

Intelligent Saw Cutter

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Abstract – The main study is to develop a safety system of wood cutting table saw, which is based on image processing. The safety devices are very essential devices that should be used in industries or workshops, the dangerous meet with such type of accidents while using wood cutter therefore to reduce the risk of occurrence of accident or an injury a safety device is required. So we need to develop a safety device to prevent the operator from the accident. Develop a safety system of wood cutting table saw, which is based on image processing. The safety devices are very essential devices that should be used in industries or workshops, the dangerous meet with such type of accidents while using wood cutter therefore to reduce the risk of occurrence of accident or an injury a safety device is required. So we need to develop a safety device to prevent the operator from the accident.



Key Words: Accidents, injury, image processing, safety device, camera module, saw cutter, workshops.

1. INTRODUCTION

The safety devices are very essential devices that should be used in industries or workshops, the danger meets with such type of accident while using wood cutter. In India commonly 12% people yearly meet with these types of accidents due to their common human behavior's like tiredness, laziness, sleepiness etc. [5] The wood cutter generally table saw is a commonly used tool in every workshop & industries. Although there are a variety of models available in market, all table saws have the same basic design. A flat surface through which a saw blade is attached generally circular in shape. The operator of the saw pushes the item to be cut towards the rapidly cutter blade the current wood cutter system is not enough to work safely. So there is requirement of safety wood cutter system. We introducing a wood cutter safety system by in which an Image processing is used to overcome the accident with the wood cutter. Hand injury is the main injury in table saw [4]. This type of accidents occurs because of adequate amount of safety equipment are not available in saw mill or present technologies are not sufficient to overcome accidents. Therefore there is requirement an advanced wood cutter safety which can minimize the accidents by wood cutter completely. The hand shape in the image is detected. In this process, the input which is an image or a frame can be obtained in camera. This color image is converted into binary image and pre-processed and hand shape is detected using scanning method in MATLAB. This is a simple yet efficient approach.

1.1 SAW STOP

Saws are the most dangerous wood working tool. In the United States, 10 finger amputations by table saws occurrence every day [1]. The operator holds the wood, rather **than** the saw, making it easy to guide fingers into the saw, while guiding the wood.

A suitable saw guard should be placed on the table of the table saw wood cutter to overcome the accidents due to contact of saw blade with human limb or hand able. Now a days blade guards are used on the table to overcome the injury [4].

2. RELATED WORK

The research method for the study include on the spot assessment (S) for injuries in saw mills industries and manuscript (Kevin C.Chung,2013) for the information about the table saw injuries and which safety devices used now a days.

We have taken a survey on some saw mills, which are at indoline furniture Nasik Maharashtra for the information about the no. of accidents occurred by the wood cutter, there are more than 10 wood cutters available for wood cutting purpose and which type of safety devices are used in saw mills. Also we preferred a research paper (P.J. Groot, G.J. Postma) to take the information about the infrared sensor and the International journal (Asim Rashid, Vol.10, No.4, pp.257.301) for some information regarding the disc brake.

Shewta K. yewale and Pankaj K. Bharne published paper on "Hand gesture recognition using different

algorithms based on artificial neural network”, this paper gives an overview of different methods for recognizing the hand gestures using MATLAB. It also gives the working details of recognition process using Edge detection and Skin detection algorithm.

P Raghu Veera Chowdary, M Nagendra Babu, Thadigotla Venkata Subbareddy and Bommepalli Madhava Reddy published paper on “Image Processing Algorithms for Gesture Recognition using MATLAB”. This paper is confined to identification of hand postures and to establish a man-machine interaction. The hand region in the image is detected and the number of active fingers is determined. In this approach, the input which is an image or a frame from a video can be obtained from web camera or high quality camera. This colour image is converted into binary image and pre-processed using scanning method in MATLAB. This is a simple yet efficient approach.

