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IOT BASED ARMED SURVEILLANCE VEHICLE

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ABSTRACT

Armed surveillance vehicle are autonomous vehicles which can be controlled and directed to accomplish the tasks. Armed surveillance vehicles or robots promise to increase the operational range of the armed forces while reducing the exposition of personnel to hazardous conditions. These robots are favourable in complicated , rigid special situations where risk bearing for army person is high. They have traditionally been in use for aerial surveillance and ground based explosive ordnance disposal. Following the ongoing progress in research and technology. Armed surveillance vehicles have the potential to play a much more versatile role in future conflicts. The use of such systems is already expanding into reconnaissance, surveillance and target acquisition scenarios. The major challenge is to increase the range and efficiency of communication for controlling and coordinating the vehicle , to reduce cost, and to avoid human exposition to hazardous This performance however, is primarily dependant on how effectively a human operator can supervise and control the unmanned system using a given human-machine interface. In this paper we made use of internet of things in order to control and coordinate vehicle for its mobile and efficient work. We believe that this approach can support the acceptance and use of iot based armed surveillance vehicle.

Keywords: IOT(Internet of things), surveillance, ordance disposal, reconnaissance.

I.INTRODUCTION

Terrorism and Insurgency are the most prominent problems that world facing today. Government and scientists across the globe are working day and night in order to bring these problems under control. Many nations spending millions of dollar for the research of new defense systems which are capable of safeguarding citizens from terrorist threats. Nowadays with major advancements in the field of vehicle automation, several dangerous and crucial counter terrorist operations are being handled by sophisticated machines which are not only more efficient but are also responsible for saving several human lives. Our project "IOT BASED ARMED SURVEILLANCE VEHICLE " is built to undertake missions like border patrol, surveillance and as well as in co-ordination with human soldiers (manual)[2]. It is a prototype illustrating the ever expanding need for sophisticated technology and precision driven vehicles catering to the present day needs for a first line of defense. A person from a remote place can comfortably control the motion of the vehicle. The manual modes of the rover are controlled by a human operator and live video is fed back to the base station. The vehicle will follow the movement of a joystick or a mouse.

In this paper we discuss the use and application of wireless networks with the wider context of Internet of things, and provide a review of application of intenet of things in the field of defence, and also focusing the attention on infrastructure technologies with smaller, efficient and accurate defence machines, This paper is a report of our forward step in providing smart unmanned defence vehicle with iot smartness in order to provide security and solutions to global problems in electrotechnology.

II. RELATED WORK

There have been many attempts in the design of robot . In 1961, Unimate was the first industrial robot developed. which was a simple robotic arm implemented for automation of die-casting in the factory [3]. In another approach, Abhinav Sinha et.al have proposed a mathematical model for the control method of mobile pick and place industrial robots using inverted pendulum concept and have proven it mathematically. But no real-time implementation is carried out to prove its efficiency [4].Recently many works are being carried for real time control and coordination of robot using iot in all sectors. Specially many works are going on for implementation unmanned robots at boarder security, In 2006, Teleoperation of unmanned vehicle, The Human factor [2][5]was the good approach for real time . Our project is the next approach in implementing unmanned vehicle for increased accuracy, increased efficiency, reduced risk of human intervention and less cost.

III. PROPOSED WORK

3.1. DESIGN

As we mentioned earlier, the vehicle is designed into two units. Robotic unit and Control unit. Robotic unit contains vehicle and equipments mounted on it. And control unit is usually a computer or smart phone. Robotic unit act according to the commands given by control unit. Control unit receives signal from the robot and controls it by sending signal in order to do required action. Control unit is operated by human where only robotic unit is exposed to hazardous not control unit, so no risk to the operator. Communication between these two is by internet of things, so we can efficiently control and coordinate the vehicle from a mobile or distance control unit with just by using wifi mode.

3.2.1 Robotic Unit

Robotic unit is the vehicle which contains actuators, sensors, wireless transmitter and receiver module, power supply and a microcontroller.

