

UNMANNED SURVEILLANCE ROBOT (USR)



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PREFACE

The goal of this project was to develop a vehicle that could reach to a required destination by wireless control. USR (Unmanned Surveillance Robot) is a powerful, robust, well-designed and relatively inexpensive Unmanned Ground Vehicle. It is equipped with 4-channel wireless remote control along with a Wi-Fi module. The control of the vehicle was achieved using 4-channel remote control which controls all the motors which are used for controlling the direction and movement of the robot and also the motor we operated on camera to control its motion. The motors are running through the relays which are operated through the remote control.

For communication we opted to use Wi-Fi technology which would allow us to use a wireless router. Using the wireless router allowed us to work with IP, which made our task simple; we would be able to connect to the robot using any computer that had Wi-Fi capability and the security clearance. IP camera is used for the surveillance and Wi-Fi router for communication. The robot has two 12V batteries one for electronics and one dedicated to motors. USR is a capable system for future research.

Chapter one gives a brief introduction and history about the robots. Chapter two describes the methodology and system level description. Chapter three describes the mechanical assembly of the robot. Chapter four explains the hardware and power setup of the USR. Chapter five explains the electrical circuit and remote functions through which robot is controlled. The Last chapter describes the application of the USR.

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INTRODUCTION

In this day and age when machines are taking over the manual jobs of humans such as packaging, manufacturing and computing, it is essential that we have to find application in machines where human life is threatened. Safety and security is something we still do not entrust to machines, however one must look at the broader picture and understand the vast uses to which these machines can be put in order to save human lives from getting endangered. With this idea in mind we set out to develop a USR (Unmanned surveillance robot) that can perform the reconnaissance and surveillance duties of humans. The major objectives were to have robust yet practical and portable body, single communication link to handle all the data going to and from the robot, obstacle avoidance to help in automatic mode and video feedback.

The system for the USR has been such that the user has the freedom to use only one operating end and operate all the tasks directly. This has been made possible by bringing all the communications onto one platform and then programming the microcontroller and the GUI to use that link for operation. Before coming to this conclusion, there were several other ideas that could have been possible. The only major possibility was the same as that was used in all previous attempts at telecom-operated robots in Pakistan. The method involved using RF controller to operate the robot in the manual manner and use the Wi-Fi technology only for audio and video feedback. This is not the feasible solution since it attracts a large cost in the form of RF Controller and RF Transceiver at robot end. It also requires a wireless camera, the mounted camera. To help us with level of communication our choice is Wi-Fi camera, router and Ethernet converter. This reduces the amount of hardware required on the operator and enabling easy setup and portability.