TERMINATOR-ROBOTIC PANZER WITH UNLIMITED RANGE

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***Abstract*— In order to reduce the number of casualties in military applications and minimize the physical presence of soldiers, there is a need to explore new technologies. The Internet of Things (IoT) is a promising solution that could potentially revolutionize the way we approach warfare. Our team is working on implementing this technology in military Panzer tankers, which would enable soldiers to control the vehicle from anywhere in the world with unlimited range via the internet. By using this technology, we can significantly reduce the risk of injury or loss of life in the event of an attack. We have already created a working model that demonstrates the effectiveness of this approach, and if successfully implemented, it could potentially change the way we think about warfare and lead to a new era of military technology. However, careful consideration must be given to the ethical implications and potential risks associated with using autonomous systems in the military.**

Keywords:- NodeMCU ESP8266, Ngrok Server, Webpage, Port Forwarding, Wide Area Network(WAN).

I. INTRODUCTION

Automation and IOT (Internet of Things) Technology have seen considerable progress lately. Robots are electro-mechanical machines that perform tasks automatically with varying degrees of autonomy. Some require guidance through remote control or a computer interface.

My project, "TERMINATOR - Robotic Panzer with UNLIMITED RANGE," aims to take the next step in technology. The Robotic Panzer tank will allow soldiers to operate it remotely from anywhere on earth with UNLIMITED RANGE over the internet through "Teleoperation."

Using cameras with video screens, soldiers can view and mark targets, operate the firing system, and control the Panzer tank remotely. This technology eliminates the need for soldiers to be physically present in combat, reduces fatigue, and improves safety by removing soldiers from dangerous situations.

The low latency teleoperation makes it suitable for complex and delicate tasks such as operating the Panzer tank. The technology connects with panzer tank using 4G/LTE or 5G towers. The objective of our project is to make the device simple and effective so that soldiers can operate it with ease.

II. PROBLEM STATEMENT

Physical presence of soldiers on the battlefield is a leading cause of fatalities in military operations. To address this issue, it may be necessary to adopt technologies and tactics that enable soldiers to engage in combat remotely, thereby reducing their exposure to harm. The use of unmanned vehicles or remote operation may be viable options.

III. OBJECTIVES

The development of a Robotic Panzer tank is crucial to minimize the loss of human life on the battlefield. By creating a remote-controlled war tank that can be operated from anywhere on the planet, soldiers will be able to operate the war tank safely and with comfort of remote zone. The technology will allow soldiers to control the war tank (panzer) remotely, using a variety of tools and gadgets, including camera screens and firing systems. In order to establish a seamless connection with the panzer (war tank), we are using 4G/LTE or 5G towers.

Our primary goal is to improve soldiers' safety and prevent unnecessary deaths on the battlefield. To achieve this, we are working hard to make this device simple as well as effective so that soldiers can operate it with ease.

IV. LITERATURE SURVEY

[1] In IEEE Access, M.A. Khan, M.A. Hannan, and M. Iqbal published a paper on the design and development of a solar-powered unmanned ground vehicle that can undertake long-range missions.

[2] The IEEE Transactions on Industrial Electronics features a paper by S. Aoki, K. Takeda, and T. Oki, which presents a modular, multi-purpose unmanned ground vehicle with hybrid propulsion for long-range missions.

[3] M. Bakhtiari and R. Ebrahimi Atani's paper, published in IEEE/ASME Transactions on Mechatronics, outlines the design and development of an autonomous unmanned ground vehicle specifically for long-range reconnaissance missions.

[4] P. M. Castillo-Guerrero, J. M. Guerrero-Castellanos, and J. A. Gomez-Pulido published a paper in IEEE Transactions on Industrial Informatics that details the use of machine learning to autonomously manage the energy consumption of a long-range unmanned ground vehicle.

[5] The IEEE Transactions on Industrial Electronics features a paper by D. Wang, J. Xue, and J. Wang, which describes an intelligent unmanned ground vehicle designed for long-range patrol and surveillance.

[6] In their paper published in IEEE Transactions on Industrial Electronics, R. Abkenar and A. T. Haghighat propose a hybrid energy system that can power long-range unmanned ground vehicles.

V. METHODOLOGY

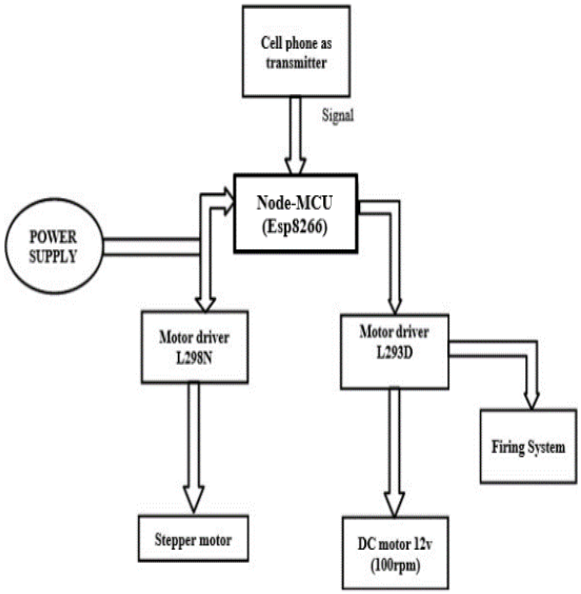

Fig 1. Block Diagram

The system in Fig 1. Shows the design a Panzer tank, the weight it can carry must first be estimated to determine the appropriate wheel size and DC motors. A cell phone can serve as a transmitter to send signals to a Nodemcu (ESP8266), which then sends signals to the corresponding devices to perform specific tasks.

