



DETECTING THE OBSTACLE BY USING IR SENSOR WITH MOBILE PHONE OPERATE ROBOT

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Abstract: Nowadays, wheeled Mobile Robots (WMRs) are designed and also the system that went to management them are created by Electronic Engineers. depend upon their need style of WMR, Technicians created used of Microcontrollers as dominant machines and DC Motors for motion management. Autonomous robotic vehicle steering for indoor navigation has been developed for Mobile Industrial automaton model. The ensuing style can navigate the geographical region in a very building while not the necessity of human intervention. The guidance device consists of infrared sensors for obstacle detection, vary determination and dodging. It will discover the obstacles among the vary ten to 80 cm. This paper represents chiefly on computer code implementation of obstacle detection and dodging system for wheeled Mobile automaton. this technique consists of infrared sensors and microcontroller. during this system 3 infrared sensors are used for left, front and right. during this automaton system, the signal is received from detector circuit and PIC is operated in line with the received sensor's signal. The infrared detector reading is taken and processed to avoid the obstacles. The 5V power offer is employed to work PIC board and detector board. The obstacle dodging algorithmic rule is just evaluated on PIC 16F877 microcontroller primarily based mobile automaton. the kind of infrared detector is GP2D12 distance measure detector. the required goal of this technique is to avoid obstacles on its path and to work out the gap

Keywords—Infrared Sensors, Obstacle Avoidance, Microcontroller Based Control System, Robot Navigation, Fuzzy Logic, Mobile Robot.

1. INTRODUCTION:

ROBOTS are currently wide employed in several industries due to the high level of performance and dependability. All mobile robots feature some reasonably obstacle dodging. planning autonom

ous automaton needs the mixing of the many sensors and actuators per their task. Obstacle detection is primary demand for any autonomous automaton. The automaton acquires data from its close through sensors mounted on the automaton. Numerous styles of sensors may be used for obstacle

avoiding. ways of obstacle
 avoiding ar distinct per the utilization of device.
 Some robots use single sensing device to notice the
 item. however another robots use multiple sensing
 devices. The common used sensing devices for
 obstacle avoiding ar bump device,
 infrared device, unhearable device, optical
 maser vary finder; charge-coupled device (CCD)
 camera digital camera then on may be used because
 the detection device [1]. Among them
 infrared device is most fitted for this obstacle
 avoiding automaton thanks to its
 low value and go capability. The IR object detection
 system consists of the SharpGP2D12 distance
 activity device. The GP2D12 could be a compact,
 self-contained IR go system incorporating associate
 degree IR transmitter, receiver, optics, filter,
 detection, and amplification electronic equipment.
 The unit is extremely immune to close light-
 weight and nearly resistant to variations within
 the surface reflectivity of the detected object. The
 paper is mentioned on the essential analysis of
 "Development of associate degree Intelligent
 wheeled Mobile utomaton (WMR)". this is often a
 sort of IR Sensors primarily based wheeled Mobile
 automaton associate degreed it mainly function as an
 Obstacle dodging Vehicle. of these processes
 ar style during this analysis andit's primarily focus
 to package implementation of this WMR. for
 every 3 main parts, comparisons with alternative
 attainable ways in which or devices are enclosed and
 therefore the selecting ways to optimize the
 will system are thought of. Background theories and
 techniques of Electronic
 management Technology are analyzed during this

paper victimization each Hardware and package
 thought.

II. SYSTEM OVERVIEW

This mobile mechanism is intended to explore within
 the setting by police work obstacles and avoiding
 collision base on the gap mensuration data obtained
 from the infrared sensors. This mechanism system is
 obstacle avoiding mechanism victimisation infrared
 sensors. Infrared detector senses the obstacle on its
 path. During this system 3infrared sensors square
 measure used for left, right and front. The infrared
 sensors, used for obstacle shunning, square
 measure connected

III. GP2D12 INFRARED DISTANCE MEASURING SENSOR

In this paper, 3 GP2D12 infrared sensors area
 unit utilised or distance measurements. The
 infrared detectorconsists ofa light-emitting
 diode emitting the infrared emission and a
 grip sensing devise (PSD) that outputs voltage
 supported results of the triangulation
 procedure. measuring of the
 space victimisation triangulation is illustrated in
 Figure three. The angles during a triangle connecting
 the IR electrode, a far off object and PSD area
 unit keen about a grip of the article with relevance
 LED/PSD plane and thus, area unit wont
 to calculate the space between IR detector and also
 the object. This detector enables to find objects with
 none influence on the colour of reflective objects,
 reflectivity, the lights of surroundings .is able
 to ceaselessly live the pace to AN object.
 most vary which will be detected victimisation the
 GP2D12 is from ten to eighty cm. it's additionally
 sensitive to alignment of the surface being measured.

It generates AN analog voltage that is a perform of vary. The output voltage may be measured by AN analog-to-digital ADC input line. it's 3 wires, positive (+5V), negative (ground), and information output. Typical Output/Distance Characteristics of GP2D12 area unit bestowed in Figure three [2].

