Vision Based Object Tracking & Firing System

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Abstract **Fundamentally weapon is something that can use to overcome danger situation where there is a risk of life. Improvement of weapons is progressively done with growing innovation. The specialists are hustling to create innovation terminating framework for security intrigue that can be put in defensively covered vehicle. This paper proposed an well-equipped system together of Automatic Guided Vehicle (AGV) and firing system. A proposed firing system is able to follow the direction of motion of target wherever they move. As this tracking and firing system is placed on AGV, which can be controlled wirelessly by person sitting at one place. AGV an unmanned battery car can increased automation in almost all field of industry. Tracking and detection for unauthorized person done from one fixed place is not so beneficial as compared to proposed tracking and firing system built on moving platform. This collaborative security model reduces the risk of human life and form intelligent solution for defense.**

Keywords Vision System, AGV, Moving Object Detection and Tracking

I. INTRODUCTION

Advancement in manufacturing industries lead to increase AGV usage is large, which ultimately raise product efficiency in terms of mass production, fast packing and delivering and other services. The AGV is profoundly adaptable because of remote correspondence. Improved product handling and better speedy operation as it allows precision turning and accurately navigate in tight spaces. With the guide of natural sensors, the AGV can recognize protests in its crash way [1,3]. Mechanization dispenses with vehicle congested driving conditions and their potential for mishaps. As automation reduces the risks of personal injury. The development of the advanced weapon technology involves various research activities within which the applications of modern control methodology and knowledge-based intelligent control approaches play significant roles. Vision based object tracking is done by pi-camera mount above the automatic guided vehicle. The purpose of the vision based object tracking control system is to rapidly stabilize and accurately point a target position regardless of external disturbances such as base motions and firing effects; parameter variations such as changes of load; nonlinearities such as backlash, Coulomb friction, and servo limitation; and unmolded dynamics such as gun barrel flexible modes. The performance requirements of the controller for the vision based object tracking system can be summarized as Closed-loop stability under parameter variations and non-linearity. Rapid and accurate command performance. Disturbance and sensor noise rejection. Object/target tracking refers to the problem of using sensor measurements to determine the location, path and characteristics of objects of interest. A sensor can be any measuring device, such as radar, sonar, ladder, camera, infrared sensor, microphone, ultrasound or any other sensor that can be used to collect information about objects in the environment.

II. LITERATURE SURVEY

In earlier, simulation in AGV for DC motors as input to five bar mechanism is done using C++ where graphical user interface is design and MatLab software is used for designing mamdani controller. Designing such complex controller is again a challenging task. In order to express elementary movement of DC motors a new command system is introduced. Each command is correspond to the elementary movement of motor. But in proposed system the simulation of DC motor [2] for guided vehicle is done using python language. Here, GUI is already installed in tkinter package with reduced software requirement like putty and VNV viewer. Reference papers used supervised learning mechanism for object detection according to their views from set of examples. A standard formulation of supervised learning classification problem where the learner approximates he behavior of a function by generating an output in form of either a continues value, which is called regression, or a class label which is called classification. In object detection [5] the learning examples are composed of object features and an associate object class where both of these quantities are manually defined. Supervised learning methods require a large collection of samples from each object class. It has been found that starting from a set of labeled data with two sets of statistically independent features, containing has been used to reduce the amount of manual interaction required for training in the context of ad boost and support vector machines. Basically tracking is used to estimate target object location by getting sequence of image from initial position to lasting position [4]. There are three main methods of object tracking and they are, Point Tracking, Kernel Tracking and Silhouette Tracking.

Point Tracking: This approach requires an outside system to distinguish the items in each edge.

Kernel Tracking: In this tracking from one frame to next frame primitive object [6, 7] region is represented for movement of target object.

Silhouette Tracking: This form of tracking makes the use of encoded information present in object region.

III. PROPOSED SYSTEM

The proposed system is real time system will used for continuous monitoring purpose. The system will recognize the person entered in prohibited area is authorized or not. If the person is unauthorized then it will start firing on the person. The whole system is controlled by using Raspberry Pi micro controller.

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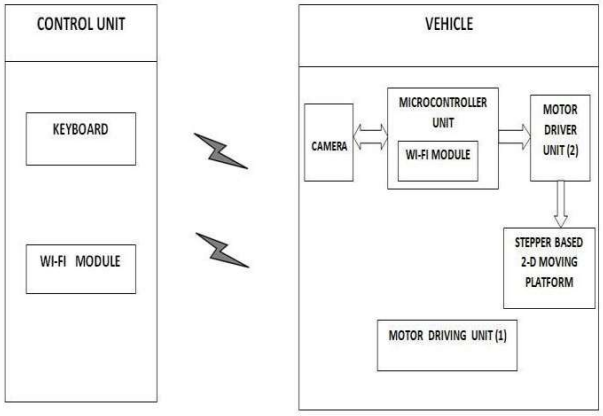

