

Chapter 1 : LINE FOLLOWING ROBOT full report

a line follower is a self operating robot that follows a line. A LINE MAY BE WHITE LINE ON BLACK SURFACE OR VICE VERSA. Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising.

Nowadays, every robot is done with the help of the microcontroller, and hence the circuit is too big and tough to understand. For that reason, this Intelligent Line follower robot is developed with a simple concept. This robot is a mobile device that detects and follows the line drawn on the floor. The path must be in a visible black line on a white surface. A line following robot is a mobile machine employed to sense and follow the black lines that are drawn on the white surface. As this robot is developed using a breadboard, it will be very simple to construct. Generally, the AGV is integrated with the microprocessor and computers for controlling its system. It also uses a position feedback system for traveling in the desired path. In addition, the electric signals and RF communication are needed for communicating with the vehicle and system controller. Such awkward functions are completely not required in this line following robot, and it just uses the IR sensors to travel on the black lines. This robot is powered by a battery. One 9V battery is enough to perform this process. For more usages, four 9V batteries may be required. If a DC power is passed on a DC motor, it will produce torque. The torque created will lead to the rotation of the wheels. It will only operate on the direct current. Here, two 12V DC motors are used. A breadboard includes several numbers of holes in which the upper and bottom holes are interconnected horizontally to each other, while the other holes in the center are vertically connected at the base. It does not require any sort of soldering works and therefore the components can be used again. The plastic wheels will be connected to the DC motors. As soon as they create the torque, these wheels will help the robot to move. The castor wheel is used to make the movements easy and quick even it has large components on its top. In this process, a small stainless steel castor could be the best one to use. This process requires two IR sensor circuits. It is used to connect the battery with the breadboard. It helps in storing the current, equalizing the power output, filtering, and more. This robot makes use of two 10uf capacitors. It is incorporated in such areas where there is a need of reduced voltage. There are various ranges of resistors available. It can be measured either by means of Multimeter or calculation of colors. It is an operational amplifier or comparator used to evaluate the voltage current. The high amount of voltage gained will be considered as the output. It is one of the main components of an IR sensor circuit. The output given from the battery to the circuit is 9V. In this process, 5V of power supply is sufficient to operate. For that reason, an IC voltage regulator is used to control the high amount of voltage. It allows the DC motor to run in both front and back directions. It consists of up to 16 pins. This device is mainly used to check the range of resistors, battery, and so on. Four core wires are implemented for connecting the motor drives, and the two core wires are used to connect on the breadboard. Two meters of each wire will be required. The glowing of the LED makes sure that the current is flowing in the circuit. If the LED does not glow, it is considered that there is some problem with the connection. Construction and Working Principle: A 9V battery is connected to the breadboard via a battery holder. As a result of this process, 5V of current is obtained. Subsequently, an IC LD is placed in the breadboard. The two plastic wheels are connected together with the motors. Additionally, a castor wheel is included at the front of the robot for balancing and as well as for making quick movements. Now, connect the battery to the circuit, and place the robot on the black lines of the white surface. The IR sensor will start sensing the black lines, and travel on it as it is drawn. These robots can also be developed with the help of a micro-controller. However, the connections made will be very complex to understand even for the professionals. As a result, this simple line following robot will certainly make you easy to assemble the components by just observing its circuit diagram. You can watch the working of the line following robot in the video given below.

Chapter 2 : Line Follower Robot Without Microcontroller | Full Project

A TERM PAPER REPORT ON LINE FOLLOWER ROBOT Submitted by: Priya Hada calendrierdelascience.com (ECE) 5rd Semester Amity School of Engineering & Technology AMITY UNIVERSITY RAJASTH Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising.

