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Path Finder with Obstacle Avoidance Robot

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Abstract - *Now a day, there have been many robots developed for automation and navigation. Robotics is an emerging technology which reduces the human work. Many types of robots navigation techniques are available in the world. The project is to build a robot which find the safe path planning and avoid obstacle. It has an infrared sensor which is used to sense the obstacles coming in the robot path. Robot will avoid the obstacles coming in the path and move a particular direction. An infrared sensor is used to detect obstacle and send information to the controller and after processing the input microcontroller redirects robots using motors which are controlled by motor drivers.*

Key Words: Robotics, infrared sensor, obstacle.

1. INTRODUCTION

Nowadays, robots are considered an important component of society. This is due to the replacement of humans by robots in basic and dangerous tasks. However, designing efficient navigation strategies for mobile robots and ensuring their safety are among the most important topics in autonomous robotics.

Therefore, the path planning problem is one of the most interesting and researched topics. The goal of robot path planning is to find a safe way for a mobile robot. Also the path must be optimal. In this sense, many Research works as a solution to the problem of path planning Proposed in the literature [1-4]. So far, many methods have been used for the design of mobile robots. In these strategies, geometric leisure methods such as artificial potential fields[5-6], Agoraphobic algorithms[7], and vector field histograms[8-9]. These methods provide a caption angle to avoid obstacles.

The purpose of the developed strategy is to solve the problem when the robot is located in the following areas: How can the robot detect and avoid obstacles and move between the two obstacles on the shortest path, without the collision between two obstacles.

Our contribution is to develop a new algorithm for this Solving robot path planning problems, including avoiding static obstacles. This planning, also known as static route planning, offers the benefit of ensuring safety and lack of routes. Moreover, the proposed algorithm for finding a collision-free path is characterized by reactive behavior and the smooth way. Mobile robots, on the other hand track the route without hitting obstacles.

2. LITERATURE SURVEY

D. Xin, C. Hua-hua, and G. Wei-kang, "Neural network and genetic algorithm based global path planning in a static environment" [1], Global robot planning is an important issue in a stable environment. In the paper a method of global path planning based on neural networks and genetic algorithms is proposed. We created a neural network model of atmospheric information in the workspace for the robot and used this model to establish the relationship between collision avoidance paths and the model's output. Then the two-dimensional coding for the way-points was converted into one-dimensional space, and the combination of both the collision avoidance path and the shortest distance was integrated into the fitness function. Duplicate results showed that the proposed method is appropriate and effective.

Y. Koren and J. Borenstein, "Potential field methods and their inherent limitations for mobile robot navigation," [5], Potential field methods are becoming increasingly popular in obstacle avoidance applications for mobile robots and manipulators. The potential field principle is particularly attractive because of its variance and simplicity, but a large number of shortcomings have been identified as problems with the underlying problem in this theory. Based on mathematical analysis, this paper presents a systematic critique of inherent problems. The heart of this analysis is a different equation that combines robots and environments into a cohesive system. The issues identified are discussed qualitatively and theoretically, and are documented, along with experimental results on actual mobile robot running.

J. Borenstein and Y. Koren, "The vector field histogram—fast obstacle avoidance for mobile robots," [8], A new real-time obstacle avoidance method for mobile robots has been developed and implemented. This method, called vector field histogram (VFH), allows detecting unknown obstacles while simultaneously steering the mobile robot while avoiding collisions. The VFH method uses a two-dimensional Cartesian histogram grid as a global model. This world model is constantly updated with the range data sampled by the on-board range sensor. The VFH method

then uses a two-step data-reduction procedure to calculate the desired controlled commands of the vehicle. In the first stage, the histogram is reduced to a one-dimensional polar histogram created around the transient location of the grid robot. Each sector in the polar histogram has a value indicating the density of the polar barrier in that direction. In the second stage, the algorithm selects the most appropriate area in all polar histogram regions with low polar barrier density, and the steering of the robot is aligned in that direction. The experimental results of the mobile robot show the strength of the VFF method of slow motion and a dense turbulent obstacle course at an average speed of 0.60.7 m / s.

3. SYSTEM ARCHITECTURE

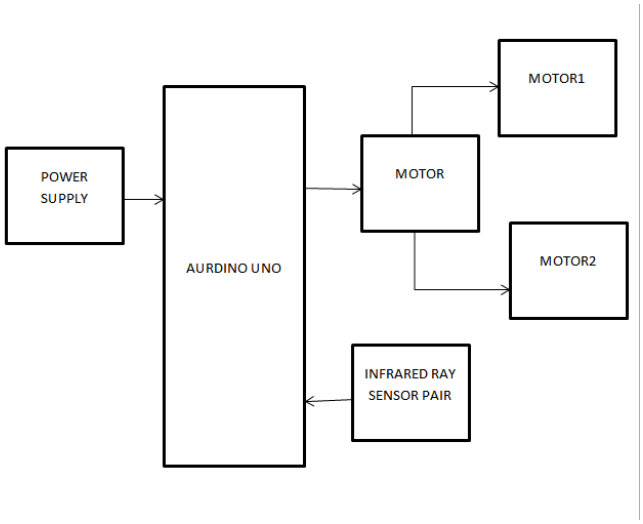

Fig -1: System Architecture

This system uses several hardware modules to detect obstacles. The robot changes when an obstacle is detected by an IR sensor using the motor, its direction automatically.

4. WORKING

When the robot is moved. This path finder detects an obstacle using a robotic IR sensor. These IR sensors work on light. It has one LED for the transmitter and a photodiode for the other receiver.

When the transmitter transmits a light wave and a barrier is detected, this light wave is received by the photodiode. The IR sensor also has a potentiometer to adjust the barrier and the distance between the sensors.

When the obstacle is detected, the robot changes direction. This means that when the robot is in front, the robot will be moved to the right or left or back. This way the robot avoids obstacles and reaches the destination safely.

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