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Recognition And Implementation Of Robot With Sixth Sense Using Image Processing Technique

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Abstract –In the modern world, everything are controlled by technology. The advancement in technology leads to a smart way of living by saving time with increased sophistication. The sixth sense technology plays a significant role in the day to day life by satisfying the deeds. To make life simpler and innovative, the sixth sense technology changes the surrounding environments with smarter ideas. Using the sixth sense technology, the electronic devices can be controlled and operated by using hand gestures. There are numerous applications to make lives a fasinating one. The sixth sense robot is develpoed by arduino controller through digital information. The image processing techniques plays a significant role in processing the data and to produce the desired output.

Keywords: Innovation, smarter life, arduino, gestures, sixth sense

I.Introduction

The technology plays a significant role in the advancement and perform versatile functions. These technology enables to reduce the work of human and promote the work with much higher efficiency and accuracy. Image processing is a technique used to perform on images to obtain and extract the information from the image to produce the desired output [1]. It is a type of image processing where the input is given and process them to obtain a desired output the information gathered through the images.

These images gives a exact information regarding the details in the images provided. The image processing is a rapid emerging trends in the field of research and develelopment due to the diverse apllications. The human gesture plays a major role in the movement and functioning of the robot [2]. These gesture helps the robot to free from input parameters by interaction [3].The main purpose of gesture acknowledgment and investigation is to identify a specific human gesture and convey information to the user relating to individual gesture. By using the arduino, the robot is developed by control and instructing the digital information regarding the functions. The gesture includes the

movements of hand such as right and left and movements of legs such as forward and backward movements respectively [4]. These gestures are essential in the analysis and development of the overall functioning of the robot. The digital image processing classifies the input images gestures and preprocess them anf feed to the corresponding functions to move and work accorodingly. These image processing plays a significant role in the functioning of the robotic system [5]. The gestures made by humans are keenly monitored and identifies through the digital image processing and functions accorodingly[6]. This enables to work and inculcate the sixth sense in the technology .

II.Proposed system

The main objective of the proposed system is to obtain a sixth sense robot by providing the machine to function based on human intelligence. This system enables to function by training and testing sequential process. The robot works based on the hand gesture and programmed through arduino UNO. The sensors are used to sense the light and heat around the surrounding environment. This robot functions by moving forward and backward by image processing techniques. The stages of image processing includes the selection of datasets, preprocessing the data to obtain clear dataset, classification and identification, optimization techniques resulted with the desired output.

III.Methodology

The system function based on the image processing technology. It enables by converting the raw data from image into useful information. This technique is done through various stages. This involves the conversion to be done with clean dataset without any noise [7].

The noise in the initial data are neglected and removed through the filters. The various kinds of filter are referred as band pass filter, low pass filter, hing pass filter and band stop filters. These filters helps to produce a clean data by reducing noise and harmonics [8]. The various stages of the images processing initiates with preprocessing the datas to the prediction with original data with removal of noise to obtain the desired output. It is allowed to contain a camera which records and holds the motion around the environment. The images obtained and captured and informations can be obtained through the image processing techniques [9]. They are connected to the coding devices and the gestures are the input instructions to the robot to function accorodingly. Figure 1 represents the stages of image processing.

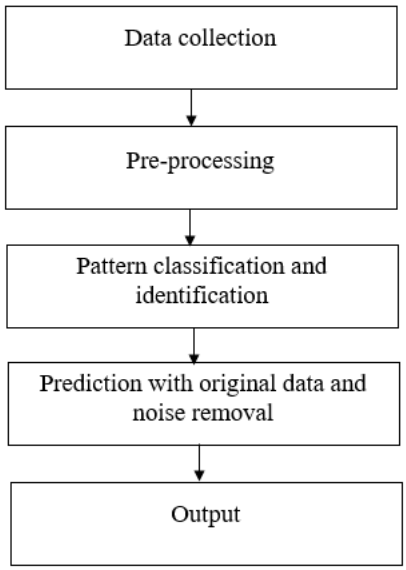

Fig 1: Stages of image processing

The camera captures the image and gesture of the hand and send for processing the image and obtain the information through them. This image processing starts initially with the collection of data as a basic source [10]. The processed image is then forwarded as the output to obtain the desired functions. The image processing is shown in figure 2 with real time demonstration using hand gesture.