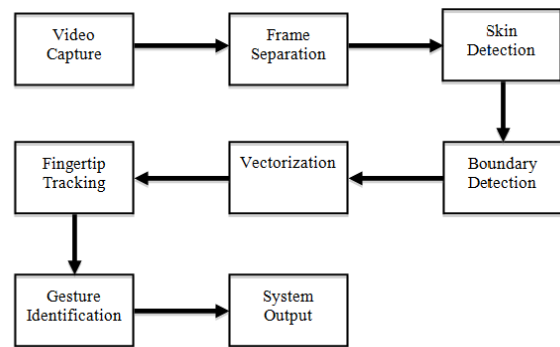
3. PROPOSED METHODOLOGY

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. MATLAB provides the Toolboxes that allow you to learn and apply specialized technology. The recognition of hand gesture using MATLAB is described as follows. We use two algorithms for hand gesture recognition using MATLAB as Skin detection algorithms.

3.1 Skin Detection

Following steps are used for skin detection

- Image capturing using a webcam or the front camera of the mobile phone.
- Converting the captured image into frames.
- Skin colour detection using hue and saturation values of various possible skin tones.
- Storing the boundary of the object in a linear array.
- Vectorization operation performed for every pixel on the boundary.
- Detection of the fingertips.
- Tracking of the fingertips in consecutive frames to determine the motion.
- Identification of the gesture based the motion.
- Insertion of the input stream into the normal input path of the computing device.



Picture courtesy [hand camera]: 3.1 Block Diagram Using Skin Detection Algorithm

4. HARDWARE SPECIFICATION

4.1 Atmega328P:

The ATmega328P is low power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega328P achieves throughputs approach 1MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

The device is manufactured using Atmel’s high density non-volatile memory technology. The

On-chip ISP Flash allows the program memory to be reprogrammed In-System through an SPI serial interface, by a conventional non-volatile memory programmer, or by an On-chip Boot program running on the AVR core. The Boot program can use any interface to download the application program in the Application Flash memory. Software in the Boot Flash section will continue to run while the Application Flash section is updated, providing true Read-While-Write operation. By combining an 8-bit RISC CPU with In-System Self-Programmable Flash on a monolithic chip, the Atmel ATmega48PA/88PA/168PA/328P is a powerful microcontroller that provides a highly flexible and cost effective solution to many embedded control applications.

4.2 LCD Display:

LCD (Liquid Crystal Display) is a 16*2 electronics display used for wide range application. LCD 16*2 display used in various application such as display some information in the form of alphabets and digits. 16*2 LCD display means it shows 16 characters in 2 lines. I.e. per character it display 5*7 pixel matrix. Display circuitry contains two register command and data. Command instruction is used to store the instruction which is given to LCD display. Data register is used to store data which is to be displayed on the LCD 16*2 screen. The data is in the form of ASCII value of the character to be displayed on the LCD.



Fig.4.2. LCD Display

4.3 DC Motor:

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor.



Fig.4.3. DC Motor

5. BLOCK DIAGRAM:

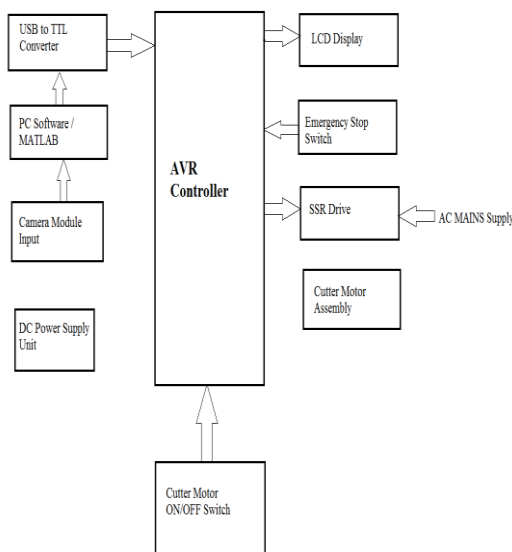


Fig.5. Block Diagram

6. CONCLUSION

We proposed a system which is useful for saw mills and saw industries. This system can be used as fast response system.

The safety system will become more accurate and reliable by taking it under observation of the modified computerized system.

It is observed that saw stop cutter is the appropriate personal protection device which is used to reduce accidents caused due to saw cutter. It is proved safe work environment.

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