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Human Following Robot Using Arduino

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ABSTRACT: Humanoid robotics is a rising studies discipline that has obtained vast interest through the years and could retain an essential position in robotics studies and plenty of applications of the 21st century and beyond. In this speedy shifting world, there may be a want of robotic such as “A Human Following Robot” that may interact and co-exist with them. Because of its human following capability.

These robots can paintings as assistants for people in numerous conditions and they can additionally collect or display positive statistics related to the human subject. In this paper, we present a prototype that makes use of Arduino Uno in conjunction with primary sensors together with ultrasonic and IR sensors. All the processing is finished through the microprocessor at the same time as the manipulation of the automobiles is finished through the controller. This robotic can similarly be changed with the aid of the use of many technologies along with Bluetooth, Pixy Camera, etc

KEYWORDS: Arduino Uno, Arduino L293D Motor Driver Shield, Ultrasonic Sensor, IR Sensor, Wheel, TT DC Motor, Servo Motor, 18650 Li-on Battery, Arduino Micro Controller, Arduino Software.

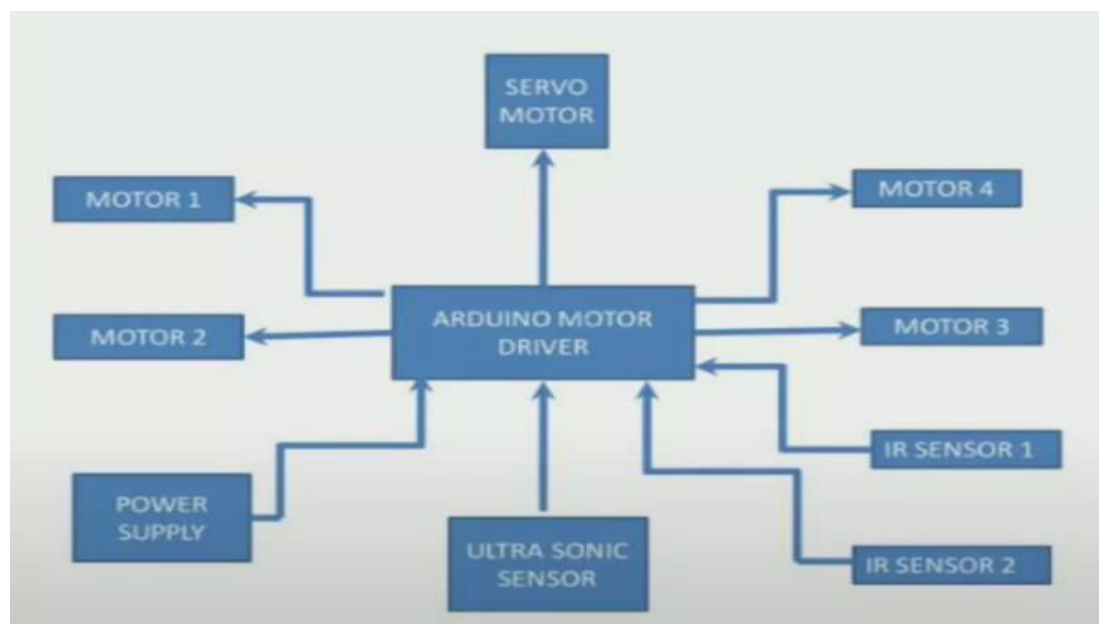
I. INTRODUCTION

In this excessive technology, a robotic ought to be capable of hitting upon and complying with humans. A robotic that could stumble on and observe humans or impediments inside a particular variety is called a ‘Human Following Robot’. The robot needs a mechanism that can decide for it to take action accordingly so that the task can be performed correctly.

The worried mechanism is a sensor that may stumble on barriers or items across the robotic itself.

In this project, an Ultrasonic sensor is used. An ultrasonic sensor is a tool that capable of degree the space to boundaries with the aid of using the usage of sound waves.

II. BLOCK DIAGRAM



Components Used: -

- 1) Arduino Uno
- 2) Arduino L293D Motor Driver Shield
- 3) Ultrasonic Sensor HCSR04
- 4) Infrared Sensor
- 5) Wheel
- 6) TT DC Motor
- 7) Servo Motor
- 8) 18650 Li-on Battery

III. METHODOLOGY

A human following robotics has to construct stages: hardware and software.

