

Path Following Weaponary Robot

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Abstract: Path 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. Sensing a line and direction the robot to stay on course, while constantly correcting wrong moves using feedback mechanism forms a simple yet effective closed loop system. As a programmer you get an opportunity to 'teach' the robot how to follow the line thus giving it a human-like property of responding to stimuli. Practical applications of a line follower : Automated cars running on roads with embedded magnets; guidance system for industrial robots moving on shop floor etc. Projectile stun guns have been developed as less-lethal devices that law enforcement officers can use to control potentially violent subjects, as an alternative to using firearms. These devices apply high voltage, low amperage, and pulsatile electric shocks to the subject, which causes involuntary skeletal muscle contraction and renders the subject unable to further resist. A stun gun is an electrical self defense weapon that uses high voltage to stop an attacker. Touching a person with the prongs on the stun gun quickly immobilizes the attacker. However, because the amperage of a stun gun is very low, no serious or permanent injury is inflicted.

Keywords: IR sensor, LASER, Microcontroller, Rotating Motors, Stun Gun.

I. INTRODUCTION

Path 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. Sensing a line and direction the robot to stay on course, while constantly correcting wrong moves using feedback mechanism forms a simple yet effective closed loop system. As a programmer you get an opportunity to 'teach' the robot how to follow the line thus giving it a human-like property of responding to stimuli. Practical applications of a line follower : Automated cars running on roads with embedded magnets; guidance system for industrial robots moving on shop floor etc.

We 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. Present project is designed using the applications of stun gun and laser gun for antiterrorist activities. A Stun gun emits energy in an aimed direction without the means of a projectile. It transfers energy to a target for a desired effect. Intended effects may be non-lethal or lethal.

Many scientific, military, medical and commercial laser applications have been developed since the invention of the laser in 1958. The coherency, high monochromaticity, and ability to reach extremely high powers are all properties which allow for these specialized applications.

II. INITIAL WORK

A. Working Stage:

The working model of a line follower consists of One Microcontroller, Two IR Sensor's, One IR Shield, Two Rotating Motors, Two Wheels, Wires and Battery's. Path Follower robot is a movable machine that can follow a path. The path can be a visible Black line on a White surface. Programming is done in Aurdino and given to the Microcontroller through USB port. Power Supply is given through the Battery's. Microcontroller Ground & VCC is Connected to IR Shield Ground & VCC resp.

Ground of IR Sensor's is Connected to IR Shield ground. VCC of IR Sensor's is Connected to IR Shield VCC. The IR sensors receive an analog signal that depends on the intensity of light reflected by the black line of emitted beam by the LEDs. Output's of IR Sensor are sent to the ADC comparator which creates digital signals that are sent to Microcontroller.

Output's of Microcontroller pins are connected to IR Sheild Input's. Rotating motor is Connected to the IR Shield through four core wires. The Microcontroller gives instructions to motor to perform work. According to the instruction Motor run and stop.

B. Final Work:

Stun guns are designed to key into the nervous system. It dumps its energy into the muscles at a high pulse frequency that makes the muscles work very rapidly, but not efficiently. This rapid work cycle depletes blood sugar by converting it to lactic acid all in just seconds. The resulting energy loss makes it difficult to move and function. At the same time, the tiny neurological impulses that travel throughout the body to direct muscle movement are interrupted. This causes disorientation and loss of balance and leaves the attacker in a passive and confused condition for several minutes. Still, there is no significant effect on the heart and other organs.

The beam of a laser gun is easily aimed at a target, and scanned across the front grille area at a typical 400 to 600 feet. At those distances, the laser beam is about 12" to 22" wide, depending on manufacturer of the laser gun. Even if you had an excellent radar detector up in the windshield, it probably would not detect the laser beam down on the front grille of target, due to how narrow the beam is. Laser = Light Amplification by Stimulated Emission of Radiation.

The typical laser diode used in a laser is an infrared, semiconductor, Gas laser diode. The light energy has a wavelength of 904nm (nanometers). The typical beam width is approximately 12" wide (0.3 m) at 100 m distance, or 2.5 - 3 ft wide at 1000 ft distance. The laser beam looks like a picket fence, a bright pulse of light, followed by a shadow, then a bright pulse, another shadow, typically between 40 to 70 pulses, travelling at the speed of light.