Fig. 1. Block Diagram of Overall System

In fig. 1 Block diagram has been shown, there is wireless connection between control unit and vehicle. Control unit consists of keyboard and Wi-Fi module. Both micro controller unit and control unit are connected to mobile hotspot. When in built Wi-Fi of micro controller gets connected to mobile hotspot, it will give unique IP address. Now this IP address is now put in putty and micro controller get connected to control unit. The Operating system installed in raspberry Pi is Raspbian Jessie. This Raspbian Jessie contains inbuilt VNC server which helps to establish wireless connection remote desktops. This same IP address need to give to VNC server application which is installed in the Laptop. The new window will pop up which is remote desktop of RPi, now the keyboard of laptop can be used to control the direction of vehicle. Tk is the command through which the keywords can be used for controlling purpose. W key is used for forward direction. S key is used for reversed direction. A key is used left direction. D key is used for right direction. P key is stop the vehicle. Motor Driving Unit (I) contains L298N motor driver which is used to control the speeds of four DC motors connected to the wheels of the vehicle. Motor Driving Unit (II) contains two L298N motor drivers. These two stepper motor 2D moving platform. Pi Camera is interfaced to the micro controller through CSI port [5]. Pi Camera is used for recognition through video streaming. Using face recognition system will check whether person is unauthorized. Based on this, the firing system will take the decision.

A. Hardware specifications

The complete hardware components used and its specification details have been given in following section. Fig. 2 shows Raspberry Pi.

Fig. 2 Raspberry Pi (Ref. Datasheet of Raspberry Pi3)

Ultrasonic Sensor

Ultrasonic sensor works in the principle of echolocation sound wave transmitted, bounced back and received, with the time difference used to calculate the distance of object. Shown in fig.3

Fig. 3 Ultrasonic sensor (Ref. Datasheet of ultrasonic sensor)

Features: Range - 2cm to 4m Beam-width - 30Deg, Beam Pattern - Conical Frequency - 40KHz, Unit Cost - 180INR

L298N Motor Driver

This dual bidirectional motor driver is based on the very popular L298 Dual H-Bridge Motor Driver IC. This module will allow you to easily and independently control two motors of up to 2A each in both directions, shown in fig. 4.

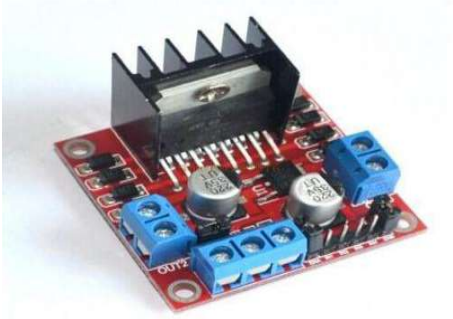

Fig. 4 L298N Motor Driver (Ref. L298N Motor Driver Datasheet)

Features: Light weight and small dimension Super driver capacity, FWD protection, Heavy load heat sink, 4 standard mounting hole Power selection switch.

Raspberry Pi Camera

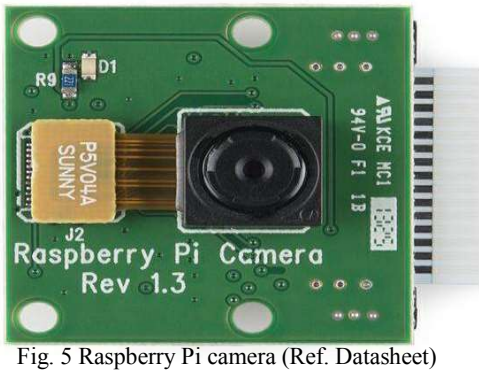

Fig. 5 Raspberry Pi camera (Ref. Datasheet)

Features: Picture formats - JPEG(accelerated); JPEG + RAW, GIF;BMP; PNG, Video formats - w:h264(accelerated) Exposure modes - auto; night; night

preview; backlight; pot light; sports Resolution - 5Megapixels Video modes - 1080p30; 720p60&640 480p60/90 Sensor resolution - 2592 944pixels Sensor image area - 3.76 2.74mm, shown in fig. 5

B. Software system details

Fig. 6 shows system flowchart for overall functioning.