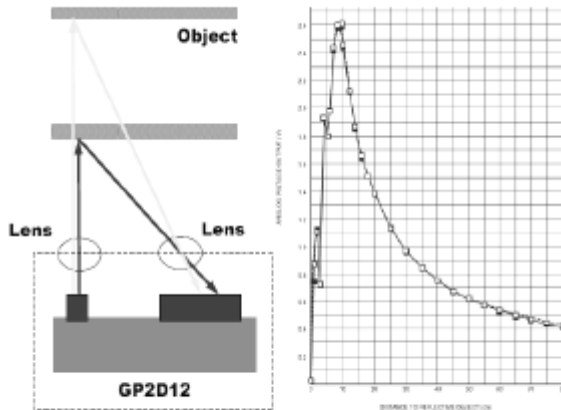


Fig. 3 Triangulation Measurements Using the GP2D12 IR Sensor and Its Output/Distance Characteristics

IV. ANALOG-TO-DIGITAL CONVERTER AND SENSOR ACCURACY

Distance sensors are generally not browse at a rate of quite a number of samples per second, that the performance characteristics of most ADCs are decent. presumptuous that the noise on the V out input has been unbroken to a minimum, the most concern is to confirm that the quantity of bits used for the ADC output is decent for the specified resolution. The amendment in voltage from seventy cm to eighty cm is just concerning zero.06 V, that corresponds to zero.006 V/cm. If the 8-bit ADC with a reference voltage of 5V is employed, every little bit of the ADC output represents zero.0195 V which suggests a

1 bit swing within the ADC output can lead to a distance swing of concerning three cm. the utmost voltage output from a GP2D12 detector is concerning 3V. If the reference voltage for the 8-bit ADC is modified to 3V, every little bit of the ADC output represents zero.0117 V, which suggests a 1 bit swing within the ADC output can still lead to a distance swing of concerning 2cm. The resolution is healthier at shorter distances as a result of there's a bigger voltage amendment

V. CIRCUIT OPERATION OF OBSTACLE DETECTION AND AVOIDING SYSTEM

This IR vary detector works by returning a voltage proportional to the gap of the article detected. thus associate object that's farther away returns a lower voltage than associate object that's nearer.

This detector measures distance victimization the triangulation methodology, as shown in Figure 3. The electrode emits a pulse of IR light-weight. This light-weight travels go in the sphere of read associated either hits an object or simply keeps on going. within the case of no object, the sunshine is rarely mirrored and therefore the reading shows no object. If the sunshine reflects off associate object, it turns to the detector and creates a triangle between the purpose of reflection, the electrode, and therefore the detector. The angles during this triangle vary supported the gap to the article. The receiver portion frequently he detector enclosed a lens that transmits the mirrored light-weight onto numerous portion of a CCD array supported the angle frequently he triangle represented higher than. The CCD

array will then determine what angle the mirrored light-weight came back at and so, it will calculate the gap to the object [3].

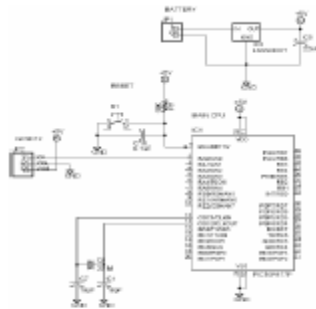


Fig.4. Interfacing a PIC16F877 with a GP2D12

VI. SENSING STATEMENTS

The sensing in mobile industrial golem depends totally on infra-red light-weight (IR) detectors, either for obstacle and goal area detection, though a couple of robots used immoderate sound distance detectors. Obstacles area unit detected with proximity sensors. To find obstacles groups sometimes use IR sensors, though a couple of robots used ultrasound sensors operative as sonar's, supported pulse reflection and time of flight. Used IR sensors area unit chiefly of 2completely different types: the primary type is supported a hacked Sharp GP1U58. Obstacle detection is active within the sense that the golem emits IR light-weight, and appears at the reflection received by the detectors. this enables a gross live of the gap of a given obstacle, because the output voltage will increase with the intensity of the modulated IR light-weight (at 40KHz) received by the detector, that is reciprocally proportional to the gap between the golem and also the obstacle. The voltage/distance relationship is more or less quadratic. Obstacle detection usually uses three of

infrared sensors, given their comparatively wide aperture (+/-30°). to enhance detection potency, the employment of over one IR LED/sensor is so as to raised illuminate the detection space. In some robots the obstacle detection was additionally improved victimisation over three sensors. The second form of IR-based obstacle detector uses a distance measuring system, the Sharp GP2D12. It uses the triangulation principle to cypher the gap between the detector and also the obstacle being helpful within the vary 10-80 cm. The detector output is a voltage that varies with the position of the spot as captured by the position sensing device(PSD), being reciprocally proportional to the gap between he golem and also the obstacle.

VII. EXPERIMENTAL RESULTS

For Obstacle detection half, the results of knowledge confirming of GP2D12 is shown in Figure five. The main thought results of this system, guidance thought is created as shown in Table I. The experimental results of the Modeling and SIMULNK procedures of Motor Drive System ar shown in Figure seven and Figure eight. This Figure shows the results of analyzing the DC Motor internal circuit that it's appropriate to use or not exploitation MATLAB [4]. and therefore the Experimental results of system testing circuit for this method ar shown in Figure 9.

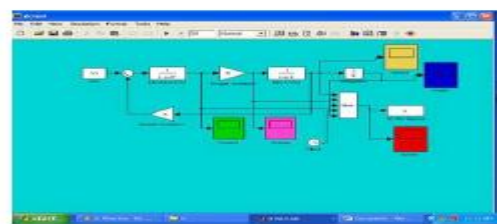


Fig.7. DC Motor Model created in MATLAB SIMULINK

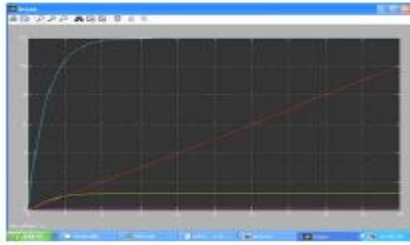


Fig.8. Scope Output of all Ratings



Fig.9. DC Motor Driving Circuit Testing Photos

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