

REMOTE SURVEILLANCE SYSTEM

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Abstract

Nowadays, a lot of devices make use of wireless surveillance system. This is regardless of different manufacturers which come with their own design, functions, and application. At the moment, the view coverage of most surveillance cameras is limited due to the location of the camera which is stationed on the wall. The camera can only be moved to the left, right, up and down direction.

Remote Surveillance System (ReSS) project is another type of surveillance system. ReSS is built with two main parts; a control unit and a mobile unit. The control unit is a computer installed with a program to control the mobile unit. The Mobile Unit is built by using a remote control tank with a camera mounted on it. The tank together with the camera had been modified so that it can be controlled from a distance by using the control unit without the remote control. The camera can be moved either clockwise or anti-clockwise to cover a 320° view. Therefore, it can cover critical areas such as small tunnel. ReSS can also be operated within the wireless fidelity range which is about 10meter radius in open space. The application of wireless technology gives an advantage to the system as it can be controlled anywhere as long as the network connection is available. Since the image from the camera can be viewed at the client side, the client can also control the movement of the tank and camera.

ReSS is capable to detect obstacle both in front and behind it. This is an important feature to ensure ReSS is free from collision. Whenever an obstacle is detected, ReSS will immediately stop and the movement is locked.

The movement of ReSS is programmed solely by using JAVA programming language which is suitable for all operating system. Video streaming is also developed using JAVA and JAVA MEDIA FRAMEWORK (JMF).

Abstrak

Pada masa kini terdapat berbagai-bagai peralatan pengawasan yang menggunakan sistem tanpa wayar. Pengeluar telah mengeluarkan peralatan pengawasan mengikut ciptaan, fungsi dan aplikasi tersendiri. Kedudukan kamera yang berada di dinding atau pun siling menyebabkan kawasan pengawasan menjadi terhad kepada pandangan kiri, kanan, atas ataupun bawah.

Projek "Remote Surveillance System" (ReSS) merupakan salah satu alternatif untuk sistem pengawasan. ReSS terdiri daripada 2 bahagian; bahagian kawalan dan bahagian mobil. Perisian untuk mengawal pergerakan berada di bahagian kawalan. Bahagian mobil terdiri daripada kamera dan kereta kebal. Kamera dan kereta kebal telah melalui proses modifikasi agar kawalan pergerakan bahagian mobil dikawal oleh bahagian kawalan. Darjah pusingan untuk kamera merangkumi 0 darjah sehingga 320 darjah. Oleh itu, kawasan yang kritikal seperti terowong yang sempit turut terangkum dalam kawasan pengawasan. ReSS dapat berfungsi secara tanpa wayar sekiranya berada di dalam kawasan WiFi. Jarak antara bahagian kawalan dengan bahagian mobil kira-kira 10 meter. Selain gambaran video daripada kamera dipaparkan di bahagian kawalan, pengawalan bahagian mobil juga dapat dibuat di bahagian kawalan.

ReSS mampu untuk mengesan halangan yang terdapat dihadapan atau dibelakang bahagian mobil. Oleh itu, ReSS dapat mengelakkan sebarang pelanggaran dengan sebarang objek. Sekiranya ReSS mengesan sebarang objek dihadapan atau dibelakang, bahagian mobil akan serta merta berhenti. Sekiranya ReSS mengesan objek dihadapan, maka pergerakan ke hadapan akan disekat dan sebaliknya.

Pergerakan untuk ReSS telah diprogram menggunakan JAVA dimana ia sesuai digunakan untuk pelbagai sistem operasi yang lain seperti Linux, Unix dan lain-lain lagi. Paparan video juga turut menggunakan JAVA dan JAVA MEDIA FRAMEWORK (JMF).

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Chapter 1

INTRODUCTION

1.1 Background

Wireless surveillance system is a type of security system that is available in the market today; it has been one of the main systems for security purposes.

Nowadays, many manufacturers of these devices have their own version of wireless surveillance system that features many special functions and application.

At the same time, there are many new inventions for such surveillance system but it does not have much improvement. Most of the surveillance cameras that are available are limited. They are positioned on the wall and can only be moved left or right and up or down direction. Remote Surveillance System (ReSS) has a camera that can move in the right and left direction and the system can be moved to any direction within the network coverage. This will give more view to the secured and critical area such as in a small tunnel. The application of wireless technology gives an advantage to the system as it can be controlled anywhere as long as the network connection is available. The system can be controlled by one main client. The camera mount on the tank will capture the image. The image will be displayed on the control panel developed by using JAVA which is on the client side.

Remote Surveillance System is a system that is low in cost and reliable. It is developed by using JAVA 1.5.0 (J2SE 5.0), JAVA HTTP Socket, JAVA Media Framework and JAVA I/O programming. A working prototype of Remote Surveillance System was developed and is it suitable to be used on flat surface such as inside a building or factory.

1.2 Objectives of the Project

The objective of this project is to develop and improve a surveillance system that is available in the market today. Most of the surveillance system nowadays is fixed on the wall and non-moveable, which means the range of view is limited. Remote Surveillance System (ReSS) is different from other surveillance camera. With a camera which can move left and right mounted on a tank give more advantages to the system where the system is moveable and the range of view is greater than the ordinary system. The system is connected via the wireless fidelity technology. The function of ReSS is for monitoring purpose on a flat surface especially a building or in a factory.

Remote Surveillance System enhanced the surveillance system available. The moveable and easy to control features makes this product ideal for monitoring purpose in a building or in a factory. The user-friendly control panel makes the system easy to use.

1.3 Scope of the Project

i) Mobile Unit Traveling distance

- The mobile unit traveling distance depends on the Radio Frequency control system. As in this case it is 27MHz UHF RF Control System. The mobile unit cannot cover a whole premise or building because the signal from the transmitter is not powerful.

ii) Wireless Camera Capability

- The Wireless IP Camera image transfer is limited to only 10m - 15m maximum. This is due to the fact that it uses Ad-Hoc connection. The mobile unit traveling distance is furthermore reduced further without the image. It is impossible for the user to navigate the mobile unit without the image.
- The main weakness of the camera is that it can only support Ad-Hoc connection for a fully wireless connection. The camera cannot support access point usage. It cannot choose access point in wireless mode.

1.4 Organization of Chapters

The remainder of the chapters is organized as follows:

Chapter 2 will focus on the literature review. This chapter provides a background of previous project or researches conducted on Close Circuit Surveillance System (CCTV).

Chapter 3 discusses the research methodology used for this study. It describes the hardware and software requirement, project working principle, project features, and safety features.

Chapter 4 describes the results from the development of the ReSS. This chapter includes an analysis based on the failure result. All the circuit diagram, movement of mobile unit, control unit GUI and system block diagram were included in this chapter.

Chapter 5 gives a general conclusion of the results. The limitations of the project were highlighted so that it may provide guidance for those who are interested to proceed with this project in the future. Suggestions for future research are also included.

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