International Journal of Research
Available at https://edupediapublications.org/journals
p-ISSN: 2348-6848
e-ISSN: 2348-795X
Volume 03 Issue 17
November 2016

Navigation of Automatic Vehicles Techniques of Ai

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ABSTRACT:

In the field of navigation of mobile robots has been studied and the task of A new generation of mobile robots no Co robot. This mobile robot navigation was Seen in an unknown environment. We consider 4-wheel cars (Co robot) of the track Planning, independent Android and avoidance of obstacles and collision for use in sensors Based on Android. We suggest that the robot's preset distance to aim and do Android target tracking at this distance and improving track characteristics. The The robot will then navigate between these obstacles without hitting them and reaching the specified Diana. To achieve this purpose different techniques and radial base function are used. Background algorithm deployment under the study of the neural network. In this Co-robot robotic arm It is mounted and kinetic analyzes Corobot arm and the help of a control panel for Phidget The wheels can be moved in the forward and reverse direction by the remote control of two motors, it must be Do. The kinetic analysis by virtue of the proposal of the relations between the positions and Direct links of skylights. In the techniques of these industrial and special studies Show control strategy with potential applications in the fields of industry, security, Defense, research, and others. Finally here, and as a result of the simulation using neural we bot This has been done and the network is compared to this result with the experimental data for various Training pattern.

INTRODUCTION:

Mobile robots have high potential in several applications. These include automatic driving with guidance for the blind and disabled, explorations of dangerous or unknown regions. Current research and development of mobile robot have attracted the attention of researchers in the areas of engineering, biology, mining, industrial and others. Autonomous mobile robots are intelligent agents which can perform desired tasks in various (known and unknown) environments without continuous human control. Many kinds of robots are autonomous to some step. One important area of robotics research is to enable the robot to cope with its environment whether this is on land, water, in the air or in space. Autonomous mobile robotics is a challenging research topic for several reasons. First, a mobile robot should able to identify features, detect obstacles, patterns and target, learn from experience, find a path and build maps, and navigate. These abilities of mobile robot require the simultaneous application of many research disciplines such as Engineering and their application. Secondly, autonomous mobile robots are the closest approximation of intelligent agents. To satisfy this goal mobile robotics research has increasingly incorporated artificial intelligence enabling the machines to mimic living beings. Path analysis and planning is another exciting challenge in building autonomous mobile robots. An autonomous robot must be able to learn its environment and programming itself without assistance. It consists on finding a route from the origin of the robot to its target destination. Path analysis and planning becomes more difficult when some static as well as dynamic obstacles are added to the environment. Thirdly, and we use an autonomous mobile robot i.e. Corobot for navigation and use the AI techniques to evaluate the path of robot. Also we show the webot software simulation and Radial basis function for this Corobot

LITERATURE REVIEW:

In a new proposal to solve the problem of path planning and obstacle avoidance for mobile robots and the study in the field of navigation of mobile robot gained an extensive interest among the researchers and scientists since last few decades. Nowadays, robotics is an important part in manufacturing practices. About mobile robots, autonomous navigation involves a great task. A mobile robot (MR) can be very beneficial in different circumstances where humans could be in risk or when they are not able to reach positive goals because of terrain environments. Like Examples of everyday tasks of driving in city traffic, parking a car, and house cleaning. In accomplishment such familiar tasks, humans use observations of time, distance, speed, shape, and other aspects of physical and mental things. For any autonomous robot obstacle avoidance is the primary requirement. Many sensors and actuators are requires for integration and coordination for designing a robot. A mobile robot is an automatic machine that is accomplished of drive in a given environment. Mobile robots have the ability to move around in their environment and are not fixed to one physical situation. In compare, industrial robots usually consist of a jointed arm and gripper assembly that is attached to a fixed surface. Navigation is a field of study that efforts on the process of monitoring and controlling the movement of a vehicle from one place to another. This navigation field includes different general categories i.e. marine navigation, land navigation, aeronautic navigation, and space navigation. It is also the term to use for the specialized knowledge used by navigators to carry out navigation tasks. To locating the navigator position compared to known locations involves different navigational techniques. In physics and mathematics is a system in Non-holonomic environment whose state depends on the path taken to achieve it. Such a system is refer to by a set of parameters subject to degree of difference constraints, such that when the system go forward along a path in its parameter space (the factors varying continuously in values) but finally returns to the original fixed of values at the start of the path, the system itself may not have back to its original state. Fuzzy logic is a form of many-valued logic or probabilistic logic; it deals with reasoning that is fairly accurate rather than fixed and exact. Fuzzy logic has been extended to handle the concept of truth, where the truth value may range between completely true and entirely false. Still, when linguistic variables are used, these degrees may be able to specific functions. Robotics is the branch of technology that deals with the design, fabrication, operation and application of robots and computer systems for their control, sensory response, and information giving out. These technologies compact with automated machines that can take the place of humans, in harmful or manufacturing processes, or simply just are like humans. The mechanical structure of a robot must be controlled to perform jobs. It involves three distinct phases for control of a robot – perception, processing, and action. Sensors give facts about the environment or the robot itself (e.g. the position of its joints or its end effector). During the past few years, wheel-based mobile robots have attracted considerable attention in various industrial and service applications. For example, room cleaning, factory automation, transportation, etc. These applications require mobile robots to have the ability to track specified path stably. In general, Non-holonomic behaviour in robotic systems is particularly interesting because most mobile robots are Non-holonomic wheeled mechanical systems. Control problems of mobile robot caused by the motion of wheels that has three degrees of freedom, while control of the mobile robot is done using only two control signals under Non-holonomic kinematics constraints. Matveeva & Teimoori [1] consider the difficulty of navigation and guidance of a wheeled mobile robot towards a target based on the measurements concerning only the distance from the robot to the target. We propose a controller that drives the robot to the predefined distance from the target and makes the robot follow the target at that distance. Mohareri et al. [2] presented the design and operation of an adaptive path tracking controller for a wheeled mobile robot (WMR) with unknown parameters and uncertain dynamics. The learning ability of neural networks is used to design a robust adaptive back stepping controller that does not require the knowledge of the robot dynamics. Systems are found in different applications ranging from unicycles and car-like vehicles, possibly equipped with trailers, to systems like rolling spheres, snake-like robots, snake boards, roller racers, and wheel-chairs. A wheeled mobile robot (WMR) is one of the well-known systems with nonholonomic constraints, and has addressed its tracking control problem. Kanda et al. [3] shows the various mechanisms have recently been developed that combine linkage tools and wheels. In exact, the combination of passive linkage mechanisms and small wheels is a main research trend because standard wheeled mobile mechanisms finds it difficult to move on rough terrain. We propose an environment recognition system for a wheeled mobile robot that consists of multiple organization analyses to make the robot more adaptive to various environments by selecting a suitable system such as decision making, navigation and controller using the effect of the environment recognition system. In environment recognition system, image data, laser scanner data, GPS and Inertial Navigation System (INS) are often used for self-localization and mapping. Sekmen et al. [5] dealt with the advances in technologies to create ever more sophisticated robots is outpacing our understanding of how such robots and humans successfully interact to complete specific responsibilities. In specific, it is now possible for humans to control the navigation of certain classes of robots via the Internet. The World Wide Web (WWW) provides an inexpensive and widely accessible means for teleoperation. Both computer and Internet technology are improving with amazing speed and some robotics researches have begun exploring tele-presence applications. In fact, the only information the human operator may have about the ‘‘terrain’’ is the information available through the robot control interface.