Line follower is a machine that can follow a path. The path can be visible like a black line on a white surface or vice-versa or it can be invisible like a magnetic field. Why build a line follower? Sensing a line and maneuvering the robot to stay on course, while constantly correcting wrong moves using feedback mechanism forms a simple yet effective closed loop system. Practical applications of a line follower: Automated cars running on roads with embedded magnets; guidance system for industrial robots moving on shop floor etc. Knowledge of basic digital and analog electronics. I started with building a parallel port based robot which could be controlled manually by a keyboard. On the robot side was an arrangement of relays connected to parallel port pins via opto-couplers. The next version was a true computer controlled line follower. It had sensors connected to the status pins of the parallel port. A program running on the computer polled the status register of the parallel port hundreds of times every second and sent control signals accordingly through the data pins. A long multi core cable for parallel data transfer is expensive. The robot is not portable if you use a desktop PC. Since I had no knowledge of uC at that time, I implemented a hardwired logic circuit using multiplexers. It basically mapped input from four sensors to four outputs for the motor driver according to a truth table. To get around this problem and add some cool features, using a microcontroller was the best option. AVR instructions are tuned to decrease the size of the program whether the code is written in C or Assembly. This comes very handy when prototyping a design or upgrading a built-up system. Also the programmer used for ISP is easier to build compared to the parallel programmer required for many old uCs. Features like I2C bus interface make adding external devices a cakewalk. While most popular uCs require at least a few external components like crystal, caps and pull-up resistors, with AVR the number can be as low as zero! This one is difficult to answer since all uC families offer comparable features in their different chips. Being a part of many engineering courses, there is a huge communitiy of people that can help you out with ; same with books and online resources. Availability of online resources and books is fast increasing. The output of the sensors is an analog signal which depends on the amount of light reflected back, this analog signal is given to the comparator to produce 0s and 1s which are then fed to the uC. Let us assume that when a sensor is on the line it reads 0 and when it is off the line it reads 1 The uC decides the next move according to the algorithm given below which tries to position the robot such that L1 and R1 both read 0 and the rest read 1.

Chapter 3 : Line Follower Robot using Microcontroller: Project with Circuit Diagram & Code

Line Follower Project Report Application of LDR Sensor on Line Follower Robot Muhamad Nor Hafiz Bin Moktaruddin TJM66 Arduino Line Follower Robot With QRD

They are able to follow a line marked on a contrasting background, usually a black line on a white surface or a white line on a black surface. Usually, the line follower robot works on a closed loop feedback algorithm where the feedback from the line sensor is used by the controller for correcting the path of the robot. Gear motors are used for driving the robotic wheels. You may try the Arduino based circuit as well to see how the same project is developed using different controllers. The line follower robot presented here is designed to follow a black line on a white background. Actually you does not need a microcontroller for implementing such a simple robot. A set of comparators and a motor driver circuit will happily do the job. Also this project serves as a platform for advanced line follower robots which works on complex algorithms. AT89S52 from Atmel is the microcontroller used here. The LDR has an inverse relationship between its resistance and the light falling on it. This variation in resistance of the LDRs is used to assess the orientation of the line follower robot in the X-Y plane. The figure shown below depicts the sensor circuit. The output of the sensor circuit is taken from the points labelled A and B in the circuit diagram. The table below shows the voltage at nodes A and B for the possible orientations of the sensor module. The job of the comparator circuit is to convert analog voltage output of the sensor into a digital format for the microcontroller to read. LM is a general purpose quad opamp which can be operated from a single supply. Out of the four comparators inside LM, only two are used here. One for the left side and the other for the right side. Circuit diagram of the comparator section is shown in the figure below. Output from the left and right sensors node A and B are connected to the non inverting input on the left and right comparators. Output of the left comparator is connected to P1. The task of the microcontroller here is to control the left and right motors according to the feedback signals from the left and right comparators so that the robot remains on the correct path the black line. The logic executed by the microcontroller for keeping the robot in track is illustrated in the table below. ULNA is a high current mA , high voltage 50V darlington array consisting of seven darlington pairs with common emitter and open collector. Out of the seven channels available in the IC, only two are used here. One for the left channel and one for the right channel. Schematic of the motor driver circuit is shown in the figure below. When a particular input line say pin 1 is made high the corresponding output line pin 16 goes low and vice versa. These capacitors are very essential and without them you can expect sudden crashes from the microcontroller side. Switch S1, capacitor C3 and resistor R9 forms a debouncing reset circuit for the microcontroller. R12 and R13 are pull-up resistors. Remaining sections of the circuit were explained already. The first part of the program initializes Port 1 as input port and Port 0 as output part. Then the programs checks whether there is a deviation to right. If there is a deviation to right, the program stops left motor and runs right motor and waits until the robot comes back from the deviation. When the robot is back on line again, both motors are started. If there is no deviation to right, the program checks for a deviation to left. If there is a deviation to left, left motor is stopped and right motor is activated. This condition is maintained until the robot is back on track. When the robot is back on track again, both motors are started. Lastly if there is no deviation to left or right, both motors are kept ON. For setting up the robot, place the robot on the line so that both the sensor pairs point on white and the black line goes in between them.

