IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Vol. 12, Issue 4, April 2023

DOI: 10.17148/IJARCCE.2023.12484

BLUETOOTH CONTROLLED TURRET GUN USING 3D PRINTED PARTS AND ARDUINO

Ritik Motwani1[1], Saurabh Kandrikar[2], Sayali Kapse[3], Devendra Meshram[4], R. B. Khule[5]

Department of Electronics Engineering, K.D.K. College of Engineering, Nagpur, India[1-5]

Abstract: This project involves the creation of a Bluetooth-controlled turret gun using 3D printed parts and an Arduino. The system can be remotely controlled using a smartphone or a computer, making it ideal for use in various applications, including security systems, gaming, and entertainment. The design is highly customizable and can be adapted to suit different requirements. The main components of the system include a 3D printed turret, servo motors, a Bluetooth module, and an Arduino board. The servo motors enable the turret to rotate and move up and down, while the Bluetooth module facilitates wireless communication with the controlling device. The Arduino board acts as the brain of the system, processing the commands received from the Bluetooth module and sending the appropriate signals to the servo motors. Overall, this project provides an exciting opportunity to explore the potential of 3D printing and Arduino technology in the development of innovative and highly functional devices.

Keywords: Bluetooth Technology, 3D printing, Arduino, Wireless communication, Arduino IDE, Bluetooth-controlled turret gun.

1. INTRODUCTION

The Bluetooth-controlled turret gun project is an exciting demonstration of the potential of 3D printing and Arduino technology in the development of innovative and highly functional devices. The project involves the creation of a customizable and adaptable system that can be remotely controlled using a smartphone or a computer, making it ideal for various applications, including security systems, gaming, and entertainment.

The system's core components are made up of 3D printed parts, including the turret base and gun mount, servo motors, a Bluetooth module, and an Arduino board. The servo motors enable the turret gun to rotate and move up and down, providing a broad range of motion that can be controlled remotely. The Bluetooth module facilitates wireless communication with the controlling device, enabling the user to operate the system without being physically present.

The Arduino board acts as the brain of the system, processing the commands received from the Bluetooth module and sending the appropriate signals to the servo motors to execute the desired movement. The software program for the Arduino board can be customized to meet specific requirements, making it a versatile and powerful component of the system.

In addition to its functionality, the Bluetooth-controlled turret gun project also provides an excellent opportunity for exploration and creativity. The design of the 3D printed parts can be modified to suit specific preferences or requirements, enabling users to create customized and unique systems. The system can also be adapted for use in various applications, providing endless possibilities for exploration and creativity.

Overall, the Bluetooth-controlled turret gun project demonstrates the potential of 3D printing and Arduino technology in the development of innovative and highly functional devices. The system's versatility, functionality, and adaptability make it a valuable asset for various applications, providing endless possibilities for exploration and creativity.

2. METHODOLOGY

The Bluetooth-controlled turret gun project involves several steps and processes, including designing and 3D printing the parts, assembling the system, and programming the Arduino board. The following is a brief overview of the methodology for this project:

- Designing the parts: The first step in the project is to design the 3D printed parts for the turret gun. This can be done using software such as SolidWorks or Tinker cad, and the designs should include the turret base, gun mount, and other necessary components.

- 3D printing the parts: Once the designs are complete, the next step is to 3D print the parts using a 3D printer. The parts can be printed using PLA or ABS plastic, depending on the user's preference.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Vol. 12, Issue 4, April 2023

DOI: 10.17148/IJARCCE.2023.12484

- Assembling the system: After the parts have been printed, the system can be assembled. This involves attaching the servo motors to the gun mount and connecting them to the turret base. The Bluetooth module should also be connected to the Arduino board at this stage.
- Programming the Arduino board: The final step is to program the Arduino board to enable it to receive commands from the Bluetooth module and control the movement of the servo motors. This can be done using the Arduino IDE software, and the program should be customized to meet specific requirements.
- Once the system is assembled and programmed, it can be controlled using a smartphone or computer with Bluetooth capabilities. The user can send commands to the system to rotate the turret, move it up and down, and even fire the gun. With the Bluetooth-controlled turret gun project, the possibilities are endless, and users can customize the system to meet their specific needs and requirements