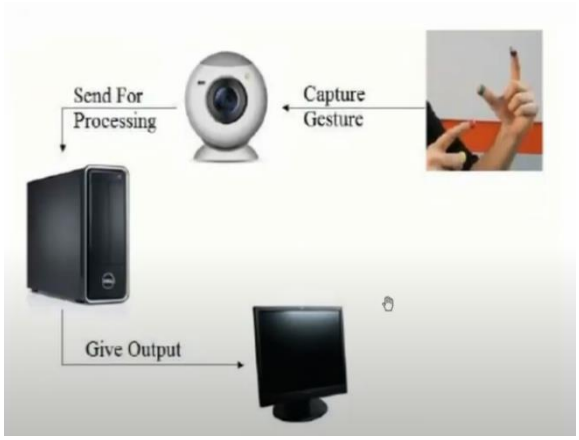

Fig 2 : Image processing

Arduino UNO

Arduino Uno is a microcontroller which is an open source electronic board with 14 digital input output pins. The arduino language is inspired by the arduino language and can be enabled with the new version of Processing IDE (Integrated development environment) [11]. The major components of the arduino board are USB connector, power port, microcontroller, analog input pins, digital pins, reset switch, crystal oscillator, USB interface chip and TXRX LED's. This sensor is used to detect the vibrations, motion sensor respectively. The accelerometer, water sensor, fire and gas sensor are connected to the

arduino UNO microprocessor [12]. The figure 3 demonstrates the arduino UNO microcontroller as shown below.

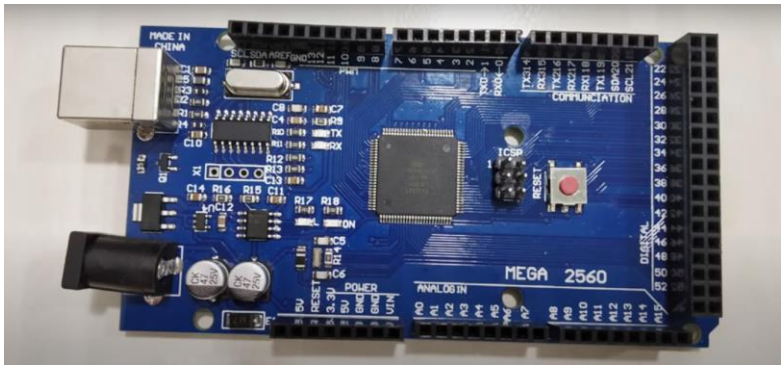

Fig 3 : Arduino UNO

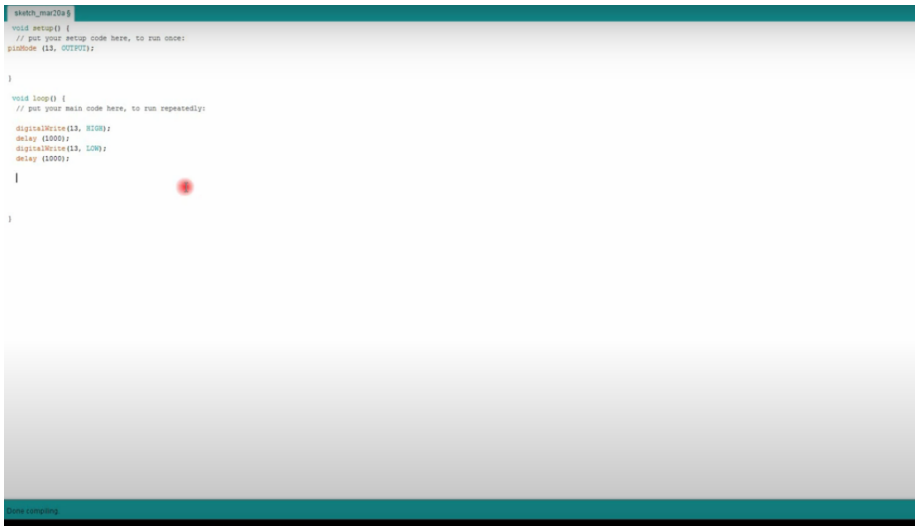

Fig 4: Programming code for arduino UNO

The figure 4 represents the programming code for the arduino UNO through the LCD display for interfacing. This program code enables to function based on the hand gesture resulting from right and left along with the forward and backward motions [13]. The open source IDE assistances to write code and upload on the board. The values are shown in arduino using LCD display unit. The arduino is adjustable based on the hand gesture with the predefined values [14].

