International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 06 | June 2020 www.irjet.net p-ISSN: 2395-0072

IBLINK: A WEARABLE DEVICE FACILITATING FACIAL PARALYSIS PATIENTS TO BLINK

AKSHAYA N[1], HANILA J[2], HARIKA V[3], Dr. M P CHITRA[4]

[1] *Student, Department of Electronics & Communication Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India*
[2] *Student, Department of Electronics & Communication Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India*
[3] *Student, Department of Electronics & Communication Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India*
[4] *Head of Department, Department of Electronics & Communication Engineering, Panimalar Institute of Technology, Chennai, Tamil Nadu, India*

Abstract - *FACIAL paralysis is a disease making people losing facial movements, which are caused by nerve damages. People suffering from facial paralysis usually have muscles on one side of the face noticeably droop, which seriously impacts the person's quality of life. What is worse, facial paralysis can incur eye damage even blindness, because the eyelid on the affected side cannot fully close, which makes the eye dry and infected by debris. The most common form of facial paralysis is known as Bell's palsy, which impacts 40,000 people in U.S. each year, where the typical symptom is the muscle dysfunction on one side of the face.*

In this paper is proposed raspberry pi based eye blink detecting device for system user. Raspberry pi is containing one USB camera, this camera is used to monitor the person eye blink count. The basic idea of eye Blink is to monitor the normal side of the face with a camera and stimulate the paralyzed side, so that the blink of both sides of the face could become symmetric. Haar cascade algorithm is used to detect particularly eye blink count of user. When the person continuously will not close the eye then controller will check and activate small shocking system in user face. This shocking system is containing small automatic stimulation circuits. This circuit is providing electric impulse to the user face.

1. INTRODUCTION

A system user may experience many physical health problems over using it over a long period of time. In that case, the main issue is, while working on a system for prolonged period he may fail to blink his eyes due to his involvement. If he practices it for a long period of time, there are many chances to be affected with facial paralysis. Facial paralysis is the loss of facial movements due to nerve damage. The facial muscles may appear to droop or become weak. According to the National Institute of Neurological Disorders and Stroke, Bell's palsy is the most common cause of facial paralysis. Every year, around 40,000 Americans experience sudden facial paralysis due to Bell's palsy. This condition causes inflammation of the facial nerve, which commonly causes the muscles on one side of the face to droop. No one knows exactly why Bell's palsy occurs. It may be related to a viral infection of the facial nerve. The good news is that most people with Bell's palsy recover completely in about six months with or without treatment. However there are few cases of Facial paralysis which could not recover. The modern treatments for Bell's Palsy include medication and sometimes surgery, which have tremendous amount of side effects which can affect the person further more.

In this paper we have proposed an innovative solution with raspberry pi based eye blink detecting device for system user. Raspberry pi is containing one USB camera, this camera is used to monitor the person eye blink count. The basic idea of eye Blink is to monitor the normal side of the face with a camera and stimulate the paralyzed side, so that the blink of both sides of the face could become symmetric. Cascade algorithm is used to detect particularly eye blink count of user. When the person continuously will not close the eye then controller will check and activate small shocking system in user face. This shocking system is containing small automatic stimulation circuits. This circuit is providing electric impulse to the user face.

1.1 EXISTING SYSTEM

Since it is sometimes hard to distinguish between a stroke and other causes of facial paralysis, it is a good idea to get your loved one to a doctor quickly if you notice facial paralysis. In this existing system designed and implemented iBlink, a pair of smart glasses to provide eye protection for facial paralysis patients. We have proposed eye-movements detection mechanism based on SVM, which can detect asymmetric eye-movements of patients under various illumination conditions. This existing system has trained data set for checking eye movement.

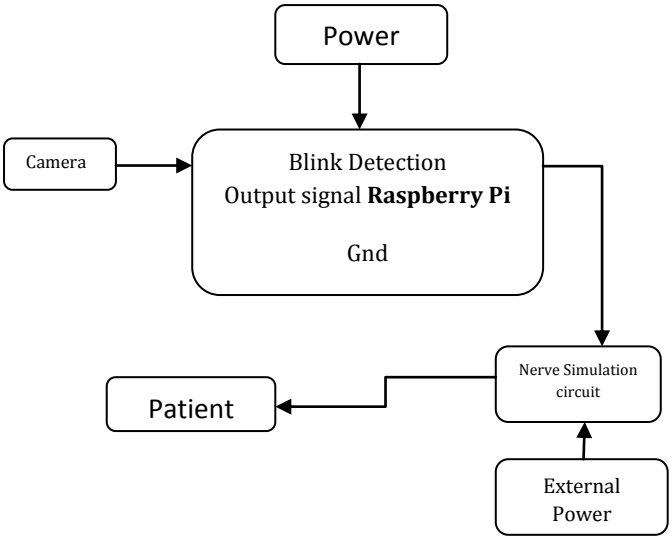
1.2 Disadvantage:

- SVM algorithm takes lot of time to detect eye movement in low level controllers like Raspberry pi. It leads to frequent generation of electric pulses and affects nerves.
- Using trained data set for checking eye movement. If any abnormal movements of eye not trained in data set, system will not stimulate electric pulse.

2. PROPOSED SYSTEM

In the proposed system is used to detect eye blinking count implemented by raspberry pi. This system is used to Haar Cascade algorithm for checking eye movement and also eye count. If the person will not blink the eye system will stimulate the electric pulse in user face.

