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Motion Controlled Rover with Robotic Arm

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ABSTRACT: The popular notion of a robot is a machine that looks and acts like a human being. The industry is moving from its current level of automation, Robotization, and in order to increase the productivity and the delivery of consistently high quality. The industrial robots of today can't look in the least like a man, in spite of all the research, it is intended to be more human-like and humanoid features, as well as the super-human abilities in the present. A type of robot that can be widely used in the industry is a robotic manipulator, or just a robot. There is an open or a closed kinematic chain of rigid links which are connected to each other by means of a movable joint. Depending on your configuration, there may be links that are considered to be agreed to come up with the human anatomy is when the waist, the upper arm and the lower arm with a joint in your shoulder and in your elbow. At the end of your arm, to the wrist, and connect the one end of the power system, it can be used as a tool for the business, or as a hook or other device to work.

KEYWORDS: Robotics, Pick and Place Robots.

I.INTRODUCTION

Robots are increasingly being integrated into the world to replace the people, and, in particular, in order to carry out dangerous tasks. A robot is an electro-mechanical machine that is able to carry out a complex series of actions automatically, or under human supervision. It can be used in a variety of industries, including industrial, military, medical, and scientific research.

It can be dangerous for humans to perform specific tasks, such as working with a potentially explosive chemicals, the degradation of explosives and other dangerous work. This is the reason why, as men, to be replaced by a robot arm to perform the operation. A robotic arm is a robot manipulator, usually programmable, with the same function as that of a human's arm. The robot arms can be autonomous or controlled manually and can be used to perform a variety of tasks with the greatest of care.

Gesture recognition technology can be used to control the robotic arm. Gesture recognition is to make it possible for people to communicate with the machine and interact naturally without any mechanical devices. Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. Gestures can originate from a physical activity or a situation, but it often comes from the face or hand. Gesture recognition is to make it possible for people to communicate with the machine, and the interaction of the mechanical equipment. Hand gestures are also used for the automatic control of the software and the automation systems can be monitored, and, of course, intuitively, that the robot communication.

II.WORKING

Transmitter Circuit

The block diagram of transmitter section, the contents of the MPU6050 Accelerometer & Gyroscope, a Flex sensor, a power supply unit, NRF-24L01 Radio station in the heart of the system is the 328p micro-Controller based on an Arduino board . To begin with, the flex sensor is a variable resistor, the resistance according to the change in the amount of the bend, the analog value is send to the micro-controller is able to process and transmit the signals to the robot using NRF-24L01 Radio

MPU6050: a 3-axis accelerometer and 3-axis Gyroscope, that is, Gyro & accelero send data to the micro-controller is able to process and transmit the signals to the robot using NRF-24L01 Radio station.

NRF 24L01:this is a 6-channel audio transmitter module, which may act as a transmitter and the receiving, so here, we have used this as a station with the information that is provided by the micro-controller and send it through the 2.4 GH radio band the radio band is a free-to-use, hobby & science and the application.

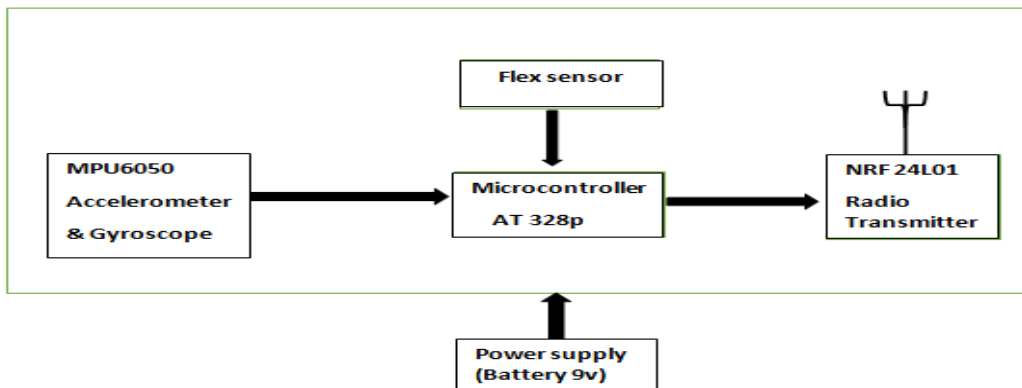**Power suppl**y:it provide the power to the all transmitter section

Fig 1: Transmitter circuit

Receiver Circuit

The block diagram Receiver section it contents the L293D Motor driver (Rover), Servo motors (Robotic arm), Power supply unit, NRF 24L01 Radio Receiver & heart of the system AT 328p Microcontroller based on Arduino .