III. RELATED WORK

1) Kessel R.:

A dazzler, sometimes called an optical distracter, transmits a visually intense light, usually in a narrow beam, in order to 1) attract the attention of a person and to make them alert to other visual or audible warnings against approaching a protected asset in a threatening manner, or 2) to suppress the actions of noncompliant persons (continued advance or aiming of weapons) by obscuring their vision with disability glare. Dazzlers feature in land operations, at military check points in non-combat land operations, to momentarily distract an assailant, to alert drivers in vehicles approaching a check point, and to alert civilian traffic to approaching forces. Dazzlers are being considered for maritime security; for port protection, counter piracy, and critical infrastructure protection to warn the occupants of small boats and for suppressing the vision of noncompliant persons who may be intent on attacking. The distances of initial detection and warning for maritime operations are generally much longer (on the order of 300 to 3000 m) than the distances in land operations (50 to 300 m). Dazzler aiming is furthermore likely to be under automatic control rather than handheld as in land operations, in order to more control dwell time against a distant contact, and to provide a large operator-dazzler separation for operator safety in counter piracy.

2) McDaniel WC, Benwell A ,Kovaleski S:

Projectile stun guns have been developed as less-lethal devices that law enforcement officers can use to control potentially violent subjects, as an alternative to using firearms. These devices apply high voltage, low amperage, and pulsatile electric

shocks to the subject, which causes involuntary skeletal muscle contraction and renders the subject unable to further resist.

3) Sabrina M. Varanelli:

Current weaponized robotic systems are too expensive for use by law enforcement agencies and yet are being demanded more and more by these agencies to augment existing human teams and to help expedite dangerous missions. In conjunction with Black I Robotics Inc., this project developed a low cost robotic device capable of accurately and safely firing a variety of Semi-automatic weapons at stationary targets. The project involved the formulation of project specifications as well as the design, fabrication and testing of the device. This system will be further developed by the company and potentially mounted on the arm of a Black-I Robotics' LandShark robotic platform and to increase the marketability of their current LandShark robotic platform for use by law enforcement agencies.

IV. MODULES

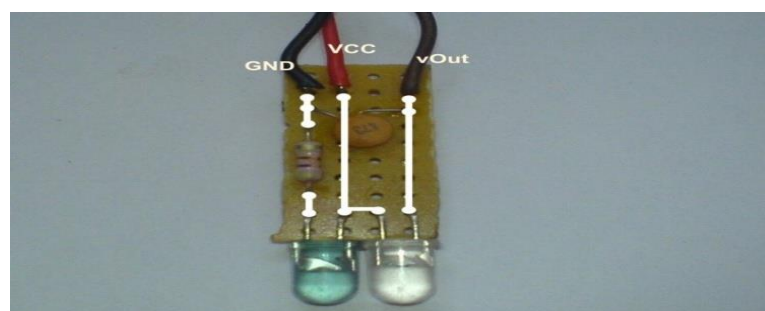
4.1 Microcontroller:



A microcontroller (sometimes abbreviated μC , uC or MCU) is a small computer on a single integrated circuit containing a processor core, memory, and programmable input/output peripherals. Program memory in the form of NOR flash or OTP ROM is also often included on chip, as well as a typically small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications.

Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers.

4.2 IR Sensors:



The IR Sensor-Single is a general purpose proximity sensor. Usually its is used for collision detection or obstacle detection. The module consist of a IR emitter and IR receiver pair. The high precision IR receiver always detects a IR signal. The module consists of 358 comparator IC. The output of sensor is high whenever the IR receiver receives a signal