BLOCK DIAGRAM:

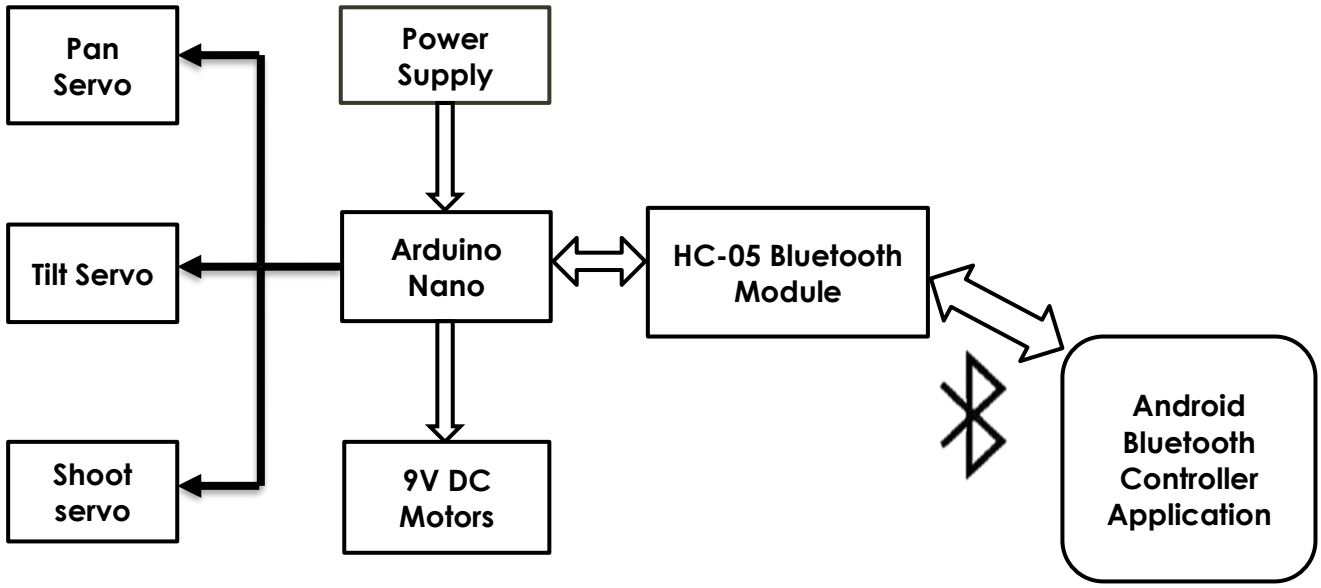
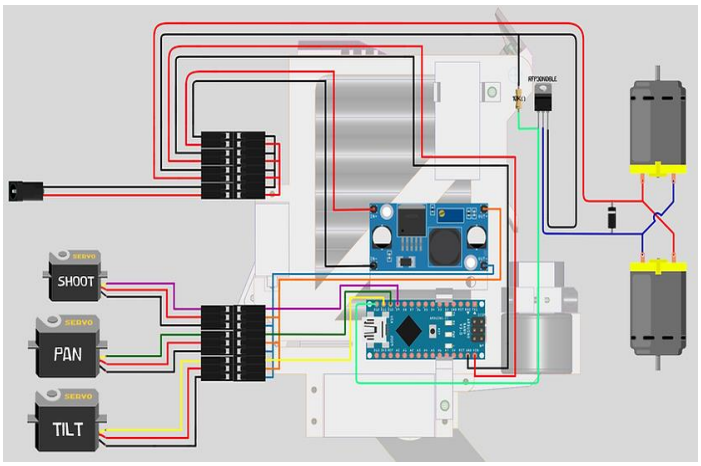