The Nodemcu and stepper motor require a power supply, which is provided to the appropriate levels.

Two motor drivers were utilized: one motor driver with four channels (L293D) for operating the motors and firing system, and another motor driver with two channels (L298N) specifically for the stepper motor.

For panzer tank first we have to estimate the weight that a panzer can load its weight according to that we have to decide the wheely (DC motors). And it is completely driver and soldiers less Robotic panzer.

Implementation achieved by following below steps as call in Fig 2.: -

1. CODING: writing programming in software, software called ARDUINO IDE.
2. Dumping program/code to NODEMCU Esp8266.
3. Designing the web page (using HTML and CSS).
4. Designing Circuit Diagram based on program/code.
5. PORT FORWARDING: It converts Local Area Network to Wide Area Network. It is the connection between controller and truck through Internet with Unlimited Range.

The flow shows that when the process starts it will select the speed mode or Angle mode according to task which is given by transmitter. If it selects speed mode then driving direction will be reverse or forward and speed is given in RPM. If it selects angle mode then steering direction will be left or Right and steering angle will be in degrees.

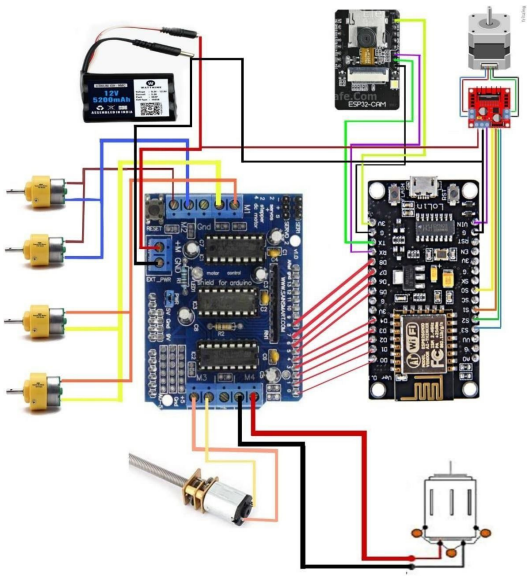

Fig 2. Circuit Diagram.

VI. HARDWARE REQUIREMENT

- DC Motor 12V (100rpm)
- Safe Screw Gear Motor 12V
- Stepper Motor
- 100 RPM 12V DC Johnson Geared Motor
- L293D Motor Driver L298N Motor Driver.
- ESP32 Camera Module Nodemcu (ESP8266)
- Li-Po Battery Connecting Wires.

A Safe Screw Gear Motor is a type of DC motor that is commonly used in robotics and automation applications. This motor is designed to provide high torque and low speed, makingit suitable for applications that require precise and controlled movement.

Fig 3. ESP32 CAMERA MODUE

The specifications of the ESP32 Camera Module include:

- Microcontroller: ESP32-D0WDQ6, shows in Fig 3.
- Processor: Dual-core Tensilica LX6 microprocessor, clocked at 240 MHz
- Operating voltage: 3.3V
- Camera sensor: OV2640
- Image resolution: 2 megapixels (1600x1200)
- Bluetooth: v4.2 BR/EDR and BLE Dimensions: 27mm x 40mm x 4. 5m

A NEMA 17 stepper motor is a type of electric motor that is commonly used in a variety of applications, including 3D

VII. RESULTS AND DISCUSSION

Fig 4. Project result

The Terminator – Robotic Panzer with Unlimited range can be used without drivers and Soldiers, and it is Result as below

The development of a Robotic Panzer tank is crucial to minimize the loss of human life on thebattlefield. By creating a remote-controlled war tank that can be operated from anywhere on the planet, soldiers will be able to operate the war tank safely and with comfort of remote zone.