- Microcontroller used is Aurdino nodemcu, with inbuilt wifi model, which helps for iot implementation
- Power supply, a 10 v dc power supply is used.

Sensors used are:

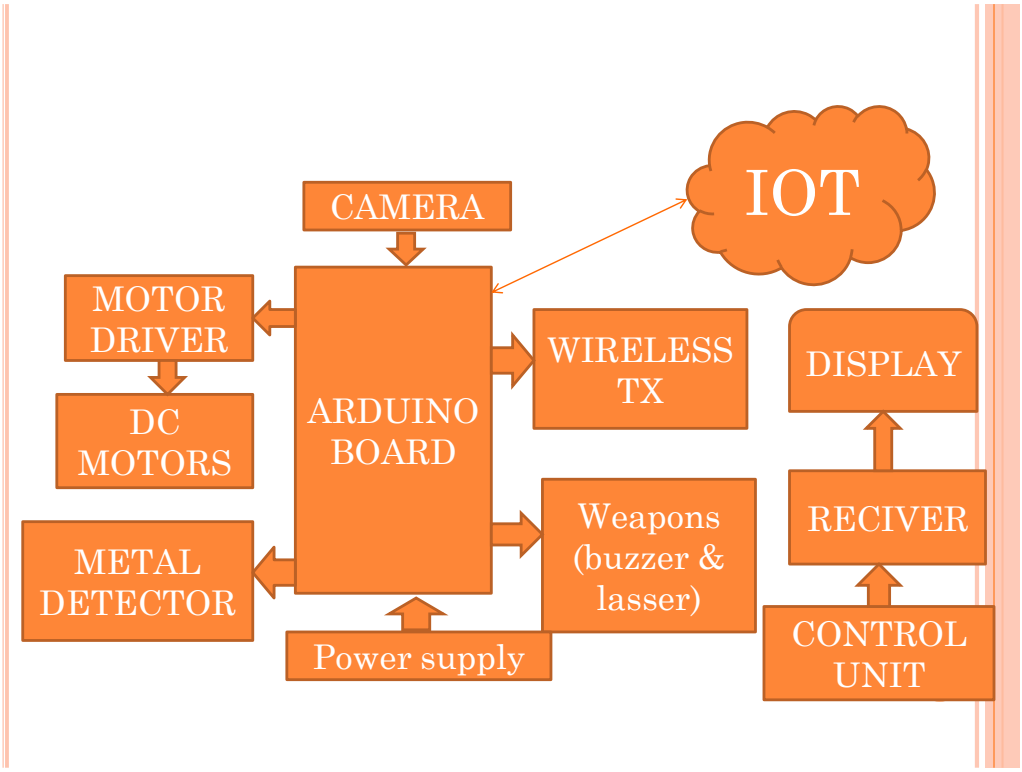
- Metal detector, in order to detect hazardous metals like bomb etc.
- Camera, 2MP RF transmitted camera, used for surveillance through real time visual mode.

Actuators used are:

- DC Motor which is driven by motor driver L293, which is used for the movement of robot, and also to tilt, grip and to hold weapons.
- Lasser, Which is used as replacement to gun to spot the enemy and fire.
- Buzzer, which is used as replacement to bomb, and when there is a situation to destruct the surrounding area with self destruction of vehicle.

3.2.2 Control unit

Control unit is the one where a human can sit and control the whole vehicle's action. It consists of display unit used for real time visualization, and also it contains wireless transmitter and receiver module for transmission, and a control unit to control. We can use smart phone for controlling it easily by using blink app.



Fig(1) Armed surveillance vehicle block diagram.