Sebastian Thrun [6] defined autonomous robots must be able to learn and maintain models of their environments. To efficiently carry out complex missions in indoor environments, autonomous mobile robots must be capable to secure and maintain of their environments. Deepak et al. [7, 8] have presented mobile robots which are widely used in various fields such as domestic fields, industries, security environments etc. because of their movement nature. So motion planning is one of the vital issues in the field of mobile robots. In which, the robot should adapt the behavior learning from the sensory information without continuous human interference. The main objective of a navigational controller of an autonomous mobile robot is to generate collision free trajectories within its workspace. For mobile, autonomous robots the capability to purpose in, and interact with, a dynamic, changing environment is of key importance. Ming et al. [9] have used incorporation of an integration procedure is becoming an increasing necessity for autonomous robotic vehicles capable of moving along in the industrial environment. This is due to a change in the kind of application required from robotics. Usually these new applications have the same basic features: a mobile robot that moves in a partially unknown industrial environment, trying to reach a target, and an articulated arm joined to the vehicle which is devoted to carrying out the required tasks. Dautenhahn Kerstin [10] defined autonomous robots are integrated into human people, interacting and cooperative both with humans and with each other. This goal is to suggest that these ideas should also find their way into the sciences of the artificial. Andrzej & Skrzypczynski [11] had studied the autonomy of mobile robots directly depends upon the availability of the adequate model of the environment, which can be used to back up the robot tasks at hand. In the case of robots operating in industrial environments the map could be provided in advance. Ulrich et al. [12, 13] have defined the following three properties are foundations of robust robot navigation: (i) the use of landmarks (ii) the use of undisputed paths, and (iii) the use of topological rather than geometrical maps. Navigation is a key for any mobile robot in its most predictable form; the navigation problem can be stated as follows: given that a robot is at a unknown location in a unknown environment, how does it go about success a goal location. Danny & Phillip [14] shows navigation an outdoor robot, one of the problems of navigating robots is that many electronic sensing systems do not produce this rich sensor data. A second