Fig.1 Block Diagram of the System

3. CIRCUIT DIAGRAM:

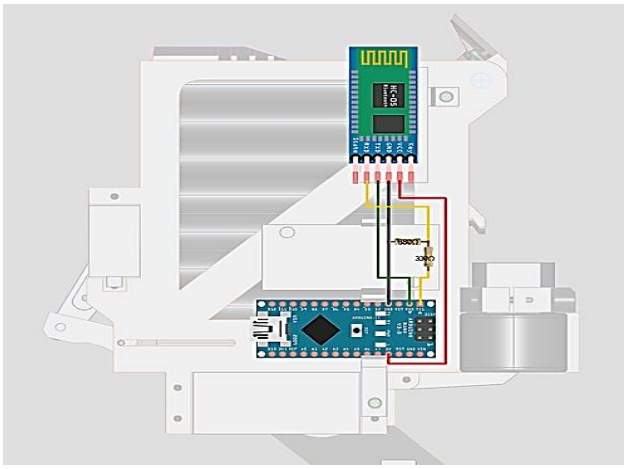


IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Vol. 12, Issue 4, April 2023

DOI: 10.17148/IJARCCE.2023.12484



4. WORKING

A Bluetooth controlled turret gun using 3D printed parts and Arduino is a project that involves building a small gun or cannon that can be controlled remotely using Bluetooth technology. The project requires the use of an Arduino board, a Bluetooth module, a servo motor, a 3D printer, and various other electronic components. The first step in building a Bluetooth controlled turret gun is to design and 3D print the parts needed to assemble the gun. This includes the base, gun mount, servo mount, and other parts. Once the parts are printed, they can be assembled together to form the gun. The next step is to connect the servo motor to the Arduino board, which will control its movement. The servo motor is typically used to control the vertical or horizontal movement of the gun, allowing it to be aimed in different directions. In order to control the gun remotely using Bluetooth technology, a Bluetooth module is connected to the Arduino board. This allows the gun to receive commands from a remote device such as a smartphone or tablet.

The next step is to write the code that will control the servo motor and receive commands from the Bluetooth module. This code can be written in C or C++, depending on the user's preference. The code typically includes instructions for moving the servo motor in response to commands received from the Bluetooth module. Once the code is written, the gun can be tested to ensure that it is functioning properly. This involves using a remote device to send commands to the Bluetooth module and observe the movement of the gun. The user can test different commands to see how the gun responds, and make any necessary adjustments to the code or hardware.

ADVANTAGES:

There are several advantages to building a Bluetooth controlled turret gun using 3D printed parts and Arduino:

1. Customizability
2. Low Power
3. Low Cost
4. Real time Operating
5. Remote Control

5. CONCLUSION

The Bluetooth-controlled turret gun project is an impressive example of the power of 3D printing and Arduino technology in the creation of innovative and functional devices. The project demonstrates how the combination of these technologies can lead to the development of adaptable, customizable, and remotely controlled systems that can be used for various applications, including security systems, gaming, and entertainment.

The system's core components, including the 3D printed parts, servo motors, Bluetooth module, and Arduino board, work together seamlessly to enable wireless communication and execute the desired movements. Moreover, the Arduino board can be customized to meet specific requirements, making it a powerful and versatile component of the system.

The Bluetooth-controlled turret gun project also provides an excellent opportunity for exploration and creativity. The design of the 3D printed parts can be modified to suit specific preferences or requirements, enabling users to create customized and unique systems. The system can also be adapted for use in various applications, providing endless possibilities for exploration and creativity.

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ Vol. 12, Issue 4, April 2023
DOI: 10.17148/IJARCCE.2023.12484

Overall, the Bluetooth-controlled turret gun project is a remarkable example of the potential of 3D printing and Arduino technology. Its versatility, functionality, and adaptability make it an exciting and innovative project that can be customized to meet specific needs and requirements.

