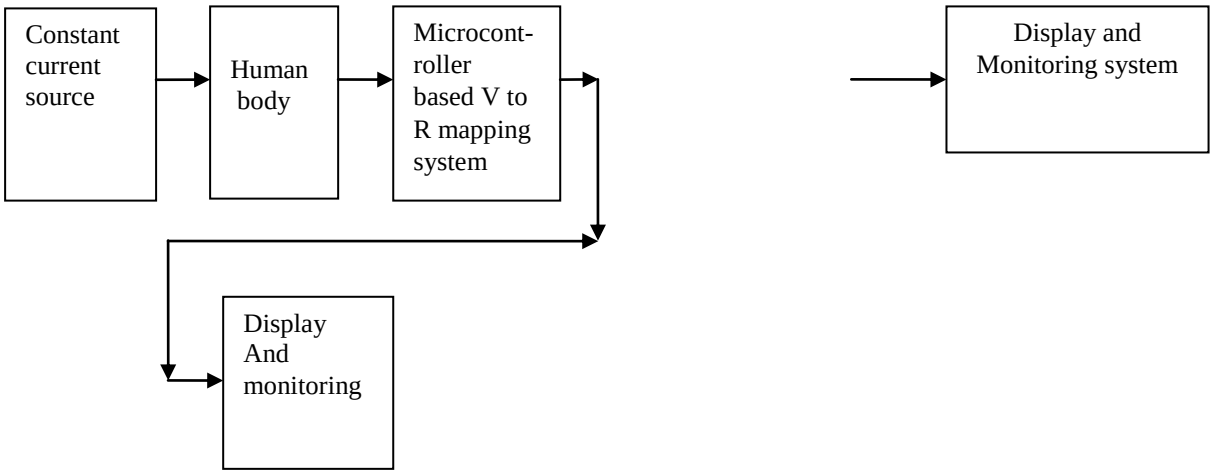

Figure 4.2:block diagram

4.3 Microcontroller based V to R mapping system

The constant current signal is injected in human body by source electrodes, then the voltage drop across the body is taken by sensing electrode and then voltage across human body is given to ADC of microcontroller. This voltage value is mapped to resistance using this mapping system.

4.4 Display and monitoring system

Display and monitoring system consist of microcontroller and GLCD Display unit for user interface. Calculation and estimation of results is done by Display and monitoring system with the help of suitable controller.

V. RESULTS

The changes in human emotions are measured under some stress by considering a parameter: skin resistance, heart beat. Skin resistance is obtained in the terms of both voltage and frequency. For the skin resistance and emotions parameter we are considering different condition such as neutral, happy, fear, disgust. Data is acquired and analyzed

separately for both adult men and women of different background.

Person 1 :Normal condition

Min.	Heart beat	Body resistance
Min1	87	239
Min2	85	231
Min3	79	243
Min4	84	241
Min5	87	239
Min6	85	240
Min7	87	238

Person 1 :Disgust condition

Min.	Heart beat	Body resistance
Min1	95	226
Min2	106	223
Min3	109	220
Min4	80	224
Min5	89	247
Min6	98	218
Min7	85	248

Person 1:Happy condition

Min.	Heart beat	Body resistance
Min1	89	317
Min2	76	308
Min3	82	312
Min4	89	295
Min5	98	298
Min6	89	306
Min7	80	217

Person 1:Fear condition

Min.	Heart beat	Body resistance
Min1	108	481
Min2	79	394
Min3	65	399
Min4	81	410
Min5	87	400
Min6	93	338
Min7	91	389

VII. CONCLUSIONS

The emotions of person are not same at all the time ,it changes according to the time and situations. By the study and analysis we conclude that, it is very easy to identify positive emotions like happiness unlike negative emotions like fear, disgust[1]. As compared to other emotion, it is very difficult to find disgust. But from the observation of skin resistance, heart beat and temperature identification of disgust is possible.

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REFERENCES

[1] P. A. Vijaya and G. Shivakumar," Galvanic Skin Response: A Physiological Sensor System for Affective Computing", International Journal of Machine Learning and Computing, Vol.3,No.1,February 2013.

[2] Tanu Sharma and Bhanu Kapoor," Emotion estimation of physiological signals by using low power embedded system," Conference on Advances in Communication and Control Systems 2013 (CAC2S 2013).

[3] G. Shivakumar and P. A. Vijaya, "Face Recognition System Using Back Propagation Artificial Neural Network," International Journal of Computer Science and Information *Technology*, vol.1, Issue 1,pp.68-77, 2009.

[4] G. Shivakumar, P. A. Vijaya and R. S. Anand, "Emotion Recognition Using Finger Tip Temperature: FirstStep towards an Automatic System," *International Journal of Computer* and Electrical Engineering, Vol. 4, No. 3, June 2012.

[5] Jonghwa Kim," Emotion Recognition Based on Physiological Changes in Music Listening," IEEE Transaction on pattern analysis and machine intelligence,Vol.30,No.12,December 2008.

[6] S. Koelstra," DEAP: A Database for Emotion Analysis using Physiological Signals,"