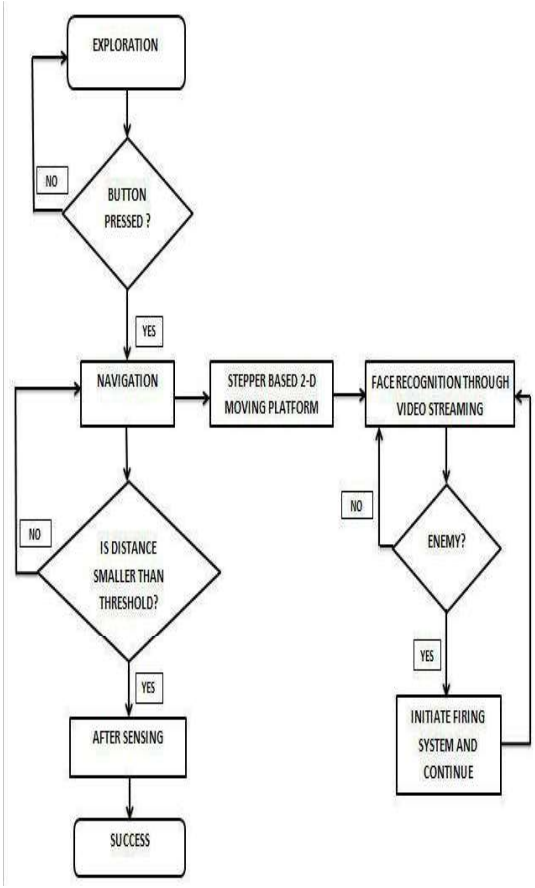

Fig. 06 Flowchart for the system

IV. RESULT

Here the result of the implemented system are given with the received results. Fig 7. Shows actual implemented hardware

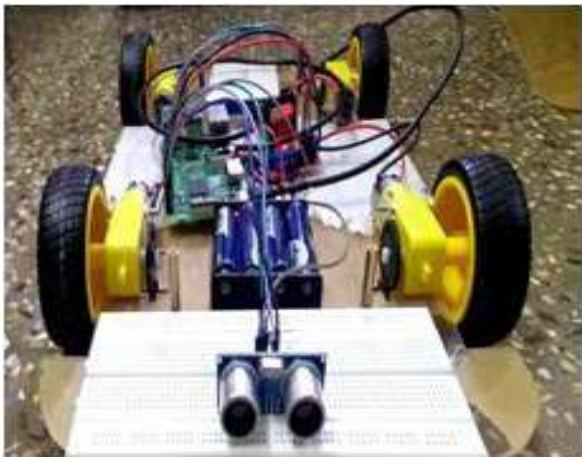

Fig. 7 Prototype of developed system

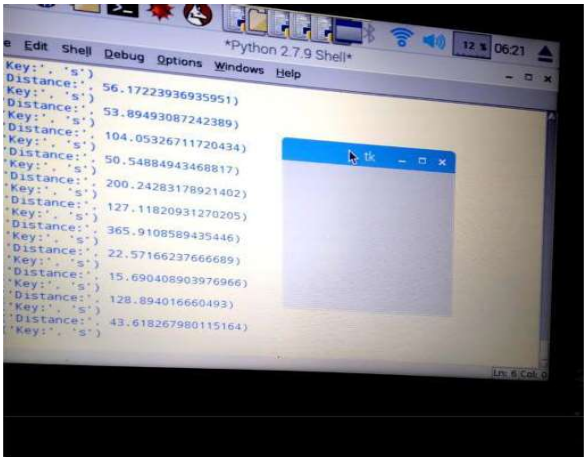

Fig. 8 Output of Ultrasonic sensor

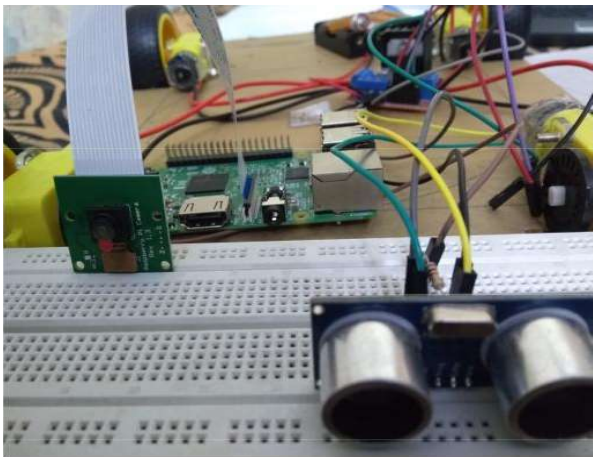

Fig 9. Interfacing of Raspberry Pi and camera

Here fig 8 and 9 shows software results and interfacing of various components.

Advantages

1) Compact.
2) Superior Performance.
3) Advanced Component.
4) Minimal Maintenance.
5) Silent Operation.
6) Silent Installation and Integration.
7) Does not cause Friendly fire.

Future scope

1) By using this system number of human resource can be reduced.
2) This kind of system can be placed at VIP houses.
3) Fatal accident like getting injured while some consequences can be avoided by using this kind of system.
4) Firing system can be automatically aimed and fired at targets that are detected by image sensor.
5) Importance of object tracking is reflected by the board area of applications such as video surveillance, human computer interaction, and robot navigation.

V. CONCLUSION

The results obtained from coding and interfacing of various components successfully, a well efficient unmanned car with tracking system gets developed. Because of automatic guided vehicle the tracking and firing is well efficient in terms of reduce man work, centralized operation and artificial intelligent. Tracking information, help us to answer numerous biological questions and save researchers a great deal of time. Useful information can often be obtained from even poor quality video. For example, it is difficult to distinguish amongst individuals in gray-scale video. Tracking for object in video containing large amounts of background movement is challenging task, which is often a result of wind when a camera is set-up with a hanging-pulley system. The main objective was to design and develop intelligent visual surveillance systems to assist the human operators to detect unusual events in the video sequence and responding to them rapidly.

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