Chapter 4 : Line Follower Robot | EngineersGarage

1. Introduction About The Project: For my final project, I decided to make a line-follower robot. This simple robot is designed to be able to follow a black line on the ground without getting off the line too much.

WhatsApp Advertisement Generally, line follower robot is microcontroller-based. Here we describe a line follower robot without microcontroller for those who are not familiar with microcontrollers. It is a simple project, which can be taken up as a classroom assignment. It lays the foundation for building your own behaviour-based simulated robot. The robot uses interfaces for the sensors to make the behaviour of the robot as versatile as possible. Two light detectors are mounted at the front of the robot. Also, a path is provided for the robot to follow—either a black track using black colour tape on a white floor or a white track on a black floor. Circuit of the line follower robot Circuit description Fig. TCRTL optical sensors are used as line follower robot sensors. The TCRTL reflective sensor includes an infrared emitter and photo-transistor in a leaded package. The sensor and its internal details are shown in Fig. Advertisement When an object comes in the sensing area, the emitted IR light reflects off the object back to the photo-transistor. So the amount of light energy reaching the detector increases. This change in light energy or photo-current is used as the input signal to activate the motors of the line follower robot. The intensity of the reflected signal returning to the detector depends on the surface over which the robot moves. White surface reflects maximum infrared signal, while black surface absorbs maximum infrared signal. An actual-size, single-side PCB for the line follower robot Fig. Component layout for the PCB of Fig. The LD is a quadruple high-current, half-H driver. It is designed to provide bidirectional drive current of up to mA at 4. The motor drivers are enabled in pairs. When enable input pins 1 and 9 of IC4 are high, the associated drivers for M1 and M2 are enabled and their outputs pin 3 and 6, and pins 11 and 14, respectively, are active and in phase with the inputs. With the proper data inputs, each pair of drivers forms an H-bridge reversible drive suitable for motor applications. Motors M1 and M2 rotate in forward direction say clockwise when both the sensor outputs are low. If you want the robot to follow a black track made using black-colour tape on a white floor, you need to connect jumpers SJ1 and SJ2 to B terminals as shown in Fig. The robot will move as follows: When the left sensor, say IC2, detects the black track, the robot turns left. When the right sensor, say, IC1, detects the black track, the robot turns right. When both the sensors are in white surface then, the robot moves in forward direction. An actual-size, single-side PCB for Fig. Component layout for Fig. As the reflector sensor moves on the black surface, the emitted signals are absorbed by the black surface and both the inverters N1 and N2 invert to low. These low signals are fed to the motor driver LD and the robot moves forward. When the left sensor, say IC2, detects the white track, the robot turns left. When right sensor, say IC1, detects the white track, the robot turns right. When both the sensors are in black surface then the robot moves in forward direction. The circuit is powered by a 12V DC battery. IC is used to provide regulated 5V supply to the circuit. Capacitor C1 bypasses the ripples from the regulated supply. Construction and testing An actual-size, single-side PCB for the line follower robot is shown in Fig. The sensors sections should be separated from the main PCB by cutting along the dotted lines. Right and left sensors should be mounted on the front of the robot with both the sensors facing towards the ground. Distance between the right and left sensors should be aligned properly as per the width of the track on the ground.