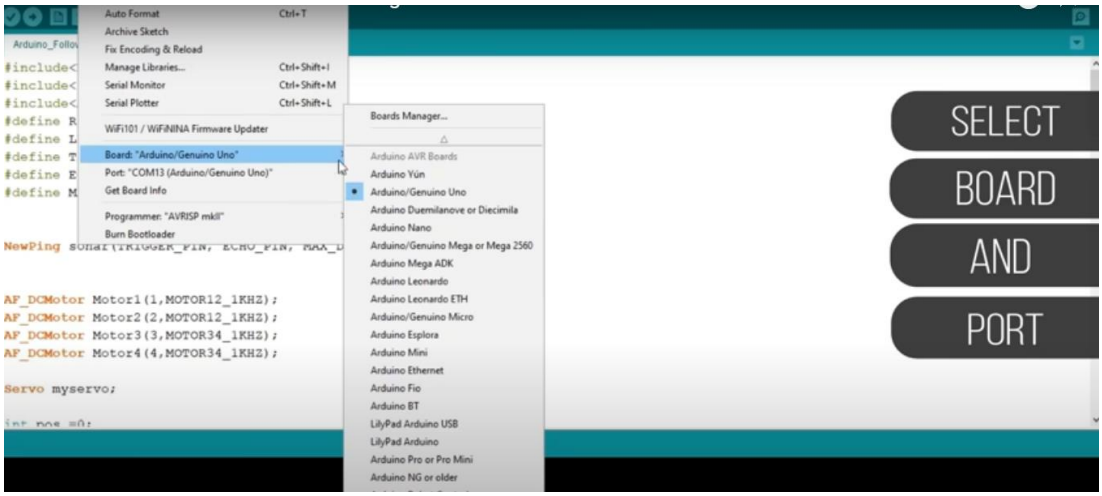

Fig 5: Programming code executed in Arduino board

The figure 5 represents the programming code executed in the arduino microprocessor. It is based on ATmega328P represented with 14 digital input and output pins. It is used due to lower cost, higly flexible in nature. This microcontroller is much easy to use in the programmable open source and can be used as an integrated source [15]. The robot arm control is done through the motor with the programming code of C++. The MinGW was the compiler used in the proposed system. The sufficient functions used are found and acquired in the open CV libraries to access and provide the necessary functionalities that are needed. The figure 6 represent the code generated for the robotic arm.

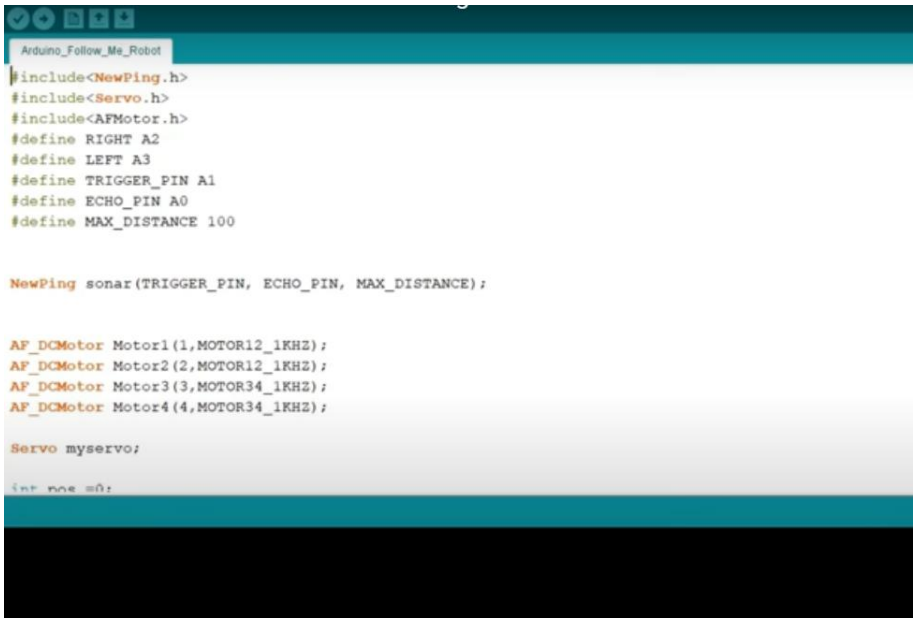

Fig 6 : Robotic arm control

IV.Simulation results

The sixth sense robotic arm is recognised and implemented by the image processing techniques. This functions based on the programming source code provided to the arduino microcontroller.