REFERENCES

[1]. E. Shi, Y. Huang, and W. Shi, "Predictive Controlling of Wheeled Mobile Robot Tracking", *Mechanics Science and Technology, vol. 23, issue 10, pp.1234-1237, Oct 2004.*
[2]. W. Ge, *"The Application Research of the Mobile Robot Teleoperation System Based on the Virtual Reality Technology,"* Tianjin University Doctor's degree Thesis, Jun 2004, pp. 1-8.
[3]. N. Ersala and D. C. Yen, "Bluetooth wireless mobile computing, eBooks", *Computer Standards & Interfaces*, vol. 24, pp. 189-191, 2002.
[4]. D. Normile, "Real-world Bluetooth," *Global design news*, Japan, Jul 2002.
[5]. N. Erasala and D. C. Yen, "Bluetooth technology: a strategic analysis of its role in global 3G wireless communication era," *Computer Standards & Interfaces*, vol. 24, pp.193-206, 2002.
[6]. W. Keigo, I. Kiyotaka, and H. Fuhua, "Development of an omnidirectional mobile robot with active dual-wheel casters", *Advanced Robotics*, vol. 13, issue 3, pp. 239-240, 1999.
[7]. K.N. Krishnanand and G. Debasish, "Formations of minimalist mobile robots using local-templates and spatially distributed interactions", *Robotics & Autonomous Systems*, vol. 53, issue 3/4, pp.194-213, Dec 2005.
[8]. F. Michaud, et al, "Autonomous Spherical Mobile Robot for Child-Development Studies," *IEEE Transactions on Systems, Man & Cybernetics*. Part A, vol. 35, issue 4, pp. 471-480, Jul 2005.
[9]. E. F. Fukushima, N. Kitamura, and S. Hirose, "Development of tethered autonomous mobile robot systems for field works," *Advanced Robotics*, vol. 15, issue 4, pp. 481-496, 2001.
[10]. H. Hu and M. Brady, "A parallel processing architecture for sensor-based control of intelligent mobile robots," *The International Journal of Robotics and Autonomous Systems*, vol. 17, no. 4, pp. 235-257, 1996.
[11]. Y. Zhou, Y. Ren, and Y. Wang, "Application in Bluetooth products of the MSP430 low energy consumption characteristics," E*lectric Technology and Application*, no. 12, pp. 12-15, 2003.
[12]. Pallard and Cedric, "Bluetooth Technology Integration: Which Path Should You Choose?" *Wireless Systems Design*, vol. 6, issue 1, pp. 53-56, Jan 2001.
[13]. Ahmadian, Mehdi, and James C. Poynor. "An evaluation of magneto rheological dampers for controlling gun recoil dynamics." Shock and Vibration8, no. 3-4 (2001): 147-155.
[14]. Ahmadian, Mehdi, Randall J. Appleton, and James A. Norris. "Designing magneto-rheological dampers in a fire out-of-battery recoil system." Magnetics, IEEE Transactions on 39, no. 1 (2003): 480-485.
[15]. Coleman, Norman, Ken Lam, and Ching-Fang Lin. "Method and system for automatic pointing stabilization and aiming control device." U.S. Patent 7,239,976, issued July 3, 2007.
[16]. Dos Santos Gomes, Marcio, and Armando Morado Ferreira. "GUN- TURRET MODELLING AND CONTROL." (2005).
[17]. Friedland, Bernard. Control system design: an introduction to state-space methods. Courier Dover Publications, 2012.
[18]. Galal, Myo, N. G. Mikhail, and G. Elnashar. "Fuzzy logic Controller Design for gun-turret system." In 13th International Conference on AEROSPACE SCIENCES & AVIATION TECHNOLOGY, ASAT, vol. 13. 2009.
[19]. Gao, Qiang, Jilin Chen, Li Wang, Shiqing Xu, and Yuanlong Hou. "Multiobjective optimization design of a fractional order PID controller for a gun control system." The Scientific World Journal 2013 (2013).
[20]. Gourley, R., Scott, "Turret Gun Stabilisation or the Art of Moving to Keep Steady" Armada Magazine, Reader Service 004, 2004, pp 48-56.
[21]. Gümüúay, Özdemir. "Intelligent Stabilization Control Of Turret Subsystems Under Disturbances From Unstructured Terrain." Phd Diss., Middle East Technical University, 2006.
[22]. Kumar, Gautam, Pradeep Y. Tiwari, Vincent Marcopoli, and Mayuresh V. Kothare. "A study of a gun-turret assembly in an armored tank using model predictive control." In American Control Conference, 2009. ACC'09., pp. 4848-4853. IEEE, 2009.
[23]. https://www.littlefrenchkev.com/bluetooth-nerf-turret