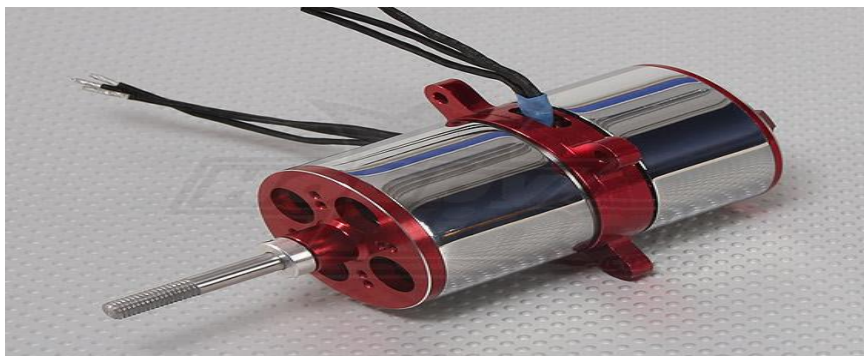
of IR frequency and low otherwise. The on-board LED indicator helps user to check status of the sensor without using any additional hardware. The power consumption of this module is low. It gives a digital output.

4.3 IR Shield:



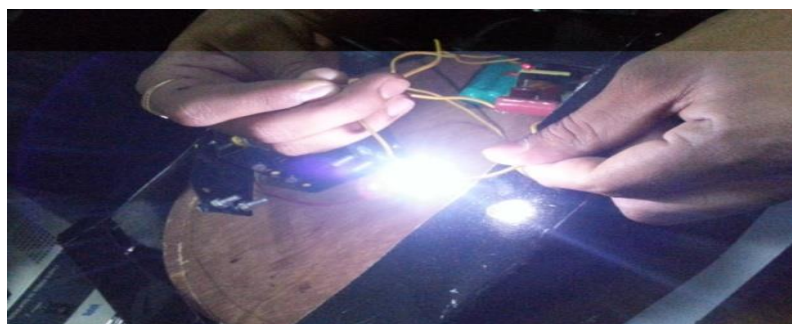
IR Shield is designed for Arduino, which is equipped with infrared receiving and dispatching module, nRF24L01 interface, Xbee interface, Micro SD slot and temperature and humidity sensor. With this IR shield, you can intelligentize your home by making a DIY monitor for indoor temperature and humidity or a controller for IR home appliances such as air-condition and television.

Rotating Motors:



The most common form of **nine-volt battery** is commonly called the **transistor battery** which was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in pocket radios and other small electronic devices. They are also used as backup power to keep the time in certain electronic clocks. This format is commonly available in primary carbon-zinc and alkaline chemistry, in primary lithium iron disulfide, and in rechargeable form in nickel-cadmium, nickel-metal hydride and lithium-ion. Mercury oxide batteries in this form have not been manufactured in many years due to their mercury content

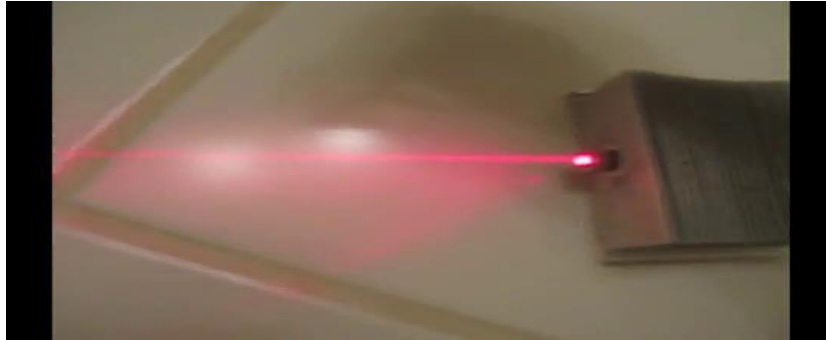
Stun Gun:



A stun gun is an electrical self defense weapon that uses high voltage to stop an attacker. Touching a person with the prongs on the stun gun quickly immobilizes the attacker. However, because the amperage of a stun gun is very low, no serious or permanent injury is inflicted.

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V. FEATURE EXTRACTION

1. Follow Black line on White surface.
2. Stun Gun used to provide security to the Robot.
3. LASER is used to hit the Obstracle Comes across the path.

VI. RESULT

1. Our Robot Successfully Follows the Black path on White surface.
2. It follows the path in minimum time.
3. Provide Security to the Robot.
4. Hit the Obstacle comes across the path.

VII. CONCLUSION

1. It can be used where human life is in risk and can save a human life.
2. This robot can be used for various military applications.
3. The inaccessible areas will be explored with the help of this robot.
4. Many things can be tracked with the help of electronic weaponry robot.

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