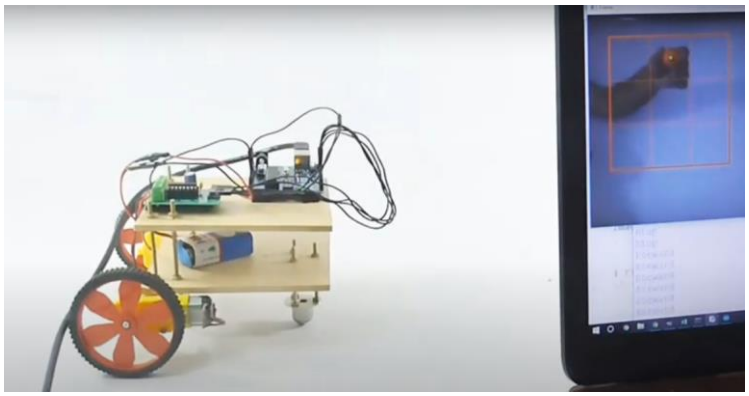

Fig 7: Simulation results

By detecting and analysing the hand gestures and motions, the robotic arm starts to function by moving forward and backward as shown in figure 7. The movement of the robot is done by the gestures. This movement is done by the motor control that is programmed in the arduino microcontroller. The motion control is done by the motors for the movement from too and fro.

V.Hardware Implementation

The figure 8 represents the hardware model of the proposed system with the motor controlled arm. The motion control are proceeded by the motors placed inbetween the wheels. The hand gesture are controlled by the arduino microcontroller.

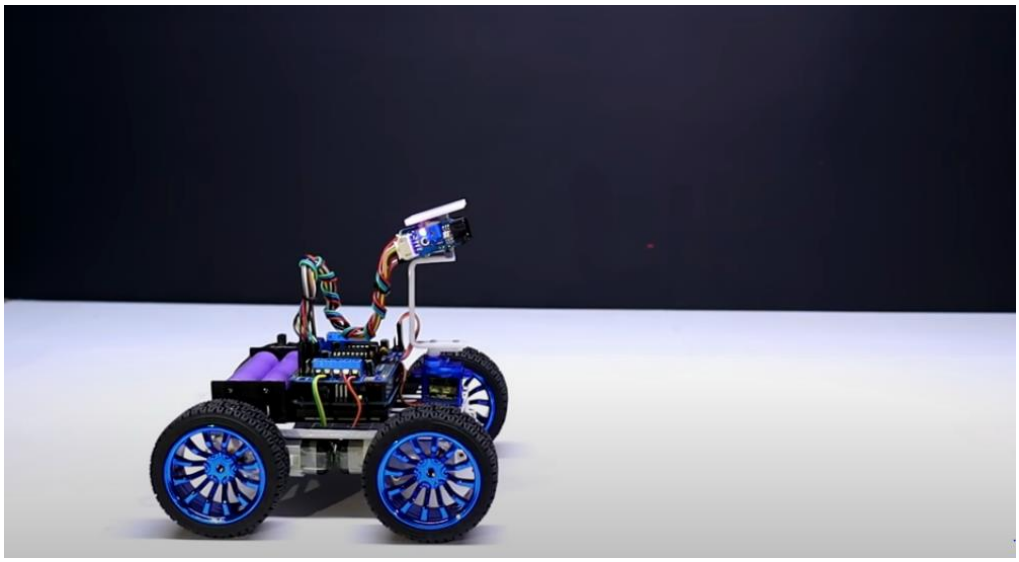

Fig 8 : Hardware model of the proposed system

VI.Conclusion

The aim of the proposed system is to have a robot with sixth sense. This proposed system is accomplished with recognition and implemenation of the needs by using the image processing techniques. Thus the system is effectively implemented and functioned based on the hand gesture and movements that tends to move forward and backward with automatic control using microcontroller. Thus the robot is implemented successfully with iniatiation of sixth sense with low cost and lesser computational time.

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