

TARGET FIRING DETECTION FOR SOLDIERS

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ABSTRACT – Now a day's Defense Sector plays a major role in our country, we have many battle tanks in the field of war area. In recent years we have studied that our soldiers can practice to Aim so that they can easy to shoot/fire the enemy in the war area. But for practicing the Aim ,we have to use number of bullet so number of ammunition which is highly very costly for the defense budget. So, we can built a system with the help of laser on the transmitting unit and the photodiode on the receiver unit for practicing the Aim of the war tank. In war tank we have two units one is commander unit and the other is the gunner unit, and they both have switches for fire the Aim with a pulse of laser. After firing, on the receiver side we have photodiodes which can detect the pulse of the laser and notify with the led or speaker when the aim is detected. With the help of these our soldiers can practice more without using ammunition.This help store reduce the budget of the defense so that we can use the money on other area.

1. INTRODUCTION

National defence is the core element of the national security system. This means that a functioning and effective defence sector is vital to national safety and security. Defence is also a major part of overall public spending. Therefore, ensuring budgets are spent in an efficient and responsible manner is crucial. India has the strength of low-cost, high-quality production. Presenting the Union Budget 2022-23 in Parliament on February 1st, Finance Minister Nirmala Sitharaman announced, among many others, an increase in allocations for the Ministry of Defense (MoD) by 9.8 percent to INR 5.25 trillion (USD 70.6 billion). The near double-digit rise in the defence allocation comes amidst India's ongoing

military stand-off with China in eastern Ladakh, which is yet to be diffused at the time of writing this brief, even after 14 rounds of talks at the level of the countries' Corp Commanders. India's military spending of \$76.6 billion ranked third highest in the world, according to the reports of 2021. This was up by 0.9% from 2020 and by 33% from 2012. Amid ongoing tensions and border disputes with China and Pakistan that occasionally spill over into armed clashes, India has prioritised the modernisation of its armed forces and self-reliance in arms production. The Indian Army accounts for more than half of the total defense budget of India, with most of expenditure going to the maintenance of cantonments, salaries and pensions, instead of critical arms and ammunition. As of 2019, there is 25% shortfall in the military's budget demand versus the actually budget allocation by the government. There are suggestions to use the military's land bank to generate more funds to bridge this gap for the modernisation of military with the latest Equipment. From November 2019, government exempted the imported defense equipment from the customs and import duties for a period of five year during which domestic production is unlikely to meet the technical demand of the forces. This will result in a savings of ₹25,000 core (US\$3.5 billion) which could be used for the modernization of the forces.

2. LITERATURE SURVEY

Matej MEŠKO, Stefan TOTH University of Žilina, Faculty of Management Science and Informatics, Slovak Republic.

Publish on (November 2017)

COMMENT - The paper proposes method for detection of laser spot emitted by a laser pointer. A camera captures projection screen on which is displayed image from a digital projector and also laser spot from a laser pointer. Our developed algorithm can effectively detect red and green laser spot in real time using image processing and by setting up camera to be captured high intensity of laser beam. To demonstrate the workings of our method we developed a simple game similar to Duck Hunt game in which main goal is to shoot a duck by laser pointers.

