Automatic Control of Wheel Chair using Hand Gestures in Signal Processing

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Abstract

This paper will be discussed about the controlling mechanism for the wheel chair for the physically disabled persons. This paper will mainly focus about the automatic detection of movement in wheel chair and its behavioural pattern. The wheel chair will be controlled by the signals which are propogated by the hand signals of the human being. This paper is decided to implement the novel approach to select the optimal posistion of the electrode. And it will be helpful to the foregoing process.

KeyTerms : *support vector machine algorithm, novel approach, hand gestures*

I. INTRODUCTION

The automatic control of wheel chair was highly convictonary with the signal processing. Because instead of helping the differently abled persons they themselves can able to surivive in this world. This system was proposed to use the novel approach and support vector machine algorithm. The proposed system is supposed to give the new invention in the field of signal processing by using the hand gesture mechanism in the wheel chair automation. This paper were tends to produce many automatic controlling mechanisms. The support vector machine algorithm is the discriminative structure of separating the hyper plane. This SVM algorithm is the supervised learning approach. And it will also use the Novel approach for training pattern evaluation technique in the wheel chair. The wheel chair automation is mainly focused on position controlling mechanism.

II. EXISTING SYSTEM

In the existing system many approaches were followed to automate the wheel chair control mechanism. They use many techniques but they were get eradicated due to some inconvenience in mechanism and also it will not be implemented properly. The physically challenged person cannot able to activate the wheel chair themselves. They need the other persons to help them. Also using only the wheel chairs as such cannot create any communication for them. Also in this system they used wired sensor for the communication but it has only limited range of communication. In the RF transmission if there are any obstacles the transmission rate will become low therefore it is very difficult to communicate. And the signal propagated for the communication will get deviated and the mechanism of controlling the wheelchair will not work properly.

III. PROPOSED METHODOLOGY

The proposed system has to implement the automation of wheel chair using the hand gesture mechanism system. The analog finger movements are controlled automatically and it will capture and it will convert as a digital signal and it will control the movement of wheel chair.

THE PROCESS AND CONTROL OF WHEEL CHAIR

In this process the main aim is to implement the wheel chair mechanism by using the hand gesture. When the user show their hand signal in front of the web camera. The hand signal images and the commands were already stored in the server. When the user shows the signal the web camera will capture the image and it will send a request to the server and it will process it and change the movement of the wheel chair.

Fig 1: Different Hand Gestures

The tilt will be fixed in the wheel chair and it will change the control of wheel chair accordingly. And a MEMS sensor will fix with the finger tip of the physically disabled persons. According to the signal propagated from the MEMS sensor it will communicate with the transmitter and the transmitter will send a request to the server and it will communicate with the tilt and the wheel chair

wirelessly and it tend to move the wheel chair as per the users request.

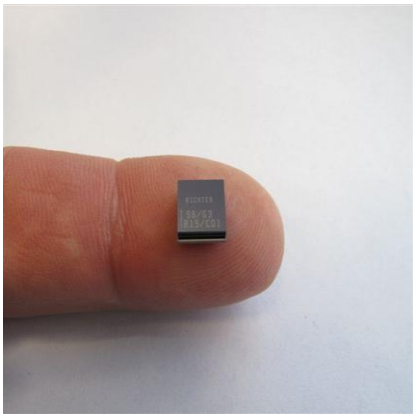

Fig 2: Mems Sensor Attached In The Finger Tip Of Physically Disabled Person

The MEMS sensor will be subjected to produce the 4 components which tend to accelerate the direction of the wheel chair. The DC generator motor is fixed with the wheel chair to move it forward and backward. The dc motor will typically change the electric energy into the mechanical energy that will create an interaction between the conductors and the magnetic fields.

Fig 3: Dc Motor Attached To Wheel Chair

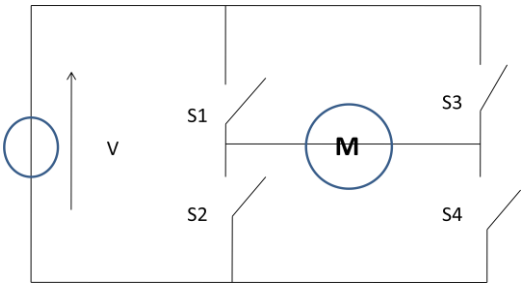

Fig 2: Switching Pattern of Motion Control

The figure explains about the switching mechanism of the motion control system of the wheel chair. When the switches S1 and S4 are opened and the switches S2 and S3 will be closed it will pass the negative voltage to the dc motor therefore the wheel chair remains unchangeable. If the switches S1 and S4 is closed and the switches S2 and S3 are opened it will pass the positive voltage to the dc motor therefore the wheel chair will move as per the control of the MEMS sensor propagated the signal to the transceiver.

S1	S2	S3	S4	RESULT
1	0	0	1	MOVES RIGHT
0	1	1	0	MOVES LEFT
1	0	1	0	MOVES FORWARD
0	1	0	1	MOVES BACKWARD
0	0	0	1	MOTOR IN BREAK CONDITION
1	1	0	0	SHOOT THROUGH

Table 1: Switching Control of Wheel Chair

From the data given in the above table if the switches of S1 and S4 is 1 and the switches from S2 and S3 is 0 the tilt will be move the position of the wheel chair to the right. If the switches S2 and S3 is 1 and the switches S1 and S4 is 0 then the tilt will move the position of the wheel chair to the left. If the switches of S1 and S3 is 1 and the switches of S2 and S4 is 0 then the tilt will move the wheel chair to the forward position. And the switches S2 and S4 is 1 and the S1 and S3 is 0 then the tilt will move the chair to the backward position. If all the other switches are 0, either the switch S1 or S4 will be 1 the will be in the break the tilt will not allow the wheel chair to move further.

In this process each request of the user will be stored in the temporary register. And then it will be processed as per the signal. It will also extend it facility to detect the obstacles which interrupt the signal that are produced from the MEMS sensor. The obstacles can be detected by passing the ultra sonic waves or by infrared rays. The obstacle will be detected from the wave proceeds from the transceiver and it will be reflected back to the receiver. The time taken from the mean time the obstacles will be detected. The arrows on the MEMS sensor will show the location of the accelerometer in the sensitive direction. Using the MEMS sensor in the wireless technology will be give many feasibility such as efficiency of cost generate low power and high performance rate.

Fig 3: Automatic Wheel Chair

IMPLEMENTATION OF SVM IN WHEEL CHAIR AUTOMATION

The support vector machine is a popular method for the binary classification. In this the vectors are the training points and it will not classify with the confidence. It is also used in the machine learning process. And this algorithm is also called as Sequential Minimal Optimization. The SVM algorithm is used in this implementation because it is conceptually simple and it is easy to implement and it was faster in the outcome process. This will be more permeability in the wheel chair controlling mechanism. Using this SVM algorithm the system has to predict the signal which is delivered by the user and it will classify the gesture and it processes the signal to produce the output. This SVM algorithm provide more reliability in this proceedings to implement the controlling mechanism.

This paper will also implement the novel approach to control the motion of the wheel chair and to predict the appropriate data with is depicted by the user through the signal and this process of signal propagation will be done prominently in the wheel chair control mechanism.

IV. CONCLUSION

This paper will provide the solution to the controlling mechanism of automatic wheel chair by propagating the signal using the hand gesture of the physically challenged people. The different gestures will considered as the signals and it will control the wheel chair as per the signal request send by the transceivers. The MEMS sensor is used to propagate the signal properly to the transceivers as per the response of the user.

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