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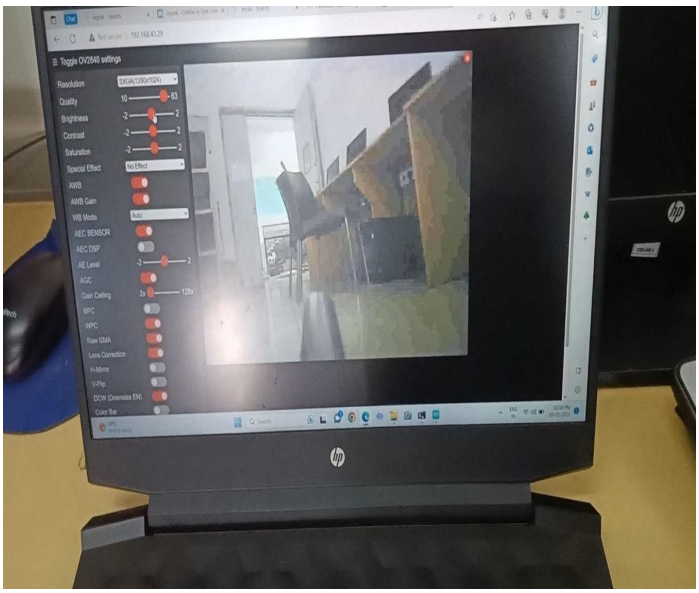
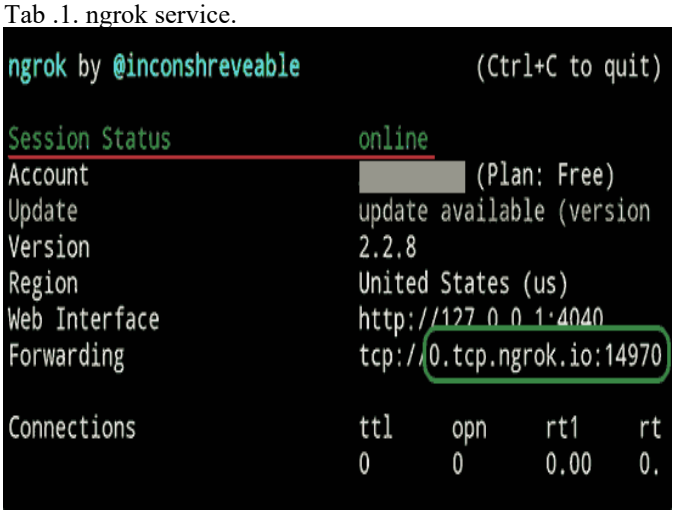


Fig.5. Interface of displaying esp32 camera

Ngrok is a secure tunneling service that allows you to expose a local web server to the internet.It provides a public URL that can be used to access the local server from anywhere, making it useful for testing and development of web applications and APIs. Shows in Tab 1.

Tab .1. ngrok service.



VIII. ADVANTAGES AND DISADVANTAGES

Strong and durable: Robotic Panzer Tanks are built to withstand gun fire from enemy personnel, making them a more robust and reliable option in combat situations.

Saves human life: With Robotic Panzer Tanks, soldiers can operate from a safe distance, reducing the risk of injury or death on the battlefield. This helps to improve soldiers' safety and reduce the number of casualties in war zones.

Improves soldiers' safety: By removing soldiers from the front line, Robotic Panzer Tanks can help to decrease the risk of harm from enemy fire, landmines, and other hazards.

Decreases the number of soldier deaths: By using Robotic Panzer Tanks instead of human soldiers, the number of casualties in military operations can be reduced, saving lives and reducing the overall cost of war.

Worldwide use: Robotic Panzer Tanks are used in military applications all over the world, demonstrating their effectiveness and reliability in a variety of combat situations.

DISADVANTAGES

Vulnerability to Hacking: Remote-controlled Panzer Tanks can be vulnerable to hacking, which can lead to the tank being taken over by an unauthorized operator.

High Cost: Remote-controlled Panzer Tanks can be more expensive than human-operated tanks, as they require specialized technology and equipment.

IX APPLICATION

In Army/Military Bases: Currently, soldiers in Army/Military bases operate Panzer tanks, which require one or more soldiers to drive them.

However, if a Panzer tank is hit by a shell, the soldiers operating it are at risk of losing their lives. To prevent such loss of life, a robotic Panzer tank can be developed, which can be operated remotely. This war tank can be controlled from any location on earth, using the internet.

X. CONCLUSION

In conclusion, the development of Robotic Panzer Tanks with unlimited range has the potential to revolutionize military operations and improve soldier safety on the battlefield. With the ability to operate autonomously and be controlled remotely, these tanks could be used in a variety of environments, including hostile or remote areas, without risking human lives.

The advancements in communication technologies, energy efficiency, sensors and imaging, and modular design could further enhance the capabilities of these tanks, making them even more effective in a wide range of mission scenarios. With continued investment in research and development, we can expect to see even more advancements in this field, making Robotic Panzer Tanks an increasingly asset in military operations worldwide.

XI. FUTURE SCOPE

The future scope of Robotic Panzer Tanks with unlimited range is vast and promising. Some potential developments and advancements that could be seen in the future include:

Increased autonomy: With advancements in artificial intelligence and machine learning, Robotic Panzer Tanks could become even more autonomous and intelligent, allowing them to operate independently in remote or hostile environments.

Improved communication and control: Future Robotic Panzer Tanks could be equipped with advanced communication technologies, such as satellite or long-range wireless communication, allowing them to be controlled and monitored from anywhere in the world.

Advanced sensors and imaging: With improved sensors and imaging technologies, Robotic Panzer Tanks could have better situational awareness, enabling them to detect and respond to threats more quickly and effectively.

XII. REFERENCES

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