2.Aston University, Aston Triangle, Birmingham, West Midlands, United Kingdom

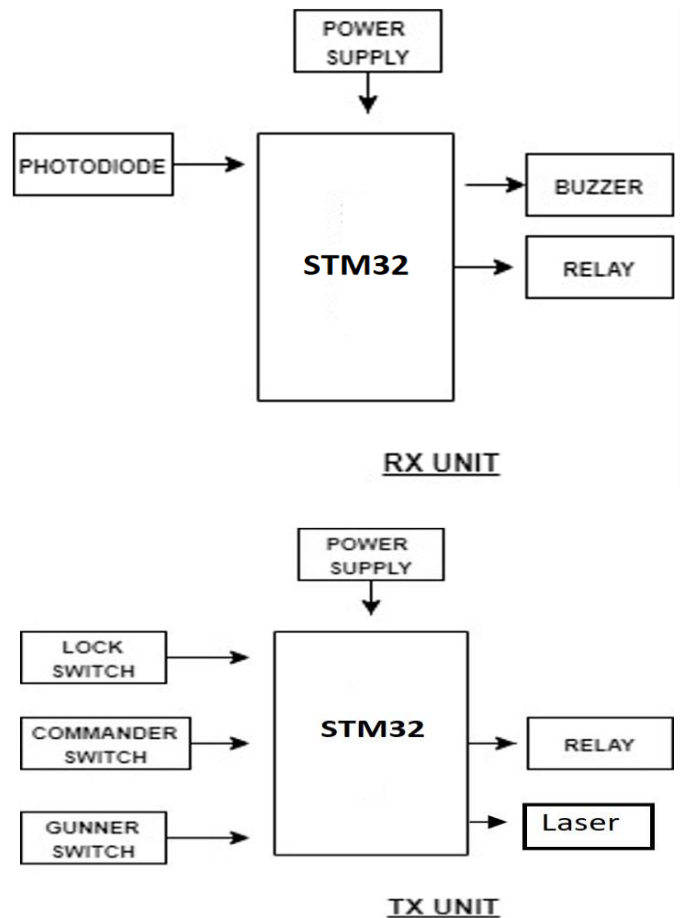
Publish on (January 2013)

COMMENT :- A low-cost method of detecting lasers based on detecting coherence properties of received light is presented. The method uses an unbalanced Mach-Zehnder interferometer with a modulating piezo-mounted mirror in one arm to discriminate against incoherent background light and identify the presence of laser radiation at the nW level against much brighter backgrounds. The wavelength of the coherent input can be determined by comparing the intensities of the modulation frequency harmonics..

3. METHODOLOGY

In war tank we have two units one is commander unit and the other is the gunner unit, and they both have switches for fire the Aim with a pulse of laser. After firing, on the receiver side we have photodiodes which can detect the pulse of the laser and notify with the led or speaker when the aim is detected.

4. BLOCK DIAGRAM



Description:

- Atmega328P microcontroller controls all the operations, it takes input from the sensors and perform the specific task which has to be assigned.
- HC-05 Bluetooth module is used to control the wheelchair directions wirelessly or remotely
- L293d motor driver is used to drive DC motors which can be operates on 12V power supply
- LDR sensor used to detect the light or dark, if dark seen automatically the Bright LED will turn ON to avoid any collisions.
- Two ultrasonic sensors used to detect any type of obstacle to avoid collisions.

- Panic switch is used to alert an emergency with the help of buzzer.

5. COMPONENTS

1. Relay: Relay is an electromechanical device that uses an electric current to open or close the contacts of a switch. The single-channel relay module is much more than just a plain relay, it comprises of components that make switching and connection easier and act as indicators to show if the module is powered and if the relay is active or not.

Features of 5-Pin 5V Relay

- Trigger Voltage (Voltage across coil) : 5V DC
- Trigger Current (Nominal current) : 70mA
- Maximum AC load current: 10A @ 250/125V AC
- Maximum DC load current: 10A @ 30/28V DC
- Compact 5-pin configuration with plastic moulding
- Operating time: 10msec Release time: 5msec
- Maximum switching: 300 operating/minute (mechanically)



Figure:1 Relay

2 Buzzer :-

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.



Fig:2 Buzzer

3. BPW34 Photodiode:-

The BPW34 is a high-speed photodiode with good photo sensitivity. It responds to visible and near infrared radiation. It has a breakdown voltage of 60V with a rise and fall time of 100ns that is a switching speed of 20nS.