3.2 WORKING

The model is divided into two separate parts, one is the robotic unit which includes vehicle and the various components equipped on the vehicle, the other is control unit as mobile or computer(Fg (1)). The various components which are mounted on the vehicle are linked to arduino nodemcu. The programme is feed to the board and all the sensors senses the required work to b needed and sends request signal to the control unit. The sensor used in the model is metal detector to detect the mines in the war field. Camera which is mounted on the

front of the vehicle is used to capture the images and send to the end user. The camera used here is 2 MP rf transmitted camera. This is able to capture good quality of images which is helpful in identifying the enemies. Control unit accepts the signals from sensors . the required action is detected and replay signals are sent to actuators. Here the communication between control unit and robotic unit is by wifi mode by connecting things to internet. Finally actuators does the required work for the commands from control unit. Since for the demonstration purpose the laser is used in the project, the laser acts as replacement of gun. Laser is used to point on the enemies object and undertake the necessary action. The buzzer in the project is the replacement for bomb. The buzzer is also linked to arduino nodemcu frame which it get the signals to undertake prior action against enemies. The buzzer rings whenever the user commands for self-destruction

.

3.3 IOT Implementation

Internet of things[6][8] is the network of things. Things are sensors, actuators and other items embedded with electronics, IOT enables these objects to connect and exchange data through the use of internet. Every item has its unique identification and connected to internet. IOT allows object to be sensed or controlled remotely By the use of existing network infrastructure, creating opportunities for more direct integration of the physical world into computer based systems, and resulting in improving efficiency, accuracy and economic benefit in order to reduce human intervention. We implemented iot in order to connect vehicle to internet and operate the vehicle through internet for high accuracy, high efficiency, low human interruption risk and reduce cost.

V. FUTURE WORK

Armed surveillance vehicle is a unmanned ground vehicle (UGV) i.e it can only work on ground. We only provided wheels to move on ground, so our future vision is to implement the same which can be used for areal surveillance through implementing drone. The vehicle is implemented with iot but not for the whole operation, we made use of rf technology for visual signal transmission, our next vision is to replace it by iot for quick work.

VI.CONCLUSION

In this era, iot is a key element which helps in development of automotive smart machines with less cost, more accurate work and human friendly handling. Consumers are realizing the benefits and businesses are monetizing the intelligence gained from technologies tested and proven in the defense sector . This commercial investment is driving huge cost savings for next-generation defense IoT systems.

We have successfully implemented and tested IOT based armed servillance vehicle with humanoid features with height of 0.2m and weight 5 kg. It b can bare maximum weight of 3 kg . Our prototype can be implemented as a big model with high capacity and used in industries with manual control. This would cost very less compared to automated robot so it can be used by small industries for jobs requiring more man power.

REFERENCES

[1] *IFR International Federation of Robotics*.[online]. Available at: https://ifr.org/

[2] Boris Trouvain, Forschungsgesellschaft für Angewandte Naturwissenschaften (FGAN)
Neuenahrer Strasse 20, 53343 Wachtberg
GERMANY. *Teleoperation of Unmanned Vehicles: The Human Factor*

[3] Joseph-Engelberger, "*Unimate - The First Industrial Robot*," Robotics Online. [online]. Available: https://www.robotics.org/joseph-engelberger/unimate.cfm.

[4] A. Sinha, R. K. Mishra, and S. Jaiswal, "*Robust and Smooth Nonlinear Control of an Industrial Robot for Automated Pick and Place*, " *2015* International Conference on Computing Communication Control and Automation, 2015.

[5] Baker, M., Casey, R., Keyes, B., and Yanco, H. A. (2004) *Improved Interfaces for Human-Robo Interaction in Urban Search and Rescue*. Proceedings of the IEEE Conference on Systems, Man

[6]Cristina Turcu, Cornel Turcu and Vasile Gaitan. *Integrating robots into the Internet of Things*

[7] Trouvain, B., Schlick, C., Mevert, M. (2003) *Comparison for a Map- vs. Camera-based User Interface in a Multi-Robot Navigation Task*, Proceedings of the Conference of Systems.

[8] https://www.windriver.com/whitepapers/iot-for-defense/wind-river_%20IoT-in-Defense_white-paper.pdf