Chapter 5 : Simple line follower robot complete project report ebook free download pdf

A line follower is an autonomous robot which navigates by following a line present on the surface beneath the robot. The specifications of the line are in terms of its width and its color with.

Video of the project: A line follower robot follows a track or path drawn by black line and feedback loop is the main part in controlling the robot. This project consists of a Robot which follows a black line drawn on a plain white surface. Whenever power supply on Robot is turned on, the Robot starts following the Line. That is why it is called Line follower robot. This robot utilizes a array of Infrared transmitters and receivers. Simple Line follower Robot can be built without Microcontroller. Talking about controlling or operation of robot, we can say that roughly there are two types of robotic operations. Manually operated robots and automatic operated robots. Line follower robot is automatically operated type of robot. And in terms of movement of robots there are again two types, first one is stationary robots and second one is movable robots. Microcontroller based advanced line following robot is movable robot. One of the main use of robot is to reduce the human efforts. This is an advanced Line follower robot using Microcontroller. This robot utilizes a feedback mechanism. By this we mean that whenever robot is turned on it immediately moves in a forward direction. Then it reads the input from IR sensors. If robot is on track then it continues to move in forward direction. However if the feedback mechanism tells Microcontroller that robot is not following the line then Microcontroller turns the Robot in Left or right direction depending upon the input from Left and Right Infrared receivers. The track drawn by black line decides the motion of Line follower robot. You will get a CD with this project: CD contains following things: Project Report in pdf format and in word format. Various important blocks of system are: It receives the IR rays reflected from white surface or black line. This is used to retrieve the digital value of signal sent from IR receiver. It displays various messages. Microcontroller can not operate 12 volt DC motor directly so we have used Motor driver. This is the main part of robot which is responsible for movement of robot. It consists of a plain surface base of metal or wood or plastic. It has two motors and two wheels. These two wheels are connected on shaft of motor using a screw. Also it has a freewheeling castor wheel which is connected at front center part of base. Applications of Line Follower Robot: In Industries it can be used to take the visitor from main gate to the desired place or unit. Robot will be kept on gate and a Line will be drawn from the gate to the respective unit. This will remove the human interactions. Advantages of Line Follower Robot: We can provide voice feedback system. Question and answers about this project: What it the use of LCD display? LCD display is used for testing purpose and mainly useful when designing project. However LCD display is optional. The Robot will still work if the LCD is removed. Do you have question or any feedback about this project? Please email us your questions or write comments below. Similar or Related Projects:

Chapter 6 : Line Following Robot (Electronics Project) | calendrierdelascience.com " Projects Ideas and

The line following robot, operates as the name specifies. It is programmed to follow a dark line on a white background and detect turns or deviations and modify the motors appropriately. The optical sensor is an array of commercially available IR reflective type sensors.

Chapter 7 : Microcontroller based Line Follower Robot

A Line Following Robot Department of Computer Science This report discusses the implementation of a line following behavior for autonomous robot navigation using.

Chapter 8 : DIY Line follower robot using microcontroller with Circuit and Program

Line follower Robot is a machine which follows a line, either a black line or white line. Basically there are two types of

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line follower robots: one is black line follower which follows black line and second is white line follower which follows white line.

Chapter 9 : Arduino Line Follower Robot Code and Circuit Diagram

7th May Mechatronics Project - Line Following Robot Slide 3 of 27 Indian Institute of Technology Navigation Principles Collision Avoidance Combination of sensors and path finding Techniques.