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# Design Surveillance Robot by Using Arduino

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**ABSTRACT**

The robotics and automation industry which is ruled the sectors from manufacturing to household entertainments. It is widely used because of its simplicity and ability to modify to meet changes of needs. The project is designed to develop a robotic vehicle using android mobile. For remote operation attached with wireless camera for monitoring purpose. The robot along with camera wirelessly transmit real time video with low light vision capabilities. This is kind of robot will be helpful for spying purpose in war fields. The wi-fi technology is relatively new as compared to other technologies and there is huge potential of its growth and practical application. The android application loaded on mobile devices will connect with security system and easy to use GUI. The security system then acts on these command and responds to the user. The ESP 32 camera is attached with security system for remote surveillance. A robot is a machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer. This kind of robot will be controlled by a human operator, sometimes from a great distance. In such type of applications wireless communication is more important. This also shows general idea and design of the robot. Surveillance security robot provides safety like man. Automatic patrolling vehicle for periodic patrolling in defined or a restricted area, the patrolling vehicle will move automatically to monitor the dead zones and capture the images by using the camera

## 1. INTRODUCTION

### *1.1 Significance*

Surveillance is a real time collection and analysis of data that is timely distributes the information to the operator. Surveillance in Defense Applications plays an important role for keeping an eye out in order to protect its citizens and take necessary action as needed. Surveillance is the task of monitoring the set of conditions,an area or a person. This generally occurs in a military scenario where surveillance war areas, adversary territory or hostage situation is crucial to a nation's security.Human surveillance is carried by experienced work forces in close sensitive areas so as to continually monitorfor changes. Whereas there is always added risks of losing work force in the time of getting caught by the adversary. With advanced technology in pasted years, there it is possibility to monitor areas of importance remotely by the use of robots instead of human. Apart from the given advantages of not losing any work forces, physical and elegant robots can be used detect subtle elements that are not conspicuous to people.

By embedding the robots with high resolution cameras, it is manageable to gather information about the designated location remotely. A surveillance robot is a partially automated machine that works as per instructed by operator and move to destination , Streaming video which can then analyzed by the operator. Surveillance is a crucial task,we cannot put someone life to risk, instead of that we can use this kind of robots whichdo not need sleep, they don't get hungry, they don't have emotions, they are just stick to their duties and follow the orders.

### *1.2 Problem Statement*

The field of surveillance robots is quite popular. A lot of work has been done in navigational algorithms and control system of wireless surveillance robots. The surveillance robot is designed to be multitasking, cost efficient and feasible machine that can be implemented for the military purpose. These machines replaces the Indian army soldiers and dogs that are used at the borders during the time of war saving the lives from opponents or enemy nations and from environmental condition such as extreme cold and heat. The system is driven by a motor and the power supply is provided by a 12v battery. A robot which performs image processing using the camera on an Android smartphone has also been implemented. However, this method is limited by the processing power of the phone, a problem that we have addressed by remotely performing all imaging processing operations on a different computer, after transmitting the camera's feed. Our project is rather unique in the critical scenarios in military as well as in industries, it also offers video feedback.

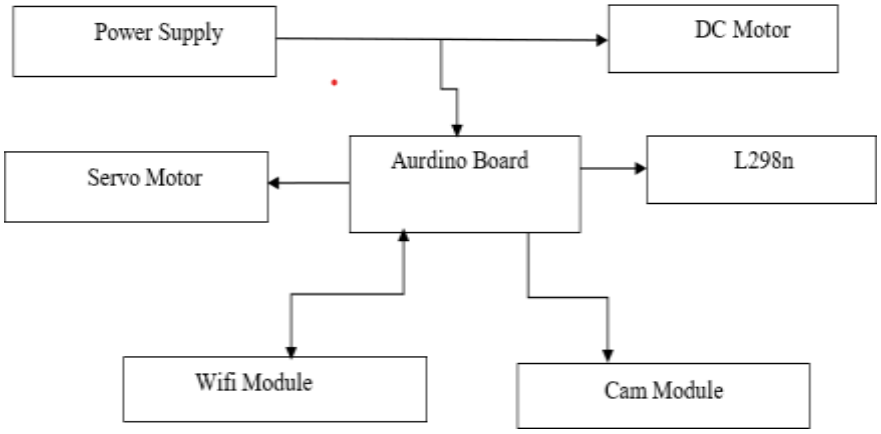
## 2. LITERATURE SURVEY

Robotics research today is focused on developing systems that exhibit modularity, flexibility, redundancy, fault-tolerance, a general and extensible software environment and seamless connectivity to other machines. Some researchers focus on completely automating a manufacturing process or a task, by providing sensor-based intelligence to the robot arm, while others try to solidify the analytical foundations on which many of the basic concepts in