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problem is that the sensors that yield rich information are not yet able to reliably perceive objects. This limitation of robot sensing and perception places severe constraints on the ability of a mobile robot to navigate. Fua et al. [15] shows for miniaturized mobile robots that aim at travelling unknown environments, contact 3D sensing of basic geometrical features of the surrounding environment is one of the most important capabilities for survival and the mission. Range sensors are usually used for non-contact exploration of the surrounding environment and for the purpose of robot dynamic navigation, and they include passive sensors and active sensors. Compared with passive sensors, active sensors, which include infrared sensors, ultrasonic sensors, and laser sensors, offer more reliable range sensing. Infrared sensors are simple, small and cheap; however, they have rather shorter sensing range and less range resolution compared to other optical sensors. In addition, because an infrared sensor only measures a range distance from the sensor coordinate frame to the target point at a time, so it needs to be scanned two dimensionally for 3D sensing. Thrun Sebastian [18] states that, a mobile robot, equipped with optical, ultrasonic and laser sensors, learns to servo to a designated target object. In less time operation, the robot is able to navigate to a marked target object in an unknown environment. Mohd Nazri & Saad [4] states Person detection and tracking systems are important capabilities for applications as a service robot in different environment. This work presents a simple method that able to visually detect and track specific person using a single camera based on hybridization method of image information. This method is applied to estimate the position and orientation of a moving target person in crowded environment. The range between the target person and the mobile robot can be computed in real-time using a set of markers so that the robot can control its speed and direction to follow the target person as closely as possible. Sebastian Thrun [6] deals Sensors are not capable of directly measuring the mass of interest. Example, like cameras measure colour, brightness and capacity of light, whereas for navigation one might be interested in statements such as “there is a door in front of the robot.” One of the robots (AMELIA) is similarly fitted out with a laser range finder, which measures closeness of nearby objects with higher 3-D resolution. Wenfeng & Weiming [16] states wireless sensor network (WSN) nodes can closely sense their surroundings in a convenient and distributed way so that they can be considered as nerve terminals connected to a network such as the Internet. Recently, due to their great application potential, a trend has emerged that combines wireless sensor networks (WSN) and multi-mobile robots (MMR). Interesting applications can be found in disaster emergency response, military, communication, transport, and plant automation. Nippun & Sudarshan [17] states that, video capturing is one more approach is used to teach the robot. In robot will follow a human demonstrator and simultaneously gathers information of the environment. Initially, a robot is controlled by a human operator who manually guides the robot through a desired path. Weckesser & Dillmann [19] defined a Robots are supposed to operate in dynamic and changing environments together with human beings and other static or dynamics objects. Sensors that are capable of providing the quality of information that is required for the described scenario are optical sensors like digital cameras and laser scanners. A multi-sensor system supports the vehicle with odometric, sonar, and visual and laser scanner information. The goal of this work is making robot navigation safer, faster, more reliable and more stable under changing environmental. Danny & McKerrow [14] show Titan is a mobile robot built for outdoor navigation research. Titan measures its location relative to the path edge with a continuous transmission frequency modulated (CTFM) ultrasonic sensor and steers to follow a trajectory relative to the edge. Miikkulainen et al. [20] dealt about path-planning, it decides continuous from discretized places and describes procedures applicable when the implementation of a plan fails. It maintains for an integrated conception of such procedures, which must be tightly designer to the specific robot that is used, notably to the abilities and limitations of its sensory-motor tools. Path-planning, which is the process of selecting a course of actions to reach a aim, given the current location? Garcia et al. [21] defined in the Motion Planning investigation field and a method has demonstrated to outperform classical approaches gaining popularity in the last 35 years. This presents a proposal to solve the problem of path planning for mobile robots based on Simple Ant Colony Optimization Meta-Heuristic (SACO-MH). The new method is called SACOdm, where d stands for distance and m for memory. The path planner application has two operating modes, one is for effective environments, and the second one works with an actual mobile robot using wireless communication. Both operating modes are overall planners for plain terrain and support static and dynamic obstacle avoidance. Marsland et al. [22] shows in landmark-based navigation systems for mobile robots, sensory perceptions (e.g., laser or sonar scans) are used to identify the robot's current location or to construct internal demonstrations, plans, of the robot's environment. Presence based on an outdoor structure of reference landmark-based robot navigation systems are now widely used in mobile robot applications. The problem that has concerned most attention to date in landmark-based navigation research is the question of how to deal with perceptual aliasing, i.e., perceptual uncertainties. In difference, what constitutes a good landmark, or how to select landmarks? The usual method of landmark selection is to map observation sat regular intervals, which has the problem of being inefficient and possibly disappeared 'good' landmarks that lie between sampling points. Fua et al. [15] defined based on different working principles laser sensors can be categorized into time-of-flight (TOF) and triangulation. The TOF laser scanners have the advantages of a wide measuring range and high relative accuracy at a long distance; however, they are expensive, high power consumption and heavy. Commercial TOF laser scanners such as the HOKUYO URG-04 LX and the Swiss Ranger SR4000 are still too large to be used on centimeter-scale miniature mobile robots

CONCLUSION:

In this thesis report, from the literature review we conclude that present a new mobile robot navigation strategy based on the WMR with unknown environment towards the proposed controller drives robot ultimately target at the required distance with the given speed. The aim was to obtain robust robot control suitable for real-time requirements and a laser scanner on a movable part actuated by a motor for navigation of mobile robots. Obstacle avoidance and gateway detection can be implemented using proper navigation strategies. The method suggested can be applied to the robot manipulators with a mobile obstacle obstructing the motion of the mobile robot, show the effectiveness of the proposed approach. It is also observed that in order to navigate between two known locations seem to prefer well defined and constant paths, even if this means longer travel distances. A method of detection and tracking a specific object based on colour camera has been implemented use of combining colour features and shape information of objects. This system points out several different modelling services, and enhances a lot the robot autonomy and efficiency. Finally, we must improve the robot speed by enhancements on the global system performance. To solve the problems of landmark tracking and understanding a techniques of image processing and pattern recognition are integrated. Some robotic applications require a wide spread coverage algorithm to agreement that the robot's path covers the whole obstacle-free part. Validation of theoretical and work has been done by simulation and a real world tests by a COROBOT simulation has been developed.

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