Block Diagram -1:



Above the block diagram is containing raspberry pi, USB camera, shocking system and power unit. The USB camera is connect to USB port of raspberry pi. Shocking system is connecting to GPIO pin of raspberry pi. Power unit is providing power to device. Haar Cascade algorithm is used to detect eye count of user.

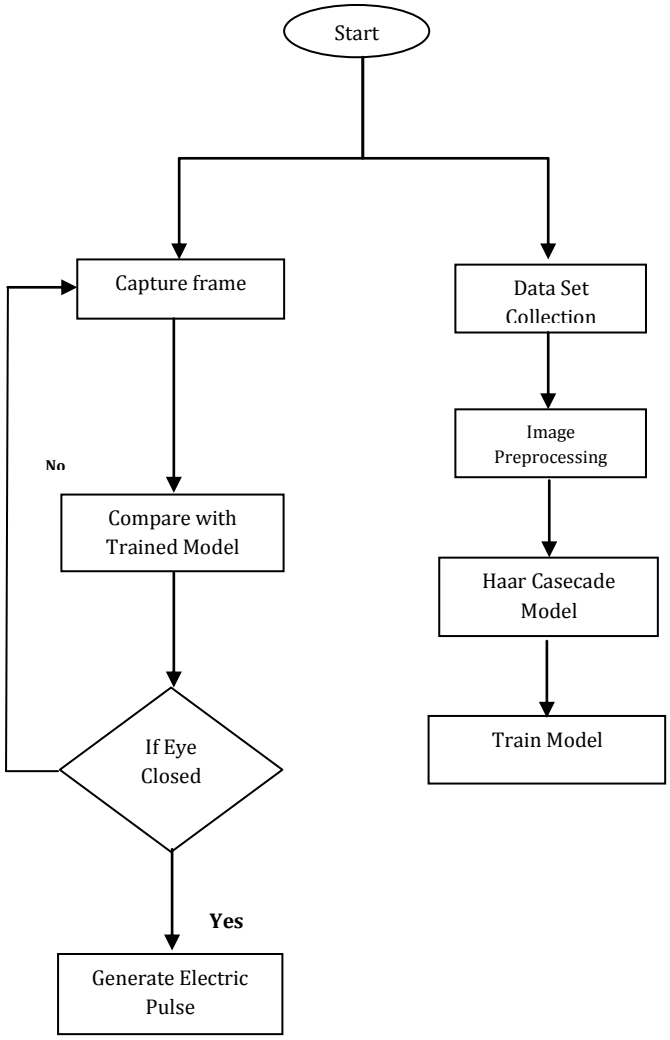
Requirements:

Hardware Requirements:

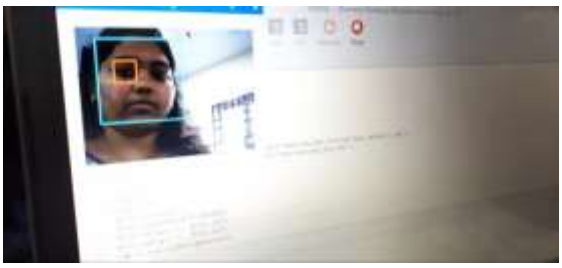
- USB camera
- Raspberry pi
- Electric signal stimulating circuit

Software Requirements:

- Language : Python
- Compiler : GCC Complier.
- OS : Linux



3. RESULT



The eye count is being detected.

The shock is being simulated to the person, which is shown with the help of a LED.

The working system enters the sleep mode when the person fails to blink his eye during the 1st trail.

4. CONCLUSION

This device is developed to prevent the possibility of occurance of facial paralysis to system users.

REFERENCES

[1] Xiaohua Tian, Xuesheng Zheng, Yisheng Ji, Binyao Jiang, Tianyi Wang, Sijie Xiong, Xinbing Wang- IEEE, 2018.
[2]2018,Link: https://en.wikipedia.org/wiki/Electromyography.
[3] Conference: The 15th Annual International Conference, 2017.
Author: Sujie Zhu, Xiaohua Tian, Xuesheng Zheng, Yisheng Ji, Binyao Jiang, Sijie Xiong, Xinbing Wang.
[4] Eye Image Library, 2016, Link:https://www.dropbox.com/s/vgrk4mfkpjmc0jo/EyeData.zip?dl=0
[5]2016,Link: http://wiki.friendlyarm.com/wiki/index.php/NanoPi_S2.
[6] S. M. Sandeep, V. N. Jayprakash, "Effect of electrical stimulation on facial grading system in subjects with early facial palsy", Nat. J. Integr. Res. Med., vol. 4, pp. 29-32, 2013.
[7] U. S. Rao, J. Poll, M. T. Yen, "Prognosis for recovery vital to facial nerve palsy management", Ophthalmology Times, vol. 34, no. 19, pp. 24-26, 2009.
[8] A. K. Das, K. Sabarigirish, R. C. Kashyap, "Facial nerve paralysis: A three year retrospective study", Indian J. Otolaryngology Head Neck Surg., vol. 58, no. 3, pp. 225-228, 2006.
[9] D.Prutchi, M.Norris, Design and Development of Medical Electronic Instruments. A Practical Perspective of the Design Construction and Test of Medical Devices, Hoboken,NJ,USA: Wiley,2005.
[10] H. Kim, S. Kim, Y. Kim, K. Park, "What is Bell's palsy?", Harvard Women's Health Watch, vol. 8, no. 10, 2001.
[11] G. E. Hinton, N. Srivastava, A. Krizhevsky, I. Sutskever, R. R. Salakhutdinov, "Improving neural networks by preventing co-adaptation of feature detectors".