Arduinoreceive the control signal send by transmitter via NRF 24L01 Radio Receiver and process it Then it can generate the control signal for L293D Motor driver (Rover) and Servo motors (Robotic arm)
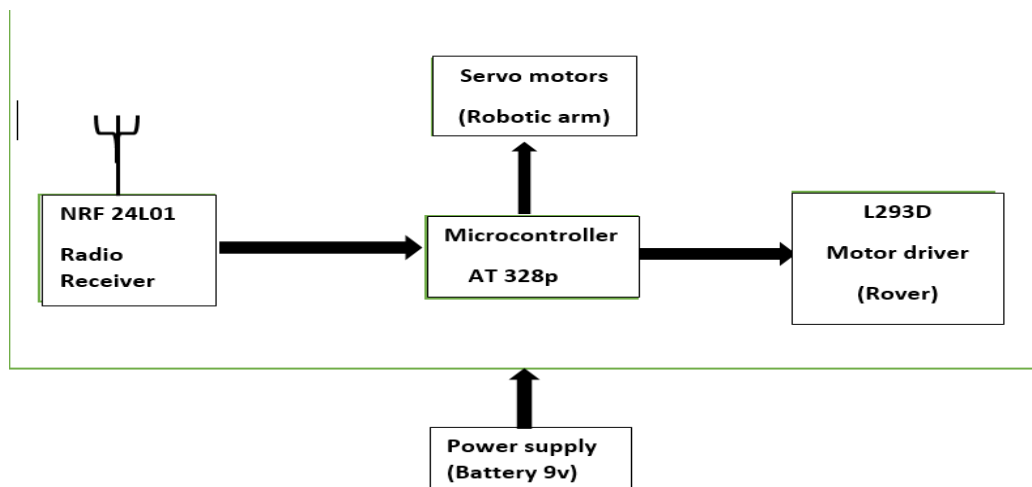

Fig 2 : Receiver circuit

III.COMPONENTS

Arduinouno: Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor.

Arduinomega: The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

MPU6050 Accelerometer &Gyroscope: The MPU6050 is a Micro Electro-Mechanical Systems (MEMS) which consists of a 3-axis Accelerometer and 3-axis Gyroscope inside it. This helps us to measure acceleration, velocity, orientation, displacement and many other motion related parameter of a system or object.

Flex sensor: Flex sensors are usually available in two sizes. One is 2.2 inch and another is 4.5 inch. Although the sizes are different the basic function remains the same.They are also divided based on resistance. There are LOW resistance, MEDIUM resistance and HIGH resistance types. Choose the appropriate type depending on requirement.

NRF 24L01 Radio transceiver: The nRF24L01 is a wireless transceiver module, meaning each module can both send as well as receive data. They operate in the frequency of 2.4GHz, which falls under the ISM band and hence it is legal to use in almost all countries for engineering applications.

L293D Motor driver: The L293D is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to drive motors. A single L293D IC is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently**.**

Servo motor: A servo motor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration.

12volt DC motor:A DC motor is any motor within a class of electrical machines whereby direct current electrical power is converted into mechanical power. ... A 12v DC motor is small and inexpensive, yet powerful enough to be used for many applications

IV. RESULT AND DISCUSSION

In the fig 3 and fig 4 , it shows the work of an motion controlled rover with robotic arm. It represents the pick and place robot controlled using RF signal.
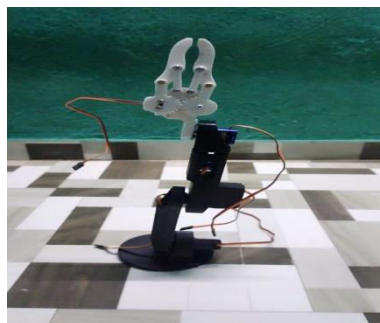
1. ARM

Fig 3: Arm

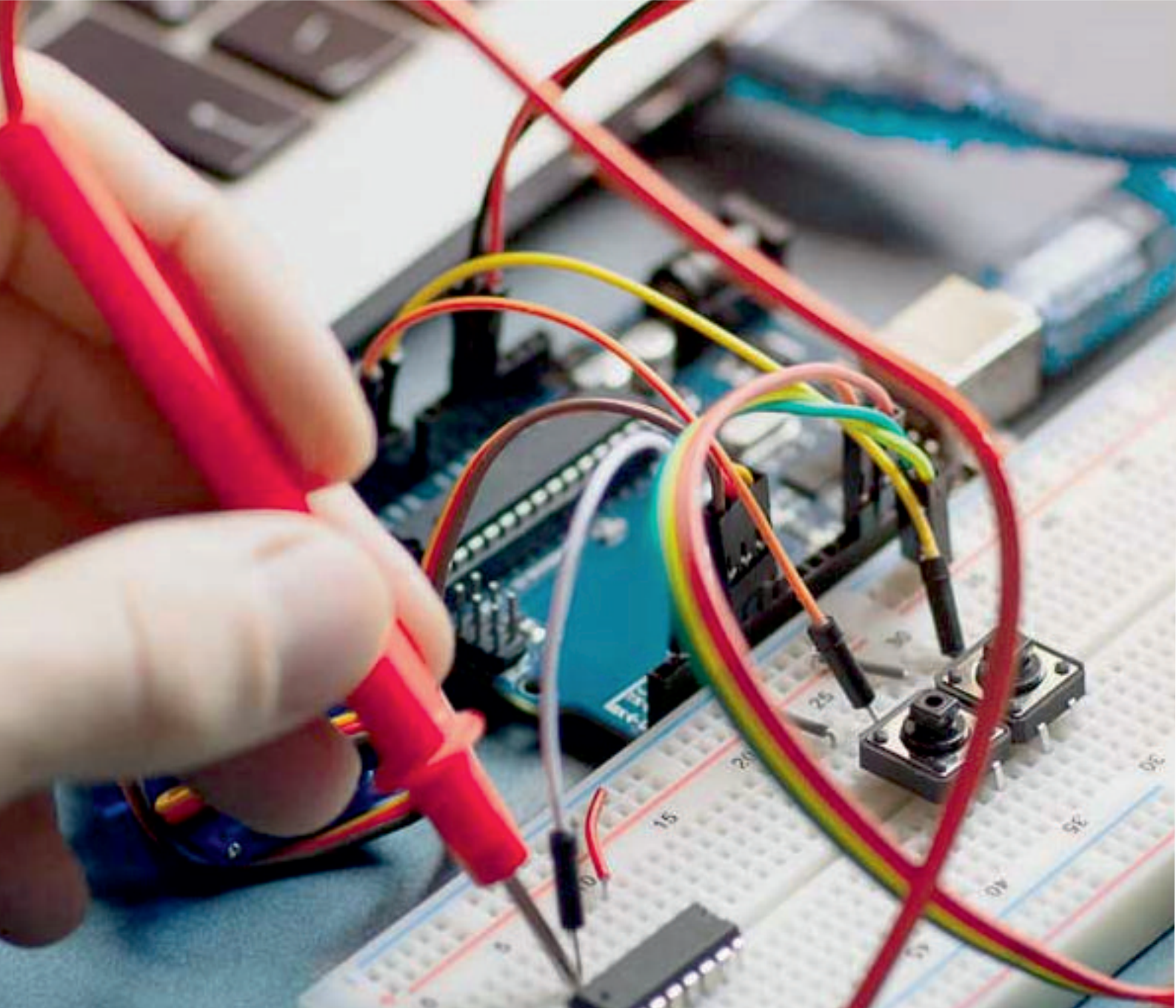2. ROVER

Fig 4 : Rover

V.CONCLUSION

Robotic pick and place automation speeds up the process of picking out the parts and the installation of the new territories, as well as to increase the production rate. This is a pick-and-place robots are more precise, and will not be tired while doing a back to break or a difficult to maneuver, with the movement, which can be difficult for the people. The consistency, quality and repeatability of a pick and place robot system, it is second to none. They are also very flexible and can be programmed and modified in order to support multiple applications to consumers.

VI. FUTURE SCOPE

The robot so programmed for pick and place operation can be made versatile and more efficient by providing the feedback and making it to work on own than any human interventions. It can be made possible by image processing tool interfaced with this Arduino. The features that can be added on to improve its efficiency, make it operate on its own thought without any human intervention are line follower, wall hugger, obstacle avoider, metal detector, bomb diffuser etc.

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