Pin Configuration

Pins Identification - The BPW34 Photo diode comes in a 2-pin DIL plastic package as shown above. The diode has no marking on it; the Anode pin can be identified by the gap between the photo receiver panel and the pin. IF the pin has greater gap, it is anode else cathode. Also, the cathode pin will have a small marking on it; you can refer to the above image for clarification.

Features and Specifications

- Reverse Breakdown Voltage: 60V
- Switching Speed: 20nS
- Diode Capacitance: 70pF (1MHz, Vr=0V)
- Open Circuit Voltage: 350mV



Figure: 3 Photodiode

4 Switch(pushbutton)

push button switch is a mechanical device used to control an electrical circuit in which the operator manually presses a button to actuate an internal switching mechanism. They come in a variety of shapes, sizes, and configurations, depending on the design requirements.



Fig: 4 Switch(pushbutton)

6. HARDWARE SETUP:



7. ALGORITHM

1. start the project
2. set AIM to the receiver section
3. press any of switch to fire
4. wait for 6 sec to refire, bcoz we could not fire immediately we have to wait for 6 seconds
5. at receiver section wait for fire from the transmitter
6. when the fire is received a buzzer and LED will ON to indicate target is detected
7. repeat all steps when you practice for aim
8. stop

8. FLOWCHART:

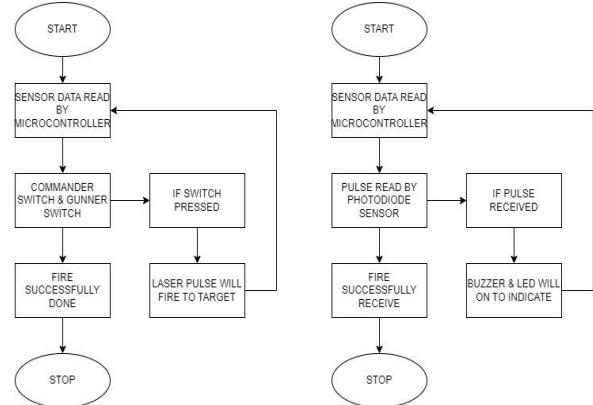


Fig 8: Flowchart

9. RESULT:

By using this method and based on experimental results we are able to detect target more precisely and identify the target individually with exact location of a target. These projects also provide experimental results on different methods for target detection and identification and method for their efficiencies.

A simple transmitter and receiver circuit has been implemented to perform this target firing system. A transmitter has two switches a commander switch and a gunner switch, when fire from both the switches a receiver has a photodiode circuit to receive the laser pulse when detect a buzzer and a LED will ON. This system is test and run successfully without any difficulties.

10. ADVANTAGES

- Low Cost
- Multiple Aim Practice.
- Save Ammunition cost.
- Easy to Operate.

11. CONCLUSIONS

This paper discusses an Armoured Laser Aim Detection system that would help defence services in many ways. The system is in the phase of under development. The system really helps our soldiers to practice more. The ammunitions used in the War Tanks, comes very costly and are also heavy for usage. If the project implements handily, than method of Armoured Laser Aim Detection would bring evolution to standard practicing and

Operation of War Tank. The capital saved with this project can be used in ammunitions that are used in real wars or research and development in defence and other sector. The hardware used in this project comes very handy and are very easy to use.

12. APPLICATION

- Camping and Survival Tools
- Science Experimentation Astronomy Star Gazing
- Detection And Tracking of Moving Objects

FUTURE SCOPE

This paper proposed the not for only soldier Aim detection. We can also use in future for the laser spot emitting by a laser pointer on the projection screen. The algorithm is based on the camera settings and value channel of HSV color model. It can recognize more laser spot colors at once. The algorithm works very well. The developed game proves useful of the algorithm as it has been used for several times to demonstrate of computer vision area. Usage of laser detection algorithm is not only for games but for example to control of presentation through laser pointer (drawing with pointer on a projection screen),

computer control or commercial use in entertainment industry. Therefore our future work will be focused to optimize the recognition algorithm and then to create a real-time application for computer control by gesture.

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