robotics are built. In this highly developing society time and man power are critical constrains for completion of task in large scales. The automation is playing important role to save human efforts in most of the regular and frequently carried works. The main idea to construct this robot is for the spying purposes, it for to keep an eye on people maneuvers in the battle ground or in the industries to monitor the area where humans cant enter. Army people or entities have to face many dangers on their lives while spying on enemy or opposite entities. To overcome these ideas for this job robot will be more suitable and will decrease the risks of loss of human lives and can better spy illicit maneuvers of their opposite entities. Before entering to any doubtful districts we can send robot to check the status of that field so the military or army individuals don't need to risk their life. Novandri et.al. (2018) Presented the design and implementation of a surveillance robot that has self protection capability by using nail guns. Also, this robot can transmit audio and visual data using Wi-Fi protocol [1]. Shantanu et al. explained the design and implementation of a wireless robot. This robot is controlled by the internet and it uses the PIR sensors for detecting the living bodies. Also, the robot is equipped with a camera which is controlled through a web page [2]. Chinmay et.al.(2010) proposed a surveillance robot using Arduino Uno microcontroller and a Smartphone. The proposed system. consists of a video camera, GPS module, and GSM radios. The Robot can be controlled by using PC through the internet. The Microcontroller receives a real-time video from the camera that attached to a stepper motor. This video can be enhanced on the PC by using intelligent image processing [3].

## 3. METHODOLOGY

In the making of a robot by which the web page and the arduino board connects to the power supply. Using USB cabled camera module connected and it shows the live streaming data in the system through the internet. It gives only online live streaming depending upon that we navigate the motion of the robot. In this project by using an ESP32 camera for the image processing of the data through the web page and in the webpage, user will get the live streaming data and will be able to control the robot in the webpage. This robot is controlled by a remote operator via the wifi module. The robot comprises of an Arduino microcontroller to control the robot's motion, and the required hardware such as chassis, motors, power supply, etc. The remote operator controls the robot via sending controlsignals to the wifi which then navigates the robot in the direction desired. The camera on the robot sends live feedback to the remote operator concurrently over the internet as a result the operator is able to navigate the robot from a remote location. A visual representation is shown below in Figure 1.

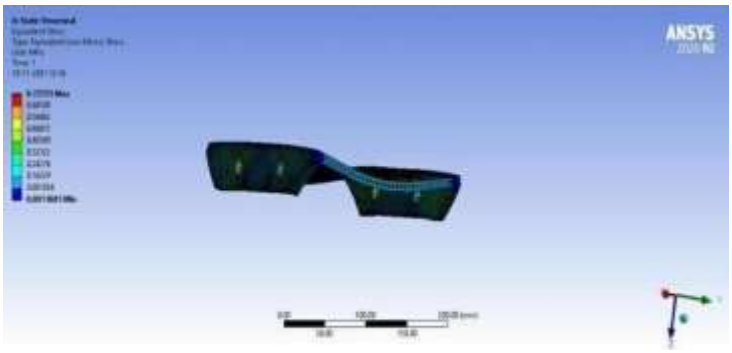


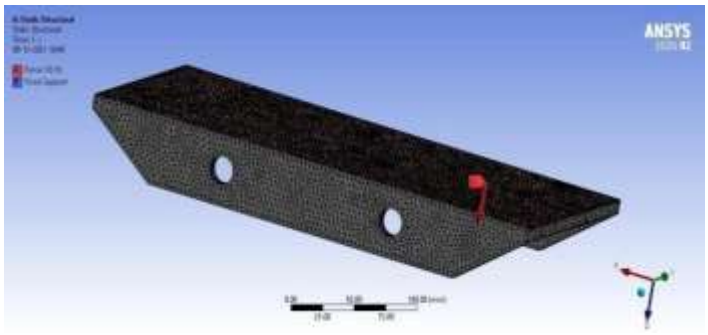

The implementation of the system is achieved using Arduino controller. This model utilizes a Wi-Fi module, an Arduino motor shield driver which controls the robot through the dc motors. One of the advantages of this is that the operator will control themovement of the robot through the live pictures seen using the mobile robot control platform. The Arduino is powered by a, which sends size able current to the dc motorfor its movement and also powers the Wi-Fi module for visual transmissionand recording of data which also send current to the servo motors for tilting the robot camera module.

## 4. Analysis of Frame

For analysis of this project ansys software has been used. ANSYS is a general-purpose,finite-element modeling package for numerically solving a wide variety of mechanicalproblems. These problems include static/dynamic, structural analysis, heat transfer, andfluid problems, as well as acoustic and electromagnetic problems.

The meshing here is 2mm size for proper discrimination of the design & given fixed support to the holes. During analysis all degree of freedom were constained for holes then applied 9.8N force as per design consideration on the face. The material consideredis structural steel .




## 5. CONCLUSION AND REFRENCES

### *5.1 Conclusion*

In this project, we made the surveillance robot used in war areas & industrial areas. In this project we design webpage to control the robot. our robot is small in size & light in weight so it is easy to operate into area where human access is impossible & this kindof robot also saves humans lives. We use wifi technology which capture live image & immidiately send to the organization by using ESP32 camera.

In this project we concluded that the surveillance robot has been designed and assembled with electronis motors, camera and WiFi. The surveillance robot moved on the ground by using wheels. This surveillance robot system can be used in the attack and resume operation to get the information from the human unreachable areas while doing military services. The robotic surveillance is very necessary, especially in dangerous environment. The result of project is that we has successfully implemented surveillance robot. An excellent wireless communication between the robot is achievedusing WiFi technology. The use of servo motor in the robot & camera enables them toMove with precise angels.

### *5.2 REFRENCES*

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