3.1 Arduino Uno: -

Arduino Uno is a microcontroller board based on Atmega328. It has 14 virtual input/output pins and 6 analog inputs. It is the brain of our project. It can give all the commands to their subordinate components which should be operated by human behaviors. It additionally delivers comments on alternative additives and humans. So that it can be used as a medium of communication between humans and robots & vice versa. It has a specification of an eight-bit CPU, sixteen MHZ clock speed, 2 KB SRAM 32 KB flash Memory, and 1 KB EEPROM.

3.2 Motor Shield: -

Motor permits you to apply Arduino to govern the operating pace and route of the motor. The motor driving force protection can manipulate 4 servos at once.

The Motor Shield is a motive force module for automobiles that lets you apply Arduino to govern the operating velocity and path of the motor. The Motor Shield can be powered with the aid of using Arduino without delay or with the aid of using an outside 6V~15V electricity delivered through the terminal input. Here Motor Driver Board is designed to work with L293D IC.

3.3 Ultrasonic Sensor: -

An ultrasonic sensor measures the gap of a goal item by emitting ultrasonic sound waves. For ultrasonic sensor variety is forty to 70 kHz.

An ultrasonic sensor is a device that measures the gap in an item with the usage of ultrasonic sound waves. The operating precept of this module is simple, it sends an ultrasonic pulse out at 40kHz which travels through the air and if there's an impediment or object, it will bounce back to the sensor. The space may be calculated by calculating the tour time and the velocity of sound.

3.4 IR Sensor: -

The proximity sensor is used to detect objects & obstacles in front of the sensor. Digital low output on detecting items in front.

IR sensor is a digital tool that emits the mild as a way to feel a few items of the surroundings. An IR sensor can degree the warmth of an item in addition to detecting the motion. Usually, inside the infrared spectrum, all of the gadgets radiate a few shapes of thermal radiation. These kinds of radiations are invisible to our eyes; however, infrared sensors can come across those radiations. The emitter is without a doubt an IR LED (Light Emitting Diode) and the detector is without a doubt an IR photodiode.

3.5 Wheel: -

To make the robot move, wheels, a direct circuit motor, and a servo motor were used. The DC motor manipulated the direction of the robot's movement. It controlled independently four wheels of the robot so that it could mimic any 4-wheel behavior that could enable the robot to turn in any direction.

3.6 DC Motors: -

A gear motor is a component whose mechanism adjusts the speed of the motor.

DC Motor is a tool that converts any shape of electricity into mechanical electricity or imparts motion. In building a robot, the motor generally performs a crucial function with the aid of giving motion to the robot. Here four DC motors are used to pressure the robot.

3.7 Servo Motor: -

A micro servo motor is a tiny and lightweight sever motor with excessive output power. The servo can rotate about 180 degrees.

A servomotor will be turning actuators or direct actuators that ponder exact control of other straight positions, speed & speed increment. This carries a valid motored coupled with sensors of placed input. This calls for an as it should be uncommon regulator, reliably a submitted module masterminded unequivocally to make use of in the servomotor. The servo motor will be a shut circle servo mechanism that uses positions to investigate for last position development & control. This obligation for the control will be a sign (direct & electronic) watching out for their positions prepared to the yield shaft.

3.8 18650 Li-on Battery: -

An 18650 is a lithium-ion rechargeable battery. Their proper name is “18650 cell”. The 18650 cell has a voltage of 3.7v and has between 1800mAh and 3500mAh (milliamp-hours). 18650s may also have a voltage variety among 2. five volts and 4.2 volts, or a charging voltage of 4.2 volts, however, the nominal voltage of a well-known 18650 is 3.7 volts. There are two types: protected and unprotected. In this project, we used a protected type.

IV. CONCLUSION

A hit implementation of a prototype of human following robotics is illustrated in this paper. This robotic no longer has the detection functionality however additionally the subsequent capacity as well. While making this prototype it becomes additionally stored in thoughts that the functioning of the robotic needs to be as green as possible. Tests have been completed in one-of-a-kind situations to Pin-factor the errors inside the set of rules and to accurately them. The unique sensors that had been incorporated with the robotic furnished an extra advantage. The human following robotic is a vehicle device that can understand obstacles, pass, and alternate the robotics' function towards the difficulty within a high-quality manner to remain on its track. This task makes use of Arduino, automobiles' special varieties of sensors to reap its goal. This undertaking challenged the organization to cooperate, communicate, and increase the know-how of electronics, mechanical systems